

Notes on the genus *Fronitaria* (Orchidaceae) with description of new species

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Abstract: The specific diversity of Neotropical orchid genus *Fronitaria* is evaluated based on morphological data. *Fronitaria* was considered a monospecific taxon for years; however, our recent studies on Andean orchids indicated that it is actually much more variable. Within Colombian material, we found a species which does not fit the morphological description of *F. caulescens* and described it here as a new species named *F. colombiana*. The novelty is characterized by inflorescence being three times as long as the ramicaul, the tridentate leaf apex with middle tooth as long as lateral ones, papillate apices of sepals, and oblong-ligulate lip middle lobe which is papillate along margins and in the apical part. The taxonomic status of *P. graminea* was evaluated, and based on the gathered data; this species should be considered separate from *F. caulescens* as well. The comparative morphology of all three *Fronitaria* species is provided. Additionally, *Octomeria tenuis* is lectotypified.

Key words: Biodiversity, Orchidaceae, Pleurothallidinae, taxonomy

1. Introduction

The last 30 years were crucial for understanding the taxonomy and diversity of the orchid subtribe Pleurothallidinae. At the end of the 18th century, less than 40 species representing this group were known, and most of them were classified in *Epidendrum* L. (today this genus is included in the subtribe Laeliinae). By 1975, about 1650 accepted Pleurothallidinae species were known (e.g., Lindley, 1859; Barbosa Rodrigues, 1877, 1882; Kuntze, 1891; Cogniaux, 1896; Hoehne, 1929; Ames 1930, 1934; Schweinfurth, 1959; Karremans and Davin, 2017). About 4000 pleurothallid orchids were recognized initially by Luer (1986) while in a recent study, Karremans (2016) recognized more than 5100 of these plants. While the number and composition of the accepted Pleurothallidinae genera varied significantly during the years, the separateness of monospecific *Fronitaria* Luer was not questioned since the description of this taxon.

This genus was proposed in late 20th century (Luer, 1986) to classify a single Pleurothallidinae representative, *Pleurothallis caulescens* Lindl. The name of this species was derived from Latin *caulescens* meaning “becoming stemlike” and it was given in reference to its unique characteristic. Unlike the other subtribe members, ramicaul of *F. caulescens* is encloded by several leaflike sheaths. The type specimen of *P. caulescens* was collected in Ecuador

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by Jameson (Lindley, 1834). Before the establishment of *Fronitaria*, Lindley (1859) classified *P. caulescens* within the section *Caulescentes* Lindl. of *Pleurothallis* R.Br., while Kuntze (1891) placed it in *Humboldtia* Ruiz & Pav. The latter genus was rejected in favor of *Humboldtia* M.Vahl (Fabaceae) and currently most of its representatives are included in various pleurothallid genera, e.g. *Acianthera* Scheidw., *Anathallis* Barb. Rodr., *Pleurothallis*, and *Stelis* Sw.

Representatives of *Fronitaria* are epiphytic, caespitose plants. The ramicaul is terminated by a single leaf with an abscission layer and it is concealed by imbricating, distichous leaf sheaths, which are usually smaller than the leaf. Their resupinate (rarely nonresupinate) flowers are arranged in a racemose, many-flowered inflorescence which arises from the apex of the ramicaul. The sepals are narrowly ovate, acute to acuminate, lateral sepals are basally connate. The petals are elliptic-ovate, oblique, acute or obtuse. The lip is 3-lobed above the middle. The short, erect, wingless, gynostemium is more or less clavate, with the column part longer than the anther. The column foot is as long as the gynostemium, gently upcurved. The base of an incumbent, motile anther is located above the stigma base. Two pollinia without distinct caudicles are produced. The apical clinandrium is obscure. The ventral stigma is relatively small, transversely elliptical, and deeply concave.

The ligulate rostellum is immotile and the single viscidium is produced at the top of the rostellum (Szlachetko and Margońska, 2002).

The geographic range of *Fronдаря* extends from Colombia to Bolivia (Luer, 1986). The plants grow usually in humid and wet montane and cloud forests at the altitudes of 2500–3000 m, but some populations were reported also from lower areas of 1550 m (e.g., Kessler & al. 13182, LPB).

Fronдаря was considered a monospecific taxon for years; however, our recent studies on Andean orchids indicated that it is actually much more variable. We found a species which does not fit the morphological description of *F. caulescens* and it is described here as new. The taxonomic status of *Pleurothallis graminea* Schltr. was evaluated, and based on the gathered data, this species should be considered separate from *F. caulescens* as well. Moreover, the examination of the type specimen of the latter species indicated that the illustration presented by Luer (1986; plate 10), actually refers to other undescribed species; however, since the author did not provide information about the specimen based on which the drawing was prepared; we cannot evaluate its status. Undoubtedly, the figure presented in *Icones Pleurothallidarum I* shows orchid with minutely denticulate petals, obliquely ovate lip lateral lobes, and somewhat 3-lobulate lip middle lobe with semicircular lateral lobules and subrectangular, retuse lip middle lobe. Neither of these characters is observed in any known *Fronдаря* representatives.

2. Materials and methods

Dried herbarium specimens were examined according to the standard procedures. Each studied sheet was photographed and the data from the labels were taken. Both vegetative and generative characters of every plant were studied. The length of ramicaul and presence of sheaths/leaves were examined first. Then, the construction of the inflorescence and the shape and size of the floral bracts were studied. The morphology of the flower was examined after it was softened in boiling water. The surface of each floral element was studied under a stereomicroscope.

3. Results and discussion

Taxonomy

In 1921, Schlechter described a new species of *Pleurothallis* from Peru, named *P. graminea*, which was recognized by Luer (1986) as conspecific with *Fronдаря caulescens*. However, examination of the type specimen of the latter with the illustration provided by Schlechter (Figure 1) indicated that these plants are distinguished enough to recognize them as separate species.

Fronдаря graminea (Schltr.) Szlach., Kolan. & Rykaczewski, **comb. nov.** (Figure 1)

Basionym: *≡Pleurothallis graminea* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9: 74. 1921. Type: PERU. Cuzco. Auf Zweigen im Schatten dichter Gebüsche bei Sandia, alt. 2600–2800 m. April 1902. A. Weberbauer 758 (probably B†).

Notes: This species differs from *F. caulescens* (Figure 2) by the obtuse leaf apex, lateral sepals being connate for about 1/3–1/2 of their length (vs shortly connate up to 1/4–1/5) and the lip middle lobe being widest above the middle (vs widest near the base).

Fronдаря colombiana Szlach., Kolan. & Rykaczewski, **sp. nov.** (Figure 3)

Type: COLOMBIA. Dept. of Caldas “Pinares” above Salento, alt. 2600–2800 m. 2–10 August 1922. F. W. Pennell 9270 (AMES!, holotype; UGDA! – drawing).

Etymology: In reference to the country of origin of the type specimens.

Diagnosis: Species distinguished from other *Fronдаря* representatives by having inflorescence three times as long as the ramicaul, the tridentate leaf apex with middle tooth as long as lateral ones, papillate apices of sepals, and oblong–ligulate lip middle lobe which is papillate along margins and in the apical part.

Plant small, caespitose. Roots slender. Ramicauls up to 1.5 cm long, erect, stout, covered by expanded basal parts of the leaves. Leaves 20–25 mm long, 3–5 mm wide, oblong–elliptic to elliptic, margins slightly revolute, apex tridentate. Inflorescence 4.5–8 cm long, subdensely many-flowered, at least three times longer than the ramicaul. Floral bract 2–2.5 mm long, glabrous. Pedicel 1 mm. Dorsal sepal 5 mm long, 1.7 mm wide, narrowly ovate, subacute, apically thickened and papillate outside, 1-veined. Lateral sepals connate basally for about 1 mm, 4.8 mm long, 1 mm wide, obliquely lanceolate, subobtuse, apically thickened and papillate outside, 1-veined. Petals 2 mm long, 0.9 mm wide, oblong–obovate, obtuse, 1-veined. Lip 1.8 mm long, 0.9 mm wide, 3-lobed, sessile; lateral lobes 0.8 mm wide, 0.3 mm long, oblong–triangular, obtuse; middle lobe about 1 mm long and 0.9 mm wide, oblong–ligulate, papillate in apical third and along margins, apex rounded; disc 1-veined. Gynostemium typical for the genus.

Distribution and habitat: So far known exclusively from Colombian Central Cordillera of the Andes, where it grows epiphytically in the forest at the altitude of about 2600–2800 m.

Taxonomic notes: This species differs from two other *Fronдаря* representatives by having tridentate leaf apex with middle tooth being as long as lateral ones, inflorescence at least 3 times as long as the ramicaul, apically papillate sepals and the lip with oblong–triangular lateral lobes, oblong–ligulate middle lobe which is papillate in the apical third and along margins above lateral lobes (Table).

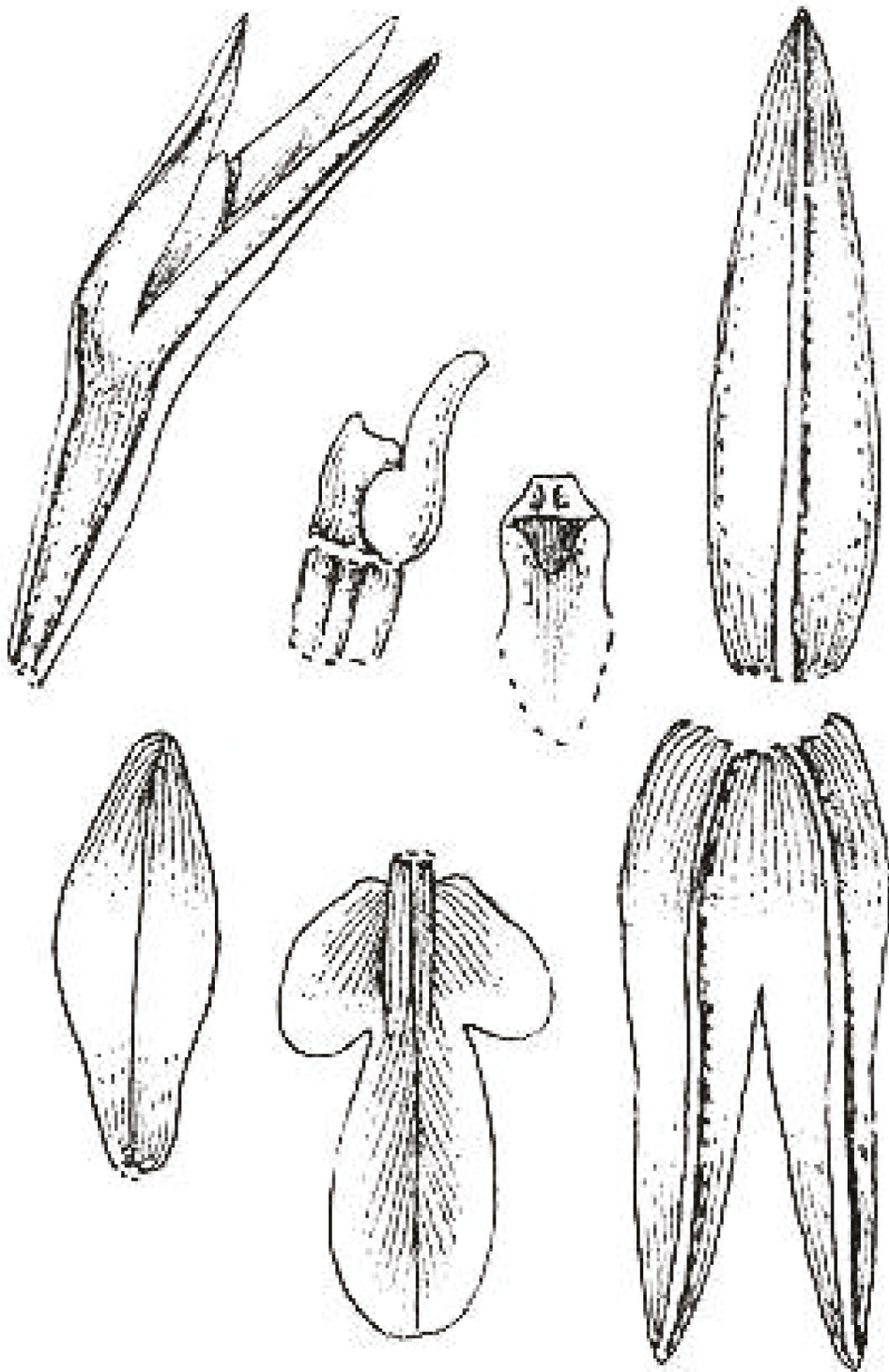


Figure 1. *Frondaria graminea*—Schlechter's original illustration.

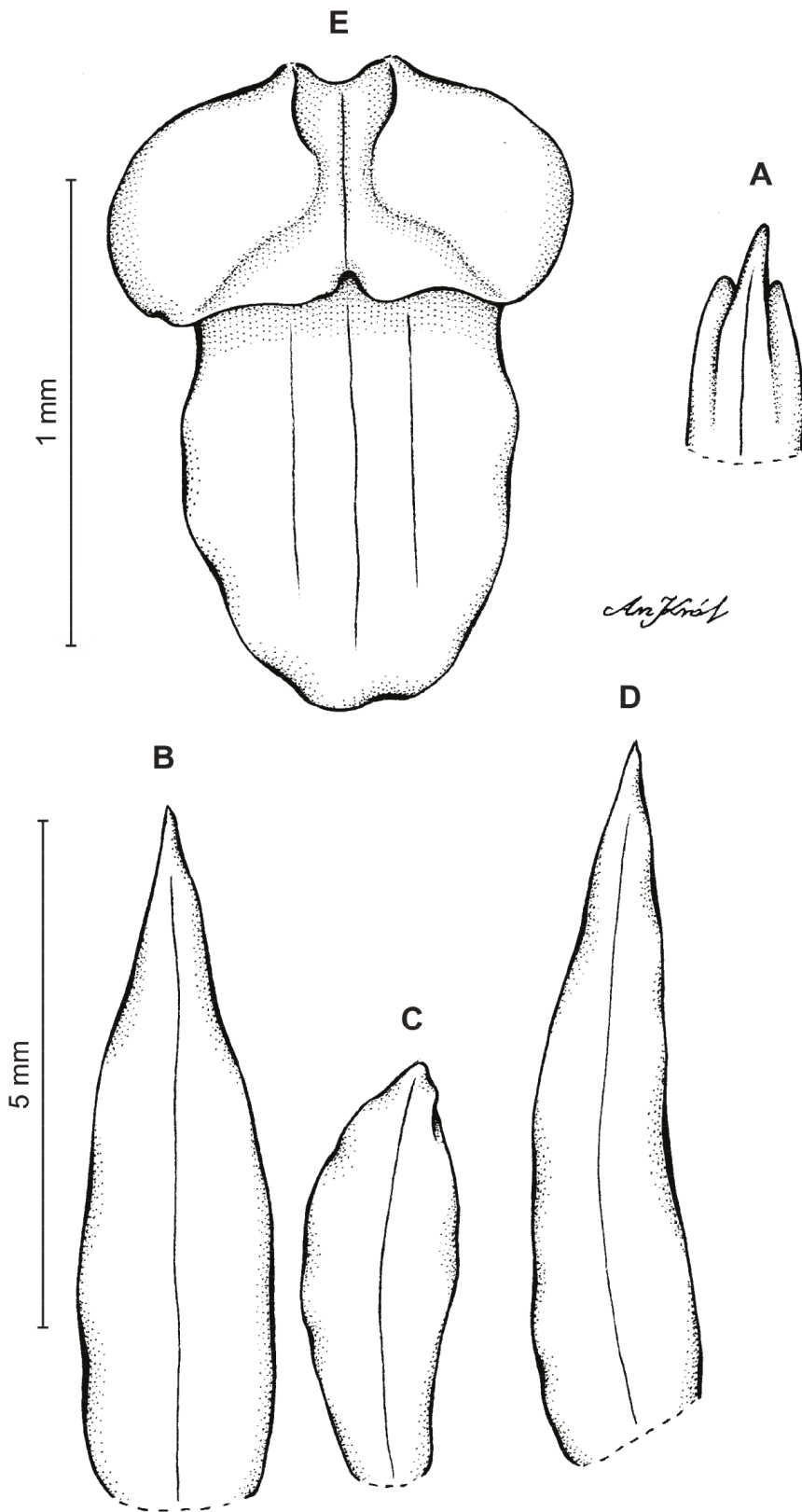


Figure 2. *Frondaria caulescens*. A: leaf apex, B: dorsal sepal, C: petal, D: lateral sepal, E: lip. Drawn by A. Król from the isotype (W).

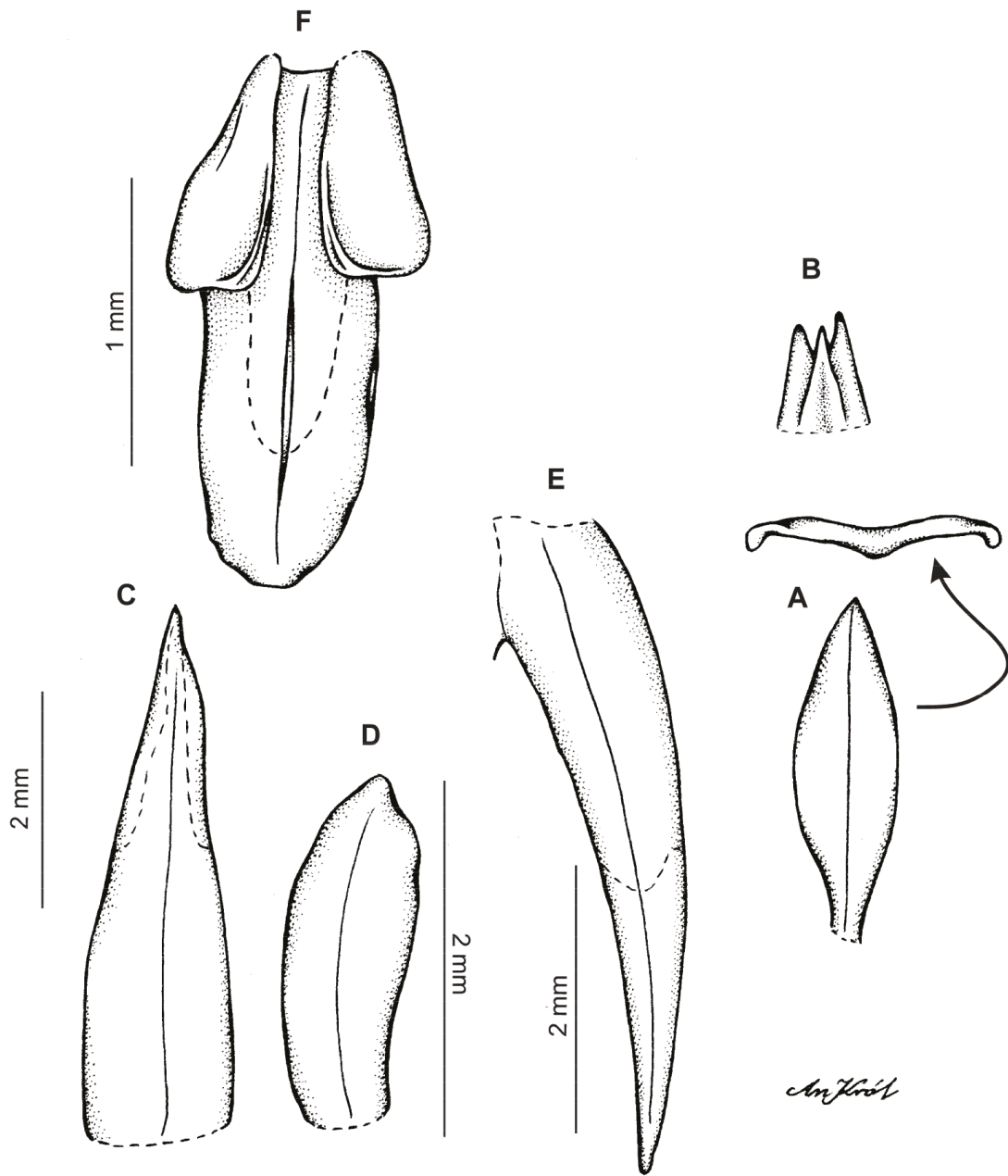


Figure 3. *Frondaria colombiana*. A: leaf, B: leaf apex, C: dorsal sepal, D: petal, E: lateral sepal, F: lip. Drawn by A. Król from the holotype.

Table. Comparative morphology of *Fronitaria colombiana*, *F. graminea*, and *F. caulescens*.

Character	<i>F. colombiana</i>	<i>F. graminea</i>	<i>F. caulescens</i>
Leaf apex	Tridentate, the middle tooth not longer than lateral ones	Obtuse, no data on apical leaf part	Tridentate, the middle tooth longer than lateral ones
Inflorescence	At least 3 times as long as the ramicaul	Up to twice as long as the ramicaul	Slightly longer or subequal in length to the ramicaul
Dorsal sepal	5 mm long, narrowly ovate, subacute, papillate in apical part	4.5 mm long, narrowly ovate, obtuse, glabrous	7 mm long, lanceolate to linear-lanceolate, obtuse or acute, glabrous
Lateral sepals	Connate in the basal 1/5, long, papillate in apical part	Connate in basal 1/3–1/2, glabrous	Connate in basal part, not more than for 1/4–1/5, glabrous
Petals	2 mm long, obliquely oblong-ovate, obtuse,	2.7 mm long, oblong-elliptic, obtuse,	4.3 mm long, obliquely oblanceolate, subacute,
Lip	1.8 mm long; lateral lobes oblong-triangular, obtuse; middle lobe oblong-ligulate, about equally wide along its length, rounded; disc 1-veined, papillate in apical third and along margins above lateral lobes	1.5 mm long; lateral lobes semiorbicular, obtuse; middle lobe oblong-ovate, widest in the apical third, obtuse; disc 1-veined, glabrous	1.3 mm long, lateral lobes semiovalate, rounded; middle lobe ovate, widest near the base, apex slightly retuse to rounded, disc 1-veined, glabrous

Additionally, the novelty differs from *F. caulescens* in having oblong-ligulate, rounded lip middle lobe (vs ovate), and oblong-triangular lip lateral lobes (vs semiovalate). From *F. graminea* the new species can be distinguished based on shortly connate lateral sepals (vs connate in basal 1/3–1/2), obliquely oblong-ovate petals (vs oblong-elliptic), oblong-ligulate lip middle lobe (vs oblong-ovate), and oblong-triangular lip lateral lobes (vs semiorbicular).

Key to identification of *Fronitaria* species:

- 1 Inflorescence up to twice as long as the ramicaul, lateral sepals glabrous 2
 – Inflorescence at least 3 times as long as the ramicaul, lateral sepals papillate in apical part *F. colombiana*
 2 Lateral sepals connate in basal 1/3–1/2, lip middle lobe oblong-ovate, widest in the apical third, apex obtuse
 *F. graminea*
 – Lateral sepals connate not more than for 1/4–1/5 of their length, lip middle lobe ovate, widest near the base, apex slightly retuse to rounded *F. caulescens*

Lectotypification of *Octomeria tenuis*

Octomeria tenuis Schltr., Repert. Spec. Nov. Regni Veg. 10: 455. 1912.

Type: BOLIVIA. On trees near Sanantonio, not far from Mapiri, 850 m. *Buchtien 1269* (Lectotype: E!).

Original material of *Octomeria tenuis* was deposited in herbarium B in Berlin, and probably destroyed during World War II. In 2010, Luer designated the neotype to replace the destroyed holotype; however, we rediscovered the original collection of *Buchtien 1269* in E herbarium. In regard of the presence of the original collection, the neotype designated by Luer is superfluous.

Acknowledgments

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