

TAXONOMICAL NOTES ON *TELIPOGON FALCATUS* WITH COMMENTS ON *HOFMEISTERELLA* (ORCHIDACEAE: ONCIDIINAE)

CARLOS MARTEL^{1,2} AND DELSY TRUJILLO³

Abstract. The transfer of *Telipogon falcatus* to *Hofmeisterella* is here challenged and *Hofmeisterella falcata* is relegated to the synonymy of *Telipogon falcatus*. Additional features to distinguish the species and comments about the type material are also provided. The recently described *Hofmeisterella biglobulosa* is discussed and referred to *Hofmeisterella eumicroscopica*.

Resumen. Aquí se cuestiona la transferencia de *Telipogon falcatus* a *Hofmeisterella* y se relega formalmente *Hofmeisterella falcata* a la sinonimia de *Telipogon falcatus*. Además se señalan características adicionales para distinguir a la especie y se dan comentarios acerca del material tipo. La recientemente descrita *Hofmeisterella biglobulosa* es discutida y propuesta como sinónimo de *Hofmeisterella eumicroscopica*.

Keywords: *Telipogon*, *Hofmeisterella*, Colombia, types, synonym

There are currently three recognized genera in the *Telipogon* Kunth alliance: *Hofmeisterella* Rchb.f., *Telipogon*, and *Trichoceros* Kunth.

Hofmeisterella was first described as *Hofmeistera* Rchb.f. (Reichenbach f., 1852a), although the author soon after proposed a new name, *Hofmeisterella*, because a variant of the name (*Hofmeisteria* Walp.) had already been used for a genus in Asteraceae (Toscano de Brito, 2001; Repasky and Christenson, 2010). The genus was described using *Hofmeisterella eumicroscopica* Rchb.f. as the type species (Reichenbach f., 1852b) and it was thought to include a single species for 157 years. Nevertheless, Nauray and Galán (2009) proposed a second species to this genus, *Hofmeisterella falcata* (Linden & Rchb.f.) Nauray & A.Galán, formerly described as *Telipogon falcatus* Linden & Rchb.f. (Reichenbach f., 1854). Nauray and Galán study was based on the revision of the type specimen (*L. Schlim 1192*, W [Reichenbach 30508]) consisting of an incomplete

pressed plant (part of an inflorescence and a leaf) with two drawings, plus a sheet with drawings (W [Reichenbach 30500]) and two photographs (*K. Senghas s.n.*, RENZ [photos 601819 and 601820]). This proposal was accepted by several plant name compilers and orchid checklists (e.g., KEW Orchid World checklist and W³TROPICOS).

A careful revision of the herbarium specimens of *T. falcatus* housed at W, as part of a current study in the *Telipogon* alliance, indicates that the combination proposed by Nauray and Galán (2009) is the result of misinterpreting the limits of both *Hofmeisterella* and *Telipogon*: these two genera share some common features but clearly differ in their floral morphology and vegetative structure. Kolanowska et al. (2014) already enumerated differences between *Telipogon* and *Hofmeisterella* and indicated why *T. falcatus* should be kept in *Telipogon*. Here we point out additional features of *T. falcatus* and propose formally *H. falcata* as its nomenclatural synonym. Comments on *Hofmeisterella* are also provided.

ON THE IDENTITY OF *TELIPOGON FALCATUS*

Vegetative features

Species of *Telipogon* can be divided into two groups according to habit: (a) those with an elongated stem, leafy throughout, and the sheath not articulated with the leaf blade, such as *Telipogon boissierianus* Rchb.f., *Telipogon bowmanii* Rchb.f., *Telipogon machupicchuensis* Nauray & Christenson, etc; and (b) those with a short compressed stem, leafy at the base, and the sheath articulated with the leaf blade, such as *Telipogon antisuyuensis* Nauray & A.Galán, *Telipogon ariasii* Dodson & D.E.Benn, *Telipogon peruvianus* T.Hashim. and the species formerly placed in *Stellilabium* Schltr.

Plants of *Telipogon falcatus* show the second kind of habit; plants of *Hofmeisterella* do develop a short compressed

stem, but the leaves are disposed in the fashion of a fan and have no articulation between the sheath and the blade.

Plants of *Telipogon* species bear bifacial (conduplicate) leaves, but those of *Hofmeisterella* unifacial (laterally flattened) leaves. Although unifacial leaves have evolved independently in the diverse orchid group, those found in *Hofmeisterella* are unique in the *Telipogon* alliance (Toscano de Brito, 2001). Nauray and Galán (2009) based their hypothesis that *T. falcatus* was a species of *Hofmeisterella* by comparing leaf morphology. They claimed that the leaves of *T. falcatus* and *H. eumicroscopica* are ensiform, equitant and organized fan-like. Notwithstanding, an examination of a single leaf blade of *T. falcatus* from *Schlim 1192* (Reichenbach 30508, W) shows that it is indeed ensiform-

We thank Günter Gerlach (M) for kindly providing a flower of *Telipogon falcatus*, Ministerio de Agricultura y Riego of Peru and its Servicio Nacional Forestal y de Fauna Silvestre (SERFOR) for issuing the collection permit under which orchid specimens for this study were collected (N° 0282-2014-MINAGRI-DGFFS-DGEFFS), and the staff of Wayqecha Biological Station for helping and providing facilities for our research. The German Academic Exchange Service (DAAD) supports the senior author's doctorate studies at Ulm University.

¹ Institute of Evolutionary Ecology and Conservation Genomics, Ulm University, Helmholtzstr. 10-1 (Containerstadt), Ulm 89081, Germany; carlos.martel-gora@uni-ulm.de

² Author for correspondence

³ Herbario San Marcos (USM), Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Av. Arenales 1256, Jesús María, Lima 11, Perú.

lanceolate and bifacial as in *Telipogon* species. Further, leaves of *T. falcatus* are not organized fan-like. The plant (and leaves) illustration shown in the sheet *Reichenbach 30500* (W), also cited as *T. falcatus* by Nauray and Galán (2009), represents a different *Telipogon* species (as it is discussed below).

Floral features

Nauray and Galán (2009) placed *T. falcatus* in *Hofmeisterella* because of its triangular-lanceolate, heart-shaped labellum. Nonetheless, this labellum shape also occurs in other *Telipogon* species, e.g., *Telipogon portillae* Christenson, *Telipogon tungurahuae* Dodson & R. Escobar, and in several miniature *Telipogon* species such as *Telipogon selbyanus* N.H. Williams & Dressler and *Telipogon pseudobulbosus* (D.E. Benn. & Christenson) N.H. Williams & Dressler. An ancipital peduncle was indicated to occur in *T. falcatus* and *H. eumicroscopica* (Nauray and Galán, 2009); however, *T. falcatus* presents a triquetrous peduncle as many species of *Telipogon* s.str. Therefore, referring *T. falcatus* to *Hofmeisterella* is not supported by the evidence presented by Nauray and Galán (2009), i.e., the shape of the labellum and the form of the peduncle.

The main characters that distinguish species in *Telipogon* are those associated with the column and callus (Dodson and Escobar, 1987); these characters were overlooked by Nauray and Galán (2009). For instance, flowers of *Telipogon* bear an abbreviated subquadrate column (with projections in some species), a rounded to subquadrate stigmatic area, an erect rostellum, a dorsal anther, and a hook-like viscidium, whereas flowers of *Hofmeisterella* present a bialate excavated column, a triangular stigmatic area, a deflexed rostellum, a terminal anther, and a spatulate flat viscidium (Reichenbach f., 1858; Schweinfurth, 1961; Dunsterville and Garay, 1965; Foldats, 1970; Vásquez and Dodson, 1982; Dodson and Dodson, 1984; Dodson and Bennett, 1989; Toscano de Brito, 2001). *Telipogon falcatus* presents, indeed, all the characters that define *Telipogon* species (Fig. 1).

Molecular evidence

Hofmeisterella was shown to form a monophyletic group in two molecular studies (Williams et al., 2005; Neubig et al., 2012), although its relative position in the *Telipogon* alliance was not determined only recently.

Telipogon is sister to *Trichoceros* and *Hofmeisterella* is sister of these two (Neubig et al., 2012). One specimen of *T. falcatus* (Escobar 3353, FLAS) was used for a molecular systematic study by Williams et al. (2005); results of this study show that *T. falcatus* is imbedded in a *Telipogon* subclade with strong support, and *H. eumicroscopica* forming another cohesive subclade.

Hofmeisterella eumicroscopica has been recorded from Venezuela to Bolivia at elevations between 1,840 to 3,000 m (Dunsterville and Garay, 1965; Foldats, 1970; Ortiz, 1975; Dodson and Dodson, 1984; Dodson and Bennett, 1989; C. Martel, pers. obs.). The records show that the flowers display some variation in color, size and lip shape (Fig. 3, 4). The

Unfortunately, we could not examine that specimen: it is no longer at FLAS (W. M. Whitten, pers. comm.).

Nomenclatural notes

Calaway H. Dodson annotated *L. Schlim 1192* (*Reichenbach 30508*, W) as the lectotype of *Telipogon falcatus* Linden & Rchb.f. in 1991, but he never formally designated it. Reichenbach f. (1854) in the original publication of *T. falcatus*—as part of his *Orchideae Schlimianae*—cited [Schlim] “1192” after the species description. Additionally, later publications of Reichenbach f. (1861) and Kränzlin (1919) indicated “*Schlim Nr 1192*” as the holotype of *T. falcatus*. We here assume that the holotype resides in the author’s herbarium, and that any attempt to propose a lectotype is superfluous.

Telipogon falcatus Linden & Rchb.f., *Bonplandia* 2: 280. 1854. TYPE: N^{LE} GRENADE [COLOMBIA]. Pamplona: La Baja, 9000 ft. [2728 m], [fl.] Januar 1846 à 1852, *L. Schlim 1192*, [*Reichenbach 30508*] (Holotype: W [*Reichenbach 0024998*]).

Synonym: *Hofmeisterella falcata* (Linden & Rchb.f.) Nauray & A. Galán, *Novon* 19: 389–390. 2009.

Additional specimens examined: COLOMBIA. Sep. 1974, *K. Senghas s.n.* (RENZ [photos 601819, 601820]); *G. Gerlach s.n.* (M-spirit); *J.J. Triana t. 512* (MAD, illustration [DIV. III A-512]).

Identity of drawings in the Reichenbach Herbarium

There is a herbarium sheet in the Reichenbach Herbarium with two drawings labeled “*T. falcatus*”: *Reichenbach 30500* (Fig. 2). It shows two species: the first one is a drawing (signed as “N°17”) showing two views of a flower (front and side view) that agrees with *T. falcatus*. The other drawing (signed as “N°18”) shows a whole flowering plant that does not seem to represent *T. falcatus* because the leaves are arranged fan-like, it bears up to four flowers open at the same time, the petals of which are long spatulate with a broad triangular acute apex, the labellum with no apparent ornamentation, and the sepals, petals and lip with red veins. Many flowered inflorescences are common in *Hofmeisterella*, but also in miniature *Telipogon* (the former *Stellilabium* species).

The plant illustrated probably is referable to a miniature *Telipogon*. It seems Friedrich Kränzlin agreed; he wrote on the herbarium label: “*Telipogon falcatus?*”, and he also pointed out on the same label that this habit might not be a *Telipogon* (see Fig. 2). Nonetheless, Kränzlin (1919) seemed to accept that this drawing represented a *T. falcatus*.

A more detailed drawing of habit of *T. falcatus* was elaborated by *J. J. Triana* (see Mutis, 2011).

COMMENTS ON *HOFMEISTERELLA*

color of the flowers varies from greenish yellow to lemon yellow with purple red to brownish red at the base of the segments (Fig. 4; Schweinfurth, 1961; Ortiz, 1975; Repasky and Christenson, 2010). The sepals and petals are 6.5–13.5 mm long and 0.5–0.8 mm wide; the lip is 8–14.4 mm long and 2.8–5.8 mm wide near the base (Schweinfurth, 1961;

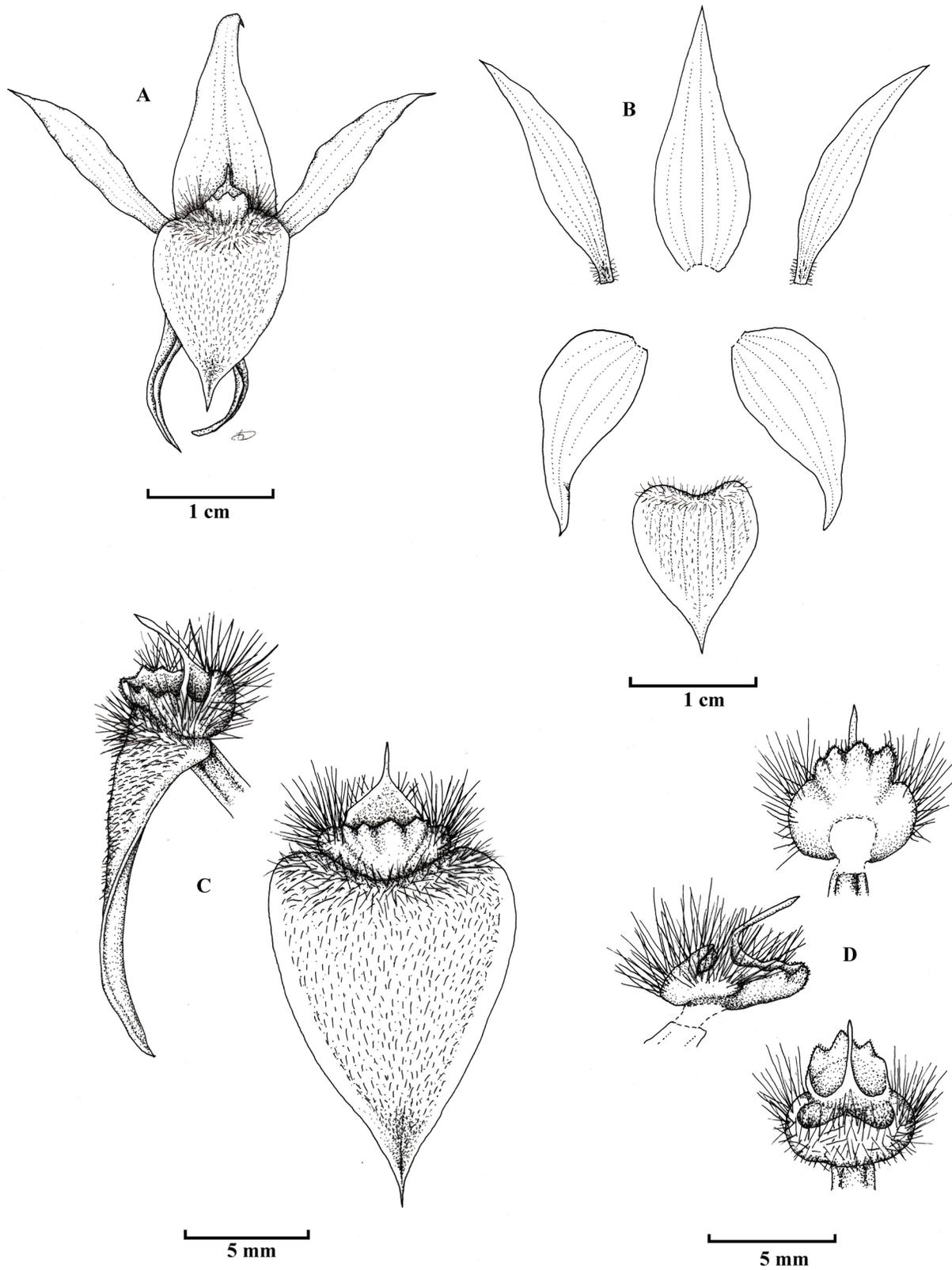


FIGURE 1. *Telipogon falcatus* Linden & Rehb. f. A, flower; B, dissected perianth; C, column and lip, frontal and lateral view; D, column, three views. Drawing by D. Trujillo from *G. Gerlach s.n.* (M-spirit).



FIGURE 2. Single herbarium sheet at W-R (Reichenbach 30500) bearing illustrations of *Telipogon* species. *Telipogon falcatus* Linden & Rehb.f. (top drawings) and *Telipogon* sp. (bottom drawings). © Naturhistorisches Museum Wien, reproduced with permission.

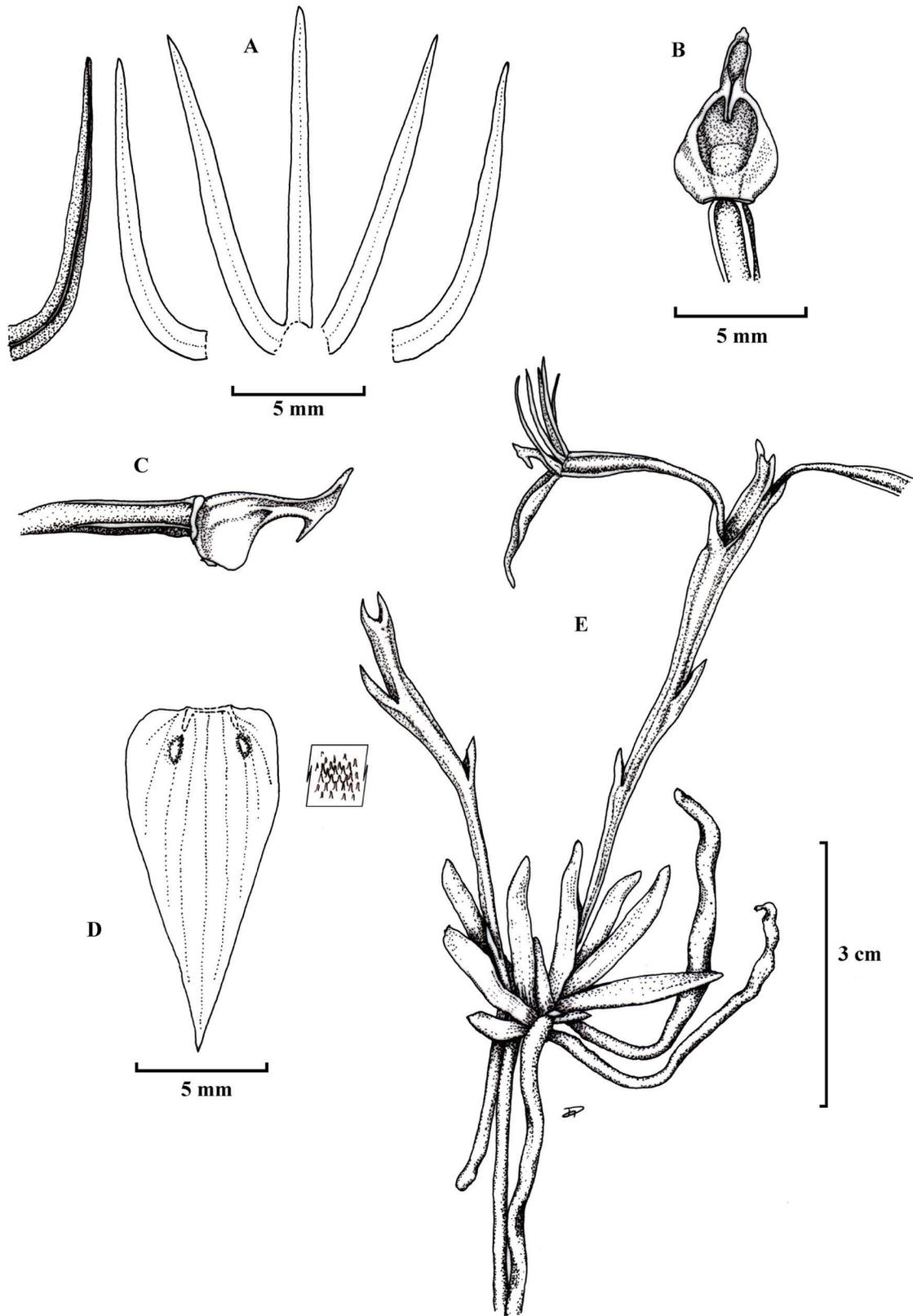


FIGURE 3. *Hofmeisterella eumicroscopica* Rchb.f. **A**, dissected perianth; **B**, column, frontal view; **C**, column, lateral view; **D**, lip; **E**, habit. Drawing by D. Trujillo from *Bennett 3583* (MOL-spirit).

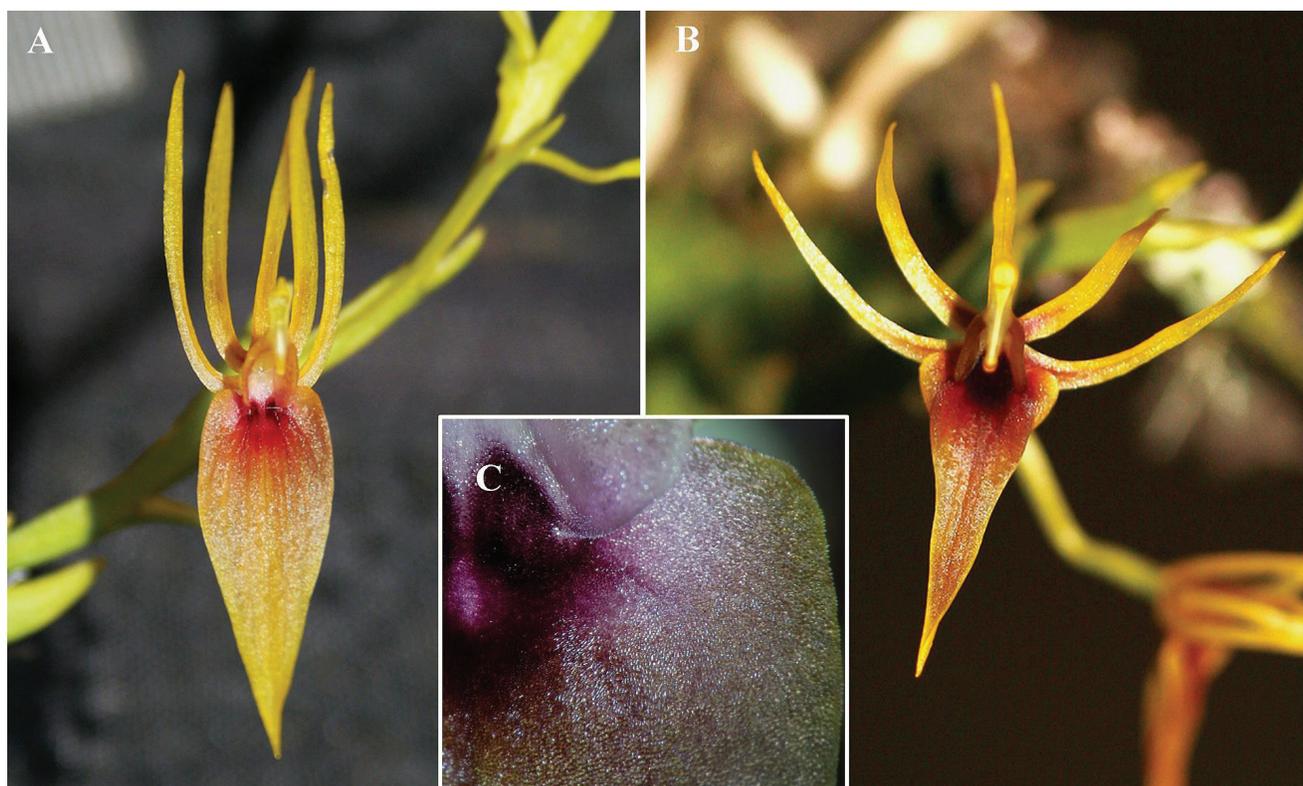


FIGURE 4. Flower variation in *Hofmeisterella eumicroscopica* Rchb.f. **A**, *C. Martel 56* (USM); **B**, *C. Martel 57* (USM); **C**, lip close-up of *C. Martel 57* (USM). Photographs by C. Martel.

Foldats, 1970). The lip is triangular to triangular lanceolate, sessile, cordate or subcordate at the base (Schweinfurth, 1961); the inner surface is densely and shortly pilose (Fig. 4C). At the point where the labellum is attached to the column, the lamina is slightly concave and has a pair of small projections (Fig. 3, 4; see also pictures in Ortiz, 1975; Dodson, 2001; Zelenko and Bermúdez, 2009; Repasky and Christenson, 2010); these projections are inconspicuous in some individuals.

Kolanowska et al. (2014) recently described *Hofmeisterella biglobulosa* Kolan., Szlach. & Medina Tr., from Colombia. They proposed this tentative new species based on two features: two globular projections and a puberulent pad on the base lip. However, these two features are not unique in the proposed new taxon because they are present in other individuals of *H. eumicroscopica*. The whole inner surface of the lip has short and dense hairs; not only on the base as was described by Kolanowska et al. (as a puberulent pad) (Fig. 4C). Furthermore, the presence of these two distinctive features while having the same whole floral morphology may not be enough to consider it as a new species: small changes in floral morphology may not be related to floral isolation in a taxon that could be auto-pollinated (Toscano de Brito,

2001; C. Martel, pers. obs.). We therefore refer this recently described taxon to the synonymy of *H. eumicroscopica*.

We hypothesize that molecular studies will greatly increase our understanding of *H. eumicroscopica*.

Hofmeisterella eumicroscopica Rchb.f., Ann. Bot. Syst. (Walpers) 3: 563. 1852. TYPE: [ECUADOR.] Loja [Loja]: 9000 ft. [2728 m], *Warszewicz s.n.* [H. Reichenbach-31005] (holotype: W-R [0025004]).

Synonym: *Hofmeisterella biglobulosa* Kolan., Szlach. & Medina Tr., Ann. Bot. Fennici 51: 209-210. 2014.
Syn. nov. TYPE: COLOMBIA. Dept. Putumayo, Sibundoy Valley, parte baja de la Vereda de la Cumbre, 2,200 m, 24 April 2013, *R. Medina 914* (Holotype: HPUJ [not seen]).

Additional specimens examined: PERU. Cusco, La Convención, collected by L. Moore and Darbe McSorley, without specific locality along road from Cuzco to Quillabamba, March 1986, *Bennett 3583* (MOL-spirit). Cusco, Paucartambo, Wayqecha Biological Station, 2,836 m a.s.l., 27 Mar 2015. *C. Martel 56* (USM); Wayqecha Biological Station, 3,005 m a.s.l., 29 March 2015. *C. Martel 57* (USM).

LITERATURE CITED

- DODSON, C. H. 2001. *Native Ecuadorian Orchids*. Vol. 2: *Dresslerella-Lepanthes*. Dodson Trust, Sarasota.
- AND D. E. BENNETT JR. 1989. *Hofmeisterella eumicroscopica*. *Icon. Pl. Trop.* ser. 2: t. 77.
- AND P. M. DODSON. 1984. *Hofmeisterella eumicroscopica*. *Icon. Pl. Trop.* fasc. 10: t. 925.
- AND R. ESCOBAR. 1987. The *Telipogons* of Costa Rica (I). *Orquideología* 17: 1–69.
- DUNSTERVILLE, G. C. K. AND L. A. GARAY. 1965. *Venezuelan Orchids Illustrated* 3. Andre Deutsch Ltd., London.
- FOLDATS, E. 1970. Orchidaceae. In T. LASSER, ED. *Flora de Venezuela 15, part 5*. Edición Especial del Instituto Botánico, Caracas.
- KOLANOWSKA, M., D. L. SZLACHETKO, AND R. MEDINA TREJO. 2014. Notes on the genus *Hofmeisterella* (Orchidaceae), with the description of a new species from Colombia. *Ann. Bot. Fenn.* 51: 207–211.
- KRÄNZLIN, F. W. L. 1919. Beiträge zur Kenntnis der Gattung *Telipogon* H.B.K. *Ann. Naturhist. Mus. Wien* 33: 9–38.
- MUTIS, J. C. 2011. Digitalization project of the drawings of the Royal Botanical Expedition to the New Kingdom of Granada (1783–1816) directed by José Celestino Mutis. Real Jardín Botánico-CSIC, www.rjb.csic.es/icones/mutis (accessed March 22, 2015, 20:30 GMT).
- NAURAY, W. AND A. GALÁN. 2009. Una nueva combinación en *Hofmeisterella* (Orchidaceae) para la flora de Colombia. *Novon* 19: 388–390.
- NEUBIG, K. M., W. M. WHITTEN, N. H. WILLIAMS, M. A. BLANCO, L. ENDARA, J. G. BURLEIGH, K. SILVERA, J. C. CUSHMAN, AND M. W. CHASE. 2012. Generic recircumscriptions of Oncidiinae (Orchidaceae: Cymbidieae) based on maximum likelihood analysis of combined DNA datasets. *Bot. J. Linn. Soc.* 168: 117–146.
- ORTIZ, P. 1975. *Hofmeisterella*, a lovely Andean genus. *Orquideología* 10: 228–236.
- REICHENBACH, H. G. 1852a. *De pollinis Orchidearum: generi ac structura et de Orchideis in artem ac systema redigendis*. Thesis, Leipzig.
- . 1852b. Orchidaceae. *Ann. Bot. Syst.* 3: 516–603.
- . 1854. Orchideae Schlimianae. *Bonplandia* 2: 277–284.
- . 1858. *Xenia Orchidacea. Beiträge zur Kenntniss der Orchideen*. Erster Band. F.A. Brockhaus, Leipzig.
- . 1861. *Telipogon*. *Ann. Bot. Syst.* 6: 861–863.
- REPASKY, R. AND E. A. CHRISTENSON. 2010. Orchids of Peru: *Hofmeisterella eumicroscopica*. *Orchid Rev.* 118: 154–155.
- SCHWEINFURTH, C. 1961. Orchids of Peru. *Fieldiana, Bot.* 30: 787–1026.
- TOSCANO DE BRITO, A. L. V. 2001. Systematic review of the *Ornithocephalus* group (Oncidinae: Orchidaceae) with comments on *Hofmeisterella*. *Lindleyana* 16: 157–217.
- VÁSQUEZ, R. AND C. H. DODSON. 1982. *Hofmeisterella eumicroscopica*. *Icon. Pl. Trop.* fasc. 6. t. 535.
- WILLIAMS, N. H., W. M. WHITTEN, AND R. L. DRESSLER. 2005. Molecular systematics of *Telipogon* (Orchidaceae: Oncidiinae) and its allies: nuclear and plastid DNA sequence data. *Lankesteriana* 5: 163–184.
- ZELENKO, H. AND P. BERMÚDEZ. 2009. *Orchids: Species of Peru*. Zai Publications, Quito.