

STUDIES IN *FERNANDEZIA* RUIZ & PAV. (ORCHIDACEAE: ONCIDIINAE)

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Abstract. Literature and herbarium studies of the Neotropical orchid genus *Fernandezia* Ruiz & Pav. reveal that a number of previously recognized taxa should be synonymized, while at the same time it is necessary to propose several new taxa (45 species and 11 varieties). *Fernandezia distichoides* (*Pachyphyllum distichum*) and *F. pectinata* are lectotypified, and *F. vaginata* is neotypified. An infrageneric subdivision is proposed for *Fernandezia*, in which six sections are recognized. Section *Capitata* is transferred from *Pachyphyllum*, *Orchidotypus* is reduced to sectional level (as it was in *Pachyphyllum*), and three new sections are proposed, namely, section *Breviconata*, section *Gracillima*, and section *Lamellata*.

Keywords: *Fernandezia*, new species, sections, synonymy, typification

The genus *Fernandezia* was proposed by Ruiz and Pavón (1794) to accommodate some monopodial orchids with an obtuse labellum. Their rather broad concept of the genus included species of *Dichaea* Lindl. and *Maxillaria* Ruiz & Pav. Unfortunately, while discussing an aberrant taxon that had an acute labellum, *F. laxa* Ruiz & Pav., they inadvertently validated it, and this entity (which is a species of *Dichaea* Lindl.) is the nomenclatural type of *Fernandezia*. Therefore, the choice of *F. subbiflora* Ruiz & Pav. (a name published in 1798 but illustrated in 1794) as lectotype by Dunsterville and Garay (1972) is superfluous. It will therefore be necessary to conserve the type of *Fernandezia* to continue its usage as currently interpreted. Of the eight species named in 1798, only *F. subbiflora* Ruiz & Pav. and *F. denticulata* Ruiz & Pav. belong to the current concept of the genus.

For a long time *Fernandezia* contained only a few (about 6 or 7), attractive, red to orange-flowered species, until Chase and Whitten (2011) merged *Pachyphyllum* Kunth (about 40 species) with it on the basis of molecular data. The justification for this merger was published by Neubig et al. (2012), and it showed that species of *Pachyphyllum* were interdigitated with those of *Fernandezia*. However, Kolanowska and Szlachetko (2014) preferred to recognize five separate genera, namely *Fernandezia* Ruiz & Pav., *Orchidotypus* Kraenzl., *Pachyphyllum* Kunth, *Raycadenco* Dodson, and a new genus *Valdiviesoa* Szlach. & Kolan. With the exception of *Raycadenco*, which seems best treated as a sister genus, I have followed Chase and Whitten's broad concept of *Fernandezia*.

I agree with the criticism of the molecular clade of Neubig et al. (2012) by Kolanowska and Szlachetko (2014), who pointed out that seven of the taxa sampled were unidentified. Another problem is that two of the names used (*F. hartwegii* [Rchb.f.] Garay & Dunsterv. and *F. tica* Mora-Retana & J.B. Garcia) are in my opinion (Ormerod 2016) respectively synonyms of *F. myrtillosa* (Rchb.f.) Garay & Dunsterv. and *F. sanguinea* (Lindl.) Garay & Dunsterv. These two latter entities were also quite often confused with each other in the

literature and herbarium. Furthermore, another name used, *F. cuencae* (Rchb.f.) M.W. Chase, has been misapplied in the herbarium to at least two different species; I have not seen modern material of it. It is evident more species that have been confidently identified are required for a broader sampling base, including the use of more coding regions.

However, the problems with the taxa sampled in Neubig et al. (2012) are not their fault but rather a reflection of the history of confused taxonomy in *Fernandezia* sensu lato, where many names were misapplied, there was a large amount of unidentified herbarium material, and about half of the species of the genus were undescribed.

In this paper my intention is to try and resolve the identities of a number of previously established taxa, thus requiring some new synonymy. A large number of new taxa are also described, particularly from Peru and Bolivia, where it is evident active speciation has occurred. After examining most of the species in the genus it would seem prudent to propose some infrageneric divisions to aid in species placement and identification.

A number of taxonomic issues remain, and they bear mentioning. *Fernandezia distichoides* M.W. Chase (*Pachyphyllum distichum* Kunth) is the type species of *Pachyphyllum* Kunth. The name is frequently misapplied, part of the problem being that the type material in Paris appears to be a mixture of three or four species. Taxa in this group are difficult to distinguish. Three other species, *F. dalstroemii* (Dodson) M.W. Chase, *F. hagsateri* (Dodson) M.W. Chase, and *F. theodorii* M.W. Chase (*Pachyphyllum hartwegii* Rchb.f.), also pose problems because of their conservative floral morphology.

Fernandezia sensu lato may be recognized by its monopodial habit, short, axillary inflorescences, small flowers (sepals 1–12 mm long), relatively simple, barely lobed lip, often bearing a medial thickening that terminates in a bilobed callus or two lamellae, broadly winged column, often with a cryptic anther, and two pollinia with variously developed viscidia and tegula.

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TAXONOMIC TREATMENT

*Infrageneric Division****Fernandezia* section *Breviconnata* Ormerod, *sect. nov.***

Type species: *Pachyphyllum breviconnatum* Schltr.

Leaves flat, often twisted basally to lie in a 180° plane; peduncle often biflorous; flowers often with sepals and petals united basally, dorsal sepal and petals often recurved, lateral sepals often upcurved, labellum short to long clawed, blade ovate-lanceolate, narrowly elliptic to subpandurate, column shortly stalked, with suborbicular wings in the upper half.

Distribution: about eight species in Peru and Bolivia.

The core group of species in this section contains *Fernandezia breviconnata* (Schltr.) M.W. Chase and five new species, *F. bilineata*, *F. chaparensis*, *F. cymbiformis*, *F. mercadoi*, and *F. solomonii*. These all agree in habit and leaf shape (elliptic with tapered ends), short 2- to 3-flowered inflorescences, flowers with a recurved dorsal sepal and petals, upcurved lateral sepals, and ovate-lanceolate to an subpandurate lip. I also consider *F. parvifolia* (Lindl.) M.W. Chase to belong here, though its habit is a little different, the leaves oblong to oblong-obovate, the sepals straight, and the lip oblong to elliptic. Another outlier is *F. luerorum* Ormerod from Bolivia, which has a short but seemingly multiflowered raceme, flowers with splayed (vs. upcurved) lateral sepals, and an unusual column widened both dorsally and ventrally.

Fernandezia* section *Capitulum* (D.E. Bennett & E.A. Christenson) Ormerod, *comb. nov.

Basionym: *Pachyphyllum* Kunth section *Capitulum* E.A. Christenson, J. Bot. Res. Inst. Texas 2, 1: 288. 2008.

Type species: *Pachyphyllum ecallosum* E.A. Christenson.

Heterotypic synonym: *Valdiviesoa* Szlach. & Kolan., Plant Syst. Evol. 300, 5: 107. 2014.

Type species: *Pachyphyllum debedoutii* P. Ortiz.

Distribution: three species found in Bolivia, Peru, Ecuador, Colombia, and Venezuela.

This section was originally proposed by Christenson on the basis of the premise that the flowers were in a capitulum, instead of a raceme. However, I consider the inflorescence to have a very short, often biflorous raceme, a feature also found in taxa of the *F. breviconnata* (Schltr.) M.W. Chase group. All three species in section *Capitulum* share the short raceme, flowers with papillose-denticulate margins to the sepals and petals, an ovate-suborbicular lip that bears a Y-shaped callus with the ends vanishing into the surface, and a column with downward-directed lobe-like wings.

Kolanowska and Szlachetko (2014) provided a revision of the group under the generic name *Valdiviesoa*, but they overlooked *Pachyphyllum ecallosum*. I think further studies are called for, especially since all three species are very similar florally.

In this paper only *Fernandezia ecallosa* and a new variety are treated.

***Fernandezia* section *Fernandezia* sensu lato**

Type species (to be conserved): *Fernandezia subbiflora* Ruiz & Pav.

Distribution: 34 species in Costa Rica, Panama, Venezuela, Colombia, Ecuador, Peru, and Bolivia.

This group is the most diverse florally and would benefit from further molecular sampling to determine the true relationships of taxa in it. The classic red- to orange-flowered species commonly associated with the generic name *Fernandezia* belong here, namely, *F. ionanthera* (Rchb.f. & Warsc.) Schltr., *F. maculata* Garay & Dunsterv., *F. myrtillus* (Rchb.f.) Garay & Dunsterv., *F. sanguinea* (Lindl.) Garay & Dunsterv., and *F. subbiflora* Ruiz & Pav. It is possible the white-flowered *F. transversalis* Ormerod is also a member of this group. Another interesting plant is the rare Costa Rican species *F. costaricensis* (Ames & C. Schweinf.) M.W. Chase, which has small greenish-white flowers with a sigmoid labellum, shaped much like that of *F. sanguinea*, which has orange flowers that are two to three times larger. Also of interest is the peculiar *F. piesikii* (Szlach., Mytnik & Rutk.) M.W. Chase, a vegetative giant (leaves to 10 cm long) in a genus of plants with leaves rarely more than 3 cm long. The other accepted taxa in this group all have small (sepals 1.0–4.5 mm long), white to greenish flowers, with the lip usually widest basally, and adorned with two fleshy conical to ellipsoid calli. These taxa are *F. crystallina* (Lindl.) M.W. Chase, *F. cuencaae* (Rchb.f.) M.W. Chase, *F. dalstroemii* (Dodson) M.W. Chase, *F. denticulata* Ruiz & Pav., *F. distichoides* M.W. Chase, *F. falcifolia* (Rchb.f.) M.W. Chase, *F. hagsateri* (Dodson) M.W. Chase, *F. lycopodioides* (Schltr.) M.W. Chase, *F. micrantha* (Schltr.) M.W. Chase, *F. putumayoensis* (Szlach., Kolan. & Oledr.) Molinari & Mayta, *F. squarrosum* (Lindl.) M.W. Chase, and *F. theodorii* M.W. Chase.

The new taxa are *Fernandezia callacallae*, *F. camposii*, *F. cuprea*, *F. espinosae*, *F. hamiltonii* (+ var. *jaenensis*), *F. harlingii*, *F. kosnipatae*, *F. militaris*, *F. rubescens*, *F. rubicunda*, *F. salliquensis*, *F. tintasensis*, *F. transversalis*, *F. vargasii*, and *F. yahuarcochae*.

Fernandezia* section *Gracillima* Ormerod, *sect. nov.

Type species: *Pachyphyllum gracillimum* C. Schweinf.

Leaves flat, often twisted to lie in a 180° plane; inflorescence three or more flowered; flowers campanulate, sepals united basally to halfway, up to 3 mm long, column sessile, widest in lower half.

Distribution: about six species in Peru and Bolivia.

Fernandezia gracillima (C. Schweinf.) M.W. Chase, and the new taxa *F. nunezii*, *F. pastinaca*, and *F. unduaviae*, resemble *F. breviconnata* and its allies vegetatively. They differ in having smaller flowers that do not have a recurved dorsal sepal or petals, nor upcurved lateral sepals (which also lack a lamellate carina on the midvein); the column is usually sessile and is broadest in the lower half or in the middle. I place *F. vanderwerffii* here even though it has dissimilar habit, but it does agree in floral characters. Another taxon, *F. tenuis* (Schltr.) M.W. Chase has little ligulate leaves but in floral characters it seems to belong here. Both *F. gracillima* and *F. tenuis* had been placed in section *Orchidotypus* because of the connate sepals but differ from those entities in column shape.

Fernandezia* section *Lamellata* Ormerod, *sect. nov.

Type species: *Pachyphyllum pectinatum* Rchb.f.

Leaves flat to conduplicate; labellum often narrowed to base but can be oblong to elliptic, with two lamellate keels, these either elongated or abbreviated; column stalked, often with suborbicular wings.

Distribution: 29 species in Peru and Bolivia.

This group of species has obviously speciated in the Andes of Peru and Bolivia. Leaf form varies from flat to conduplicate, coriaceous to fleshy. Obviously the plants have some vegetative similarity to various species in section *Fernandezia*, but generally the lip is narrower in the basal half and adorned above with lamellae, whereas in section *Fernandezia* the lip is usually broader in the basal half, and the calli of the lip are thick and fleshy.

The nine established taxa are *Fernandezia capitata* (Kraenzl.) M.W. Chase, *F. cardenasii* (L.B. Sm. & S.K. Harris) M.W. Chase, *F. cyrtophylla* (Schltr.) M.W. Chase, *F. herzogii* (Schltr.) M.W. Chase, *F. minor* (Schltr.) M.W. Chase, *F. pectinata* (Rchb.f.) M.W. Chase, *F. pseudodichaea* (Rchb.f.) M.W. Chase, *F. serra* (Rchb.f.) M.W. Chase, and *F. tajacayaensis* (D.E. Bennett & E.A. Christenson) M.W. Chase. The 20 new species and 9 new varieties are *F. amboroensis* (+ var. *obovata*), *F. angusta* (+ var. *erythromitra*), *F. barnettiae*, *F. carabayana*, *F. crassapex*, *F. cuneata*, *F. diazii*, *F. dorriana*, *F. ichneumonea*, *F. jordaniae* (+ var. *trullata*), *F. mandonii*, *F. minor* var. *boekeorum* and var. *breviflora*, *F. pandurata*, *F. pectinata* var. *punoensis*, *F. pseudominor*, *F. quadrangularis*, *F. scimitaris*, *F. shoveliformis* (+ var. *inversa*), *F. steinbachii*,

F. teranii, *F. tinquiana*, and *F. weberbaueri* (including varieties *platychlila* and *tricurucensis*).

Fernandezia* section *Orchidotypus* (Kraenzl.) Ormerod, *comb. nov.

Basionym: *Orchidotypus* Kraenzl., Bot. Jahrb. Syst. 37: 383. 1906.

Type species: *Orchidotypus muscoides* Kraenzl.

Homotypic synonym: *Pachyphyllum* Kunth section *Orchidotypus* (Kraenzl.) E.A. Christenson, J. Bot. Res. Inst. Texas 2, 1: 287. 2008.

Distribution: eight species in Mexico, Guatemala, Costa Rica, Panama, Venezuela, Colombia, Ecuador, and Peru.

This group of species may be recognized by the small size of the plants (to 6 cm tall), short, 1- to 2-flowered inflorescences, and tiny campanulate flowers (sepals 1.2–2.7 mm long), with connate sepals and petals, a broadly clawed lip with well separated lamellae, and a shortly stalked column. One exception to floral size is *Fernandezia pastorelliae* Trujillo, which has 10-mm-long sepals. A recent synopsis of the Colombian species was given by Szlachetko et al. (2014), but in my opinion the authors misapplied the name *Orchidotypus bryophytus* (Schltr.) Senghas to material of *O. schultesii* (L.O. Williams) Senghas, while what they called *O. schultesii* is rather *O. vaginatus* (Schltr.) Senghas. Notes on this can be found under the relevant taxa.

The following key is arranged using the sections above, but in the following order (basically from those with the least species to the most): Sections *Capitata*, *Orchidotypus*, *Gracillima*, *Breviconnata*, *Fernandezia*, and *Lamellata*.

KEY TO THE SECTIONS AND SPECIES OF *FERNANDEZIA* TREATED HERE

- A. Section **Capitata**. Labellum with callus tips vanishing into its surface.
- 1A. Labellum with apical margin minutely papillose; column 1.0–1.3 mm wide laterally *F. ecallosa* var. *ecallosa*
- 1B. Labellum with apical margin entire; column 1.8 mm wide laterally *F. ecallosa* var. *cundinamarca*
- B. Section **Orchidotypus**. Sepals and petals connate; base of lateral sepals not broadly oblique; column widest in upper half.
- 1A. Leaf sheaths with margins fimbriate-denticulate; lateral sepals to 1.9 mm long; blade of labellum pentagonal-suborbicular *F. antioquiensis*
- 1B. Leaf sheaths with margins entire to shortly denticulate; lateral sepals 1.9–2.9 mm long; blade of labellum obovate to ovate-elliptic 2
- 2A. Lateral sepals 1.9 mm long; sepals with free parts elliptic *F. vaginatus*
- 2B. Lateral sepals 2.2–2.9 mm long; sepals with free parts triangular *F. schultesii*
- C. Section **Gracillima**. Sepals and petals connate basally to halfway; lateral sepals to 3 mm long with a broadly oblique base, sometimes thickened medially but not lamellate carinate; column widest medially.
- 1A. Leaves narrowly oblong to oblong; sepals and petals connate about halfway; labellum pentagonal *F. vanderwerffii*
- 1B. Leaves ovate-elliptic, attenuate both ends; sepals and petals connate in lower third or not; labellum oblong to trullate 2
- 2A. Labellum ovate-elliptic; column narrowly stalked. *F. pastinaca*
- 2B. Labellum oblong to trullate; column broadly stalked. 3
- 3A. Labellum trullate *F. nunezii*
- 3B. Labellum oblong to oblong-elliptic *F. unduaviae*
- D. Section **Breviconnata**. Sepals and petals connate in basal part; lateral sepals (3.0–)3.4–8.8 mm long, usually lamellate carinate.
- 1A. Leaves oblong to oblong-oblancheolate; sepals and petals forward-pointing, straight 2
- 1B. Leaves ovate-elliptic, attenuate both ends; dorsal sepal and petals recurved; lateral sepals upcurved to splayed. 3
- 2A. Labellum oblong to narrowly elliptic, 1.0–1.3 mm wide. *F. parvifolia* var. *parvifolia*
- 2B. Labellum elliptic, 1.8 mm wide *F. parvifolia* var. *cajamarcae*
- 3A. Lateral sepals splayed; labellum with claw longer than blade, blade ovate-elliptic bearing a single callus; column widened dorsally and ventrally at apex *F. luerorum*
- 3B. Lateral sepals parallel, upcurved; labellum with claw shorter than blade, blade ovate-lanceolate to subpandurate and bearing two lobe-like calli; column widened ventrally 4
- 4A. Labellum subpandurate 5
- 4B. Labellum oblong to ovate-lanceolate 7

KEY TO THE SECTIONS AND SPECIES OF *FERNANDEZIA* TREATED HERE CONT.

- 5A. Labellum with large lamellae about 1/4 length of blade; column 2.1 mm long *F. cymbiformis*
 5B. Labellum lamellae twice as small; column 3.1–3.2 mm long 6
 6A. Dorsal sepal oblong; petals 1.8 mm wide; labellum subacuminate, calli obliquely angled *F. solomonii*
 6B. Dorsal sepal ligulate-oblongate; petals 1.2 mm wide; labellum narrowly triangular in upper half, calli parallel *F. bilineata*
 7A. Petals with claw 1/3 length; labellum ovate-lanceolate *F. mercadoi*
 7B. Petals with claw 1/5 to 1/6 length; labellum oblong *F. chaparensis*
- E. Section **Fernandezia**. Labellum with fleshy calli arising from a thickened medial ridge (see discussion above about exceptions).
 1A. Labellum obovate, or wider in apical half 2
 1B. Labellum wider in lower half, or similar width throughout 4
 2A. Labellum with a transversely elliptic blade in upper half *F. transversalis*
 2B. Labellum more or less obovate 3
 3A. Sepals 3.5–4.1 mm long; labellum 4.0 × 2.3 mm *F. salliquensis*
 3B. Sepals 2.0–2.6 mm long; labellum 2.7 × 1.5 mm *F. espinosae*
 4A. Leaves semitubular, rigid *F. militaris*
 4B. Leaves flat to conduplicate, texture softer 5
 5A. Sepals 1.0–1.7 mm long 6
 5B. Sepals (1.8)–1.9–4.1 mm long 8
 6A. Flowers globular with broadly elliptic to subcircular tepals; column wings semi-elliptic, forward pointing *F. falcifolia*
 6B. Flowers not globular, tepals ovate, elliptic to oblong; column wings truncate or barely produced 7
 7A. Stems subclaxly leafy; leaf sheaths smooth; sepals 1.0–1.5 mm long; petals oblong *F. micrantha*
 7B. Stems densely leafy; leaf sheaths subverrucose-rugulose; sepals 1.5–1.7 mm long; petals oblong-oblongate *F. camposii*
 8A. Column angled down dorsally *F. callacallae*
 8B. Column straight or slightly curved dorsally 9
 9A. Stems up to 12 mm across leaf sheaths; column 2.95–3.00 mm long *F. tintasensis*
 9B. Stems up to 8 mm across leaf sheaths; column 1.1–2.3 mm long 10
 10A. Labellum upper part (“epichile”) transversely elliptic, distinctly broader than long 11
 10B. Labellum upper part (“epichile”) ovate, deltate, to subcircular, hardly broader than long, more often longer than broad 12
 11A. Leaves oblong-elliptic, 10.0–15.0 × 4.5–6.5 mm; petals widest basally; column wings slightly narrowed toward base *F. cuprea*
 11B. Leaves ligulate, 8.0–10.0 × 2.5–4.0 mm; petals widest apically; column wings distinctly narrowed towards base *F. yahuarcochae*
 12A. Column 1.1–1.3 mm long 13
 12B. Column 1.5–2.3 mm long 14
 13A. Labellum ovate-deltate; column 0.7 mm wide laterally, wings obtuse, forward-pointing, produced *F. rubescens*
 13B. Labellum subpandurate; column 0.9–1.0 mm wide laterally, wings obliquely truncate, slightly produced *F. denticulata*
 14A. Labellum widely ovate, upper part triangular; column shortly and broadly clawed, truncate, wings transverse rectangular . *F. rubicunda*
 14B. Labellum ovate, ovate-lanceolate, to oblong; column usually sessile, if shortly clawed then not truncate, wings deltate to elliptic . . . 15
 15A. Column 1.5 mm long; labellum 1.15–1.30 mm wide *F. crystallina*
 15B. Column (1.4)–1.7–2.3 mm long; labellum 1.3–2.0 mm wide 16
 16A. Stem laxly leafy; column widest basally, wings angling up from base to apex *F. kosnipatae*
 16B. Stem rarely laxly leafy, usually subclaxly to densely leafy; column either narrowest basally, or wings straight (i.e., 180° line) 17
 17A. Lower margins of column straight (i.e., basal and apical width equal) 18
 17B. Lower margins of column angling back toward base (i.e., column widest apically) 21
 18A. Column wings obliquely truncate, apex of clinandrium relatively large *F. harlingii*
 18B. Column wings shortly produced, rounded, apex of clinandrium smaller 19
 19A. Leaves thinly coriaceous to fleshy 20
 19B. Leaves thin but firm (edges often revolute); labellum upper part straight; column wings about 1/3 width of apex *F. putumayoensis*
 20A. Leaves oblong to elliptic, usually 6–10 × 3–6 mm; labellum upper part usually deflexed to recurved *F. crystallina*
 20B. Leaves ligulate, 15–18 × 5 mm; labellum upper part straight *F. squarrosa*
 21A. Sepals 2.0–2.6 mm long; labellum 1.4 mm wide *F. hamiltonii* var. *jaenensis*
 21B. Sepals 2.75–3.70 mm long; labellum 1.8–2.1 mm wide 22
 22A. Leaves 5.0–17.0 × 4.0–5.5 mm spread, sides upcurved; labellum lower half divided longitudinally by a narrow medial thickening *F. hamiltonii* var. *hamiltonii*
 22B. Leaves 12.0–31.0 × 7.0–9.5 mm spread, sides weakly upcurved; labellum lower half divided longitudinally by a broader thickening *F. vargasii*
- F. Section **Lamellata**. Labellum usually narrowed in basal half, base not wider than upper part, bearing short to long lamellae; column usually stalked, often with suborbicular wings.
 1A. Labellum blade subquadrate *F. quadrangularis*
 1B. Labellum blade otherwise shaped 2
 2A. Labellum cuneate to rectangular 3
 2B. Labellum otherwise shaped 4
 3A. Sepals 2.30–2.65 mm long; labellum 2 × 1 mm *F. cuneata*
 3B. Sepals 2.8–3.8 mm long; labellum 2.7–3.0 × 1.0–1.6 mm *F. mandonii*
 4A. Labellum subpandurate 5

KEY TO THE SECTIONS AND SPECIES OF *FERNANDEZIA* TREATED HERE CONT.

- 4B. Labellum otherwise shaped 6
- 5A. Labellum apex obtusely apiculate; lamellae small, subquadrate, well separated. *F. pandurata*
- 5B. Labellum apex broadly rounded; lamellae transverse ligulate, approximate *F. diazii*
- 6A. Labellum with a long rectangular claw terminating in a pentagonal blade; lamellae large, overlapping nexus of claw and blade if spread out *F. pseudodichaea*
- 6B. Labellum with claw absent, short, or cuneate, blade shaped otherwise; lamellae rarely overlapping edges 7
- 7A. Labellum oblong, of equal width throughout, broadly rounded. *F. pseudominor*
- 7B. Labellum otherwise shaped, if oblong then either narrowed toward base or apex 8
- 8A. Labellum blade forming an acute to right angle with claw 9
- 8B. Labellum blade forming an obtuse angle with claw, or simply the base cuneate or rounded in each side 11
- 9A. Labellum sessile, oblong-lanceolate, acute; lamellae paired, short *F. scimitaris*
- 9B. Labellum with a short subquadrate claw, blade broadly rounded; lamellae parallel to slightly divergent, more or less elongate. 10
- 10A. Sepals 3.2–3.5 mm long; labellum 3.4–3.5 × 1.8 mm; column 2 mm long *F. shoveliformis* var. *shoveliformis*
- 10B. Sepals 1.8 mm long; labellum 2.0 × 1.2 mm; column 1.15 mm long *F. tinquiana*
- 11A. Labellum ovate-lanceolate, upper 1/3 thickened *F. crassapex*
- 11B. Labellum otherwise shaped, upper 1/3 not thickened, except along midvein below 12
- 12A. Labellum elliptic, same width apically and basally 13
- 12B. Labellum otherwise shaped, sometimes oblong-elliptic but then more tapered apically or basally 14
- 13A. Petals obovate-oblong to unevenly ovate-elliptic, noticeably thickened along midvein; column wings not much broader than basal part of column *F. minor* var. *boekeorum*
- 13B. Petals oblong to elliptic, not noticeably thickened along midvein; column wings almost as much broader again than basal part of column *F. minor* var. *breviflora*
- 14A. Labellum oblong-oblancheolate 15
- 14B. Labellum otherwise shaped 21
- 15A. Sepals to 2.8 mm long 16
- 15B. Sepals 2.9–4.6 mm long 18
- 16A. Labellum lamellae abbreviated, subquadrate to suborbicular *F. teranii*
- 16B. Labellum lamellae elongate or with drawn out bases 17
- 17A. Leaf sheaths broad, covering stem; labellum lamellae within confines of blade when spread *F. carabayana*
- 17B. Leaf sheaths narrow, semitubular, internodes partially exposed; labellum lamellae overlapping edge of blade when spread *F. angusta* var. *erythromitra*
- 18A. Leaves thick and fleshy, conduplicate 19
- 18B. Leaves thin coriaceous, flat 20
- 19A. Petals oblong-oblancheolate; labellum lamellae obliquely lanceolate in profile in apical half, gradually decreasing in height toward the base; carinae below labellum apex deltate, obtuse, forward-pointing *F. ichneumonea*
- 19B. Petals oblong; labellum lamellae rectangular to obliquely trapezoid in profile in upper half, suddenly decreasing in height toward base; carina below labellum apex semi-elliptic, rounded, not forward-pointing *F. minor* var. *minor*
- 20A. Column constricted basally; column wings downward directed *F. weberbaueri* var. *weberbaueri*
- 20B. Column stalked but not constricted; column wings slightly forward directed. *F. weberbaueri* var. *tricurucensis*
- 21A. Labellum oblong-cuneate; lamellae drawn out basally and overlapping edges when spread *F. angusta* var. *angusta*
- 21B. Labellum otherwise shaped; lamellae rarely spreading over edges, if so then bases not long drawn out 22
- 22A. Labellum oblong, slightly tapered each end. 23
- 22B. Labellum otherwise shaped 26
- 23A. Leaf sheaths with distinctly outcurved apices; labellum lamellae elongate. *F. amboroensis* var. *amboroensis*
- 23B. Leaf sheaths not distinctly outcurved apically; labellum lamellae abbreviated 24
- 24A. Leaf sheaths oblong-lanceolate in profile; petals high carinate on outside in upper half *F. dorriana*
- 24B. Leaf sheaths subrectangular to broad triangular in profile; petals not high carinate 25
- 25A. Petals oblong-oblancheolate. *F. pectinata* var. *pectinata*
- 25B. Petals obliquely elliptic *F. pectinata* var. *punoensis*
- 26A. Labellum trullate *F. jordaniae* var. *trullata*
- 26B. Labellum otherwise shaped 27
- 27A. Sepals 3.00–3.75 mm long 28
- 27B. Sepals 1.5–2.4 mm long 29
- 28A. Labellum oblong-elliptic, subpandurate; lamellae rather short *F. shoveliformis* var. *inversa*
- 28B. Labellum obovate-oblancheolate; lamellae elongate *F. weberbaueri* var. *platychila*
- 29A. Sepals fleshy, obtuse; labellum lamellae abbreviated. *F. jordaniae* var. *jordaniae*
- 29B. Sepals thinner, acute to subacute; labellum lamellae elongate. 30
- 30A. Petals obovate-oblancheolate, midvein thickly carinate in upper half; labellum obovate-oblancheolate; lamellae obliquely triangular in upper part *F. amboroensis* var. *obovata*
- 30B. Petals elliptic to obovate-elliptic, midvein not thick carinate; labellum lamellae not raised apically 31
- 31A. Sepals 1.5–1.8 mm long; labellum lamellae parallel, apices decurrent on blade. *F. barnettiae*
- 31B. Sepals 2.1–2.4 mm long; labellum lamellae divergent, apices truncate. *F. steinbachii*

Fernandezia amboroensis Ormerod, *sp. nov.*

TYPE: BOLIVIA. Santa Cruz: Prov. Florida, Parque Nacional Amboro, 8 km by air NE of Mairana, 5.5 km N of Campamento "La Yunga" park station, 2300 m, 29 March 2002, M. Nee, M. Sundue, M. Mendoza & A. Arbelaez de Churchill 52044 (Holotype: NY). Fig. 1.

Similar to *Fernandezia barnettiae* Ormerod but with oblong (vs. elliptic) leaves, leaf sheath tips curving outward (vs. close to stem), and labellum lamellae with erect ensiform tips (vs. running into blade).

Epiphytic herb. Roots terete, 0.40–0.75 mm thick. Stems simple, densely leafy, 3–10 cm long, ca. 0.08 cm thick. Leaves oblong, acute, minutely denticulate near apex, coriaceous, subsessile, 7–8 × 3–4 mm; leaf sheaths ovate-lanceolate laterally, curving away from stem, margins entire, surface smooth, striate. Inflorescence 12–15 mm long; peduncle ca. 7 mm long; rachis subaxly 6–8 flowered, 5–8 mm long; floral bracts deltate, acute, 2 × 1.5 mm. Flowers white. Pedicellate ovary clavate, triquetrous, 2.1 mm long. Dorsal sepal oblong, subacute, fleshy, 1.7 × 0.8 mm. Lateral sepals obliquely oblong-lanceolate, acute, midvein carinate, 2 × 0.85 mm. Petals broadly oblong-ob lanceolate, acute, apex thickened dorsally, 1.5 × 0.75 mm. Labellum broadly oblong-ob lanceolate, subacute, carinate below tip, 1.7 × 0.8 mm; medially with 2 parallel lamellae, which each terminate in an erect, ensiform blade. Column each side with a low semicircular wing, 1.1 mm long, 0.75–0.80 mm wide laterally.

Distribution: Bolivia.

Habitat: on tree branches in disturbed cloud forest, with *Dicksonia sellowiana*, *Prunus oleifolia* var. *bangii*, and *Ceroxylon parvum*, along trails, on and near ridge top.

Etymology: named after the type locality, the Amboro National Park.

This species appears to be most similar to *Fernandezia barnettiae* but differs in having oblong (vs. elliptic) leaves, leaf sheaths that have the tips distinctly curving away from the stem, labellum lamellae that end in raised ensiform tips (vs. running into the blade of the lip), and a column with wings that are widest medially rather than apically.

Fernandezia amboroensis var. *obovata* Ormerod, *var. nov.*

TYPE: BOLIVIA. Cochabamba: near Siberia, between Comarapa and Cochabamba, 2500–2600 m, 18 January 1983, C. Luer, J. Luer, E. Besse & R. Vasquez 8530 p.p. (Holotype: SEL, upper rhp). Fig. 2.

Differs from the typical variety in the flowers having more strongly carinate petals and the labellum more distinctly clawed (obovate-ob lanceolate vs. broadly oblong-ob lanceolate).

Epiphytic herb. Roots terete, to 0.7 mm thick. Stems with 3–8 branches, leafy, to 13.5 cm long, 0.08 cm thick. Leaves ovate-elliptic, acute, margins minutely denticulate toward tip, coriaceous, 9 × 4 mm; leaf sheaths smooth, striate, margins entire. Inflorescences to 15 mm long; peduncle 5.5 mm long; rachis up to 8 flowered, 9.5 mm long; floral bracts deltate, acute, to 2 mm long. Flowers white. Pedicellate

ovary clavate, triquetrous, 2.5–2.8 mm long. Dorsal sepal oblong, subacute, concave, weakly carinate, 1.80 × 0.75 mm. Lateral sepals obliquely oblong-lanceolate, subacute, carinate, 1.95 × 0.80–0.85 mm. Petals obovate, subacute, midvein thickly carinate in upper half, 1.55–1.60 × 0.90 mm. Labellum obovate-ob lanceolate, obtuse, 1.70 × 0.85 mm; claw with a narrow midline that divides and raises up into 2 parallel, apically triangular, frontally truncate lamellae. Column each side with a weakly developed, rounded wing each side, 1 mm long, 0.75 mm wide laterally.

Distribution: Bolivia.

Habitat: cloud forest, 2500–2600 m.

Etymology: named after the shape of the lip.

This variety can be distinguished from typical *Fernandezia amboroensis* by its thickly carinate petals and obovate-ob lanceolate lip. The type material is a mixture—the other specimen on the sheet belongs to *F. dorriana*.

Fernandezia angusta Ormerod, *sp. nov.*

TYPE: BOLIVIA. La Paz: Prov. Nor Yungas, Sacramento Valley of the Rio Coroico, 10 km NE of Chuspipata on Coroico road, 2450 m, 29 January 1984, A. Gentry & J.C. Solomon 44800 (Holotype: MO). Fig. 3.

Similar to *Fernandezia cuneata* Ormerod but with smaller flowers (sepals 2.0–2.3 vs. 2.30–2.65 mm long) and an oblong-ob lanceolate (vs. cuneate) labellum.

Epiphytic herb. Roots terete, 0.6 mm thick. Stems simple, subaxly leafy, 5.0–6.5 cm long, ca. 0.1 cm thick. Leaves ligulate, acute, coriaceous, conduplicate, margin minutely denticulate toward apex, 5–10 × 3 mm; leaf sheath tubular, apices shortly curved outward, smooth, striate, not fully covering internodes, ca. 3.0–3.5 mm long. Inflorescence 7 mm long; peduncle 5 mm long; rachis densely, simultaneously 5 flowered, 2 mm long; floral bracts ovate-lanceolate, acute, to 1.3 mm long. Flowers white. Pedicellate ovary narrowly clavate, triquetrous, 3.4 mm long. Dorsal sepal ligulate, acute, 2.0 × 0.6 mm. Lateral sepals obliquely ligulate-lanceolate, acute, 2.3 × 0.7 mm. Petals narrowly oblong-ligulate, acute, 1.95 × 0.55 mm. Labellum oblong-ob lanceolate, subacute, carinate below tip, 1.95 × 0.80 mm; lamellae 2, divergent from base of lip, very low until raised up apically into more or less semicircular flaps. Column shortly stalked, each side an obliquely suborbicular wing, 1.75 mm long, 0.8 mm wide laterally.

Distribution: Bolivia.

Habitat: dense ridgetop cloud forest, 2450 m.

Etymology: from the Latin *angustus*, narrow, in reference to the uniformly narrow sepal and petals.

This is a neat little plant, easily recognized by its combination of small size, narrow leaves, simultaneously (not sequentially) 5-flowered inflorescences, subequal, narrow sepals and petals. It seems to be most closely related to *Fernandezia cuneata*, but with longer (5–10 vs. 3–6 mm), ligulate (vs. oblong-lanceolate) leaves, longer, more exerted inflorescence peduncles (5 vs. 3–4 mm), smaller flowers, and an oblong-ob lanceolate (vs. cuneate) lip in which the keels do not overlap the edges.

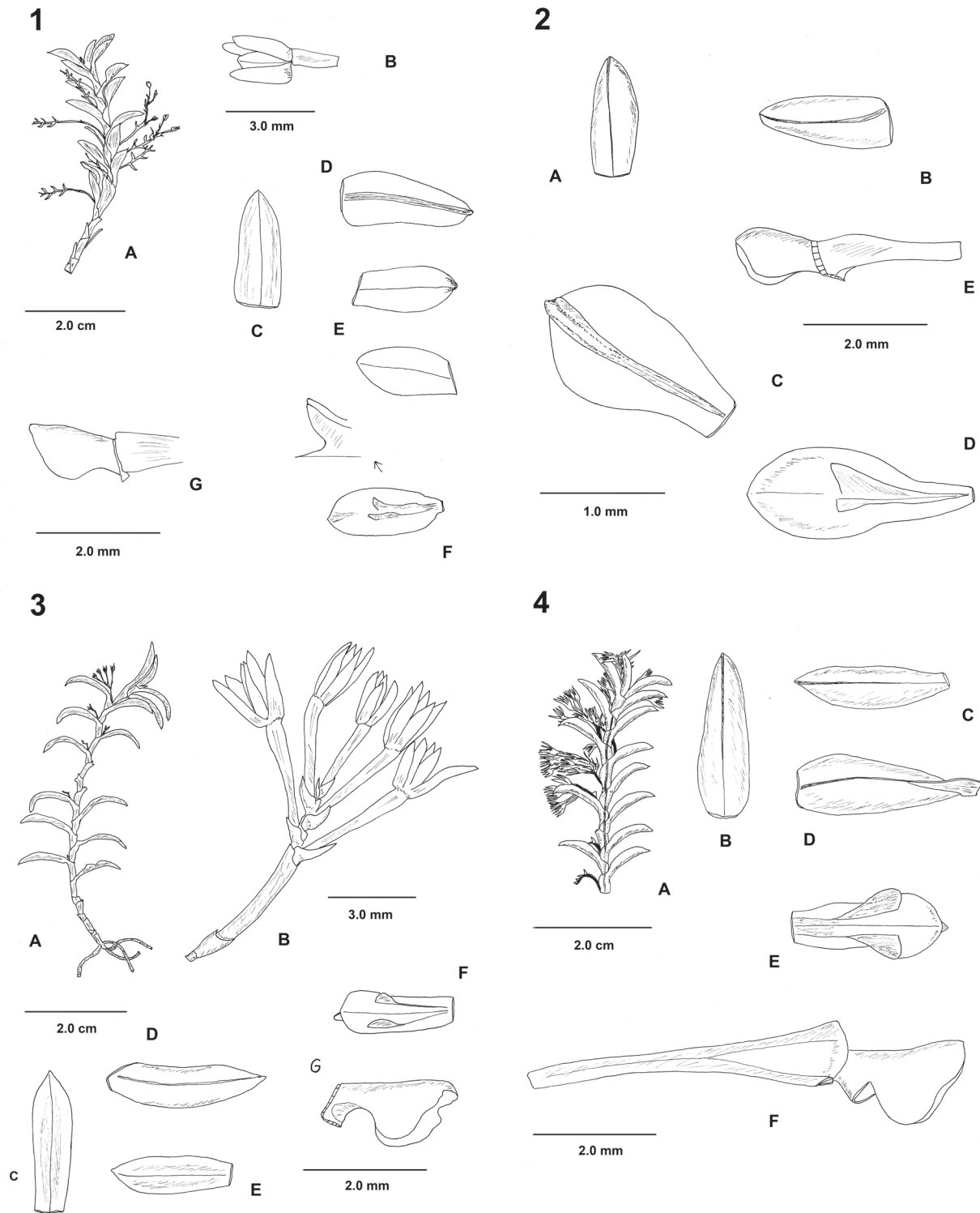


FIGURE 1–4. **1**, *Fernandezia amboeroensis* Ormerod var. *amboeroensis*. **A**, stem; **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petals; **F**, labellum; **G**, column. Drawn from holotype. **2**, *Fernandezia amboeroensis* Ormerod var. *obovata* Ormerod. **A**, dorsal sepal; **B**, lateral sepal; **C**, petal; **D**, labellum; **E**, column. Drawn from holotype. **3**, *Fernandezia angusta* Ormerod var. *angusta*. **A**, plant; **B**, inflorescence; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype. **4**, *Fernandezia angusta* Ormerod var. *erythromitra* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, column. Drawn from holotype.

Fernandezia angusta var. *erythromitra* Ormerod, var. nov.

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, between Chapare and Villa Tunari, near KM 1000, 1850 m, 17 January 1984, C. Luer, J. Luer & R. Vasquez 9396 (Holotype: SEL). Fig. 4.

Differs from the typical variety in the flowers having longer (2.5–3.3 vs. 2.0–2.3 mm) sepals with distinct carinae on the apex of the lateral sepals,

Epiphytic herb. Roots terete, to 0.7 mm thick. Stems simple, subclaxly leafy, 7–12 cm long, 0.15–0.20 cm wide across leaf sheaths, 0.05–0.10 cm thick. Leaves ligulate-lanceolate, acute, coriaceous, margins minutely denticulate toward apex, 5–7 mm long, 1.0–1.5 mm wide laterally; leaf sheaths tubular, striate, smooth, margins minutely denticulate, not fully covering internodes. Inflorescence 8–10 mm long; peduncle ca. 4–6 mm long; rachis 3–6 flowered, 4 mm long; floral bracts deltate, acute, 1.7–2.5 mm long. Flowers white, anther cap red. Pedicellate ovary clavate, triquetrous, 3–4 mm long. Dorsal sepal narrowly oblong-lanceolate to ligulate, acute, midvein low carinate, 2.50–3.10 × 0.75–0.90 mm. Lateral sepals obliquely lanceolate, acute, high carinate near apex, 2.7–3.3 × 0.8–1.2 mm. Petals oblong-ligulate to oblong, subacute to acute, 2.2–2.8 × 0.7–0.9 mm. Labellum oblong-oblancoelate, acute, carinate below tip, 2.2–2.5 × 0.8–1.0 mm; lower of labellum medially thickened, dividing and raising up into 2 flap-like, oblique-based, obtuse lamellae that over-reach the labellum edges. Column shortly stalked, each side with a suborbicular wing, 1.7–1.9 mm long, 1.0–1.2 mm wide laterally.

Distribution: Bolivia.

Additional specimen examined: BOLIVIA. Cochabamba: Prov. Chapare, along road to Tablas, 2500 m, 9 February 1980, C. Luer, J. Luer & R. Vasquez 5165 (SEL).

Habitat: cloud forest (type), 1850–2500 m.

Etymology: from the Classical Greek *erythros*, red, and *mitra*, originally a headband, but later a cap, in reference to the red anther cap.

I had originally considered this plant to be a separate species, but it agrees well in habit and floral characters with *Fernandezia angusta*, differing in having longer sepals with high keels on the apices of the lateral ones.

Fernandezia antioquiensis (Szlach., Kolan. & Mystk.) Molinari, Richardiana 15: 268. 2015.

Basionym: *Orchidotypus antioquiensis* Szlach., Kolan. & Mystk., Polish Bot. J. 59, 2: 169. 2014.

TYPE: COLOMBIA. Antioquia: Municipio Urrao, Paramo de Frontino, Sitio Llano Grande, 3420 m, 11 September 1986, F.J. Roldan, O. Marulanda & M. Escobar 390 (Holotype: COL, not seen). Fig. 5.

Distribution: Colombia.

Additional specimens examined: COLOMBIA. Cundinamarca: Choconta, El Sisga, high part of the La Represa, 2700–2900 m, 14 January 1962, H. Garcia-Barriga 17384 (AMES, NY); Paramo de Guasca, 3355 m, 8 May 1958, R.E. Schultes, E.W. Smith & H. Blohm s.n. (AMES).

Among the taxa in the *Orchidotypus* group with glabrous leaves, this species is notable for the relatively prominent fimbriate-denticulate margins of the leaf sheaths. The flowers have a suborbicular-pentagonal (illustrated as ovate-elliptic in the protologue) labellum “midlobe.” One collection (Garcia-Barriga & Jaramillo 19784) cited in the protologue I find to be *F. vaginata* (see there for further comment).

Fernandezia barnettiae Ormerod, sp. nov.

TYPE: BOLIVIA. Cochabamba: Prov. Carrasco, Serrania Siberia, 20–35 km W of Comarapa (Dept. Santa Cruz), on the old Cochabamba to Santa Cruz road (Highway 4), 2000 m, 14–15 January 1990, L.J. Dorr & L.C. Barnett 7026 p.p. (Holotype: GH). Fig. 6.

Similar to *Fernandezia steinbachii* Ormerod but not as tall (stems to 10.5 vs. to 19.5 cm), flowers with a shorter (1.5 vs. 5.0 mm) pedicellate ovary, labellum narrower (0.8 vs. 1.2–1.3 mm) and bearing parallel (not divergent) keels.

Epiphytic (?) herb. Roots terete, 0.6–0.8 mm thick. Stems often with several basal branches (these 4–6 cm long), subdensely leafy, to 10.5 cm long, 0.1 cm thick. Leaves elliptic, acute, margins minutely denticulate near apex, 5.5–8.0 × 5.0 mm; leaf sheaths semitubular, exposed part 3.5–4.5 mm long. Inflorescence to 8.5 mm long; peduncle 4 mm long; rachis to 4.5 mm long, up to 6 flowered; floral bracts widely ovate, acute, ca. 1.6 × 1.6 mm. Flower color not known. Pedicellate ovary weakly clavate, triquetrous, 1.5 mm long. Dorsal sepal ovate-elliptic, acute, 1.50 × 0.75 mm. Lateral sepals obliquely oblong-lanceolate, acute, midvein carinate toward tip, 1.80 × 0.75 mm. Petals obovate-elliptic, subacute, 1.6 × 0.8 mm. Labellum elliptic from a broadly clawed base, subacute, weakly carinate below tip, 1.9 × 0.8 mm; lamellae 2, parallel, starting at base of lip and ending at apical 1/3. Column broadly stalked, each side apically with an apical, obliquely suborbicular wing, 1.1 mm long, 1.0–1.1 mm wide laterally.

Distribution: Bolivia.

Eponymy: named after Lisa C. Barnett (1959–), specialist in the Sterculiaceae and one of the collectors of the type.

As noted below, the type sheet of this species also contains the holotype of *Fernandezia dorriana*. Discussion on how these two taxa differ is given under the latter taxon. *Fernandezia barnettiae* is however more closely to *F. steinbachii*, which occurs higher up in the same region. The former is a much smaller plant than *F. steinbachii*, has slightly smaller flowers, with a much shorter pedicellate ovary (1.5 vs. 5.0 mm), and a narrower lip (0.8 vs. 1.2–1.3 mm) with parallel (not divergent) keels.

Fernandezia bilineata Ormerod, sp. nov.

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, along road to Villa Tunari, 2840 m, 13 & 16 January 1981, C. Luer, J. Luer, E. Besse & R. Vasquez 5615 (Holotype: SEL). Fig. 7.

Related to *Fernandezia mercadoi* Ormerod but the flowers with an oblancoelate-ligulate (vs. ligulate) dorsal sepal, thicker, unclawed petals, and the labellum wider (vs. narrower) in the upper half.

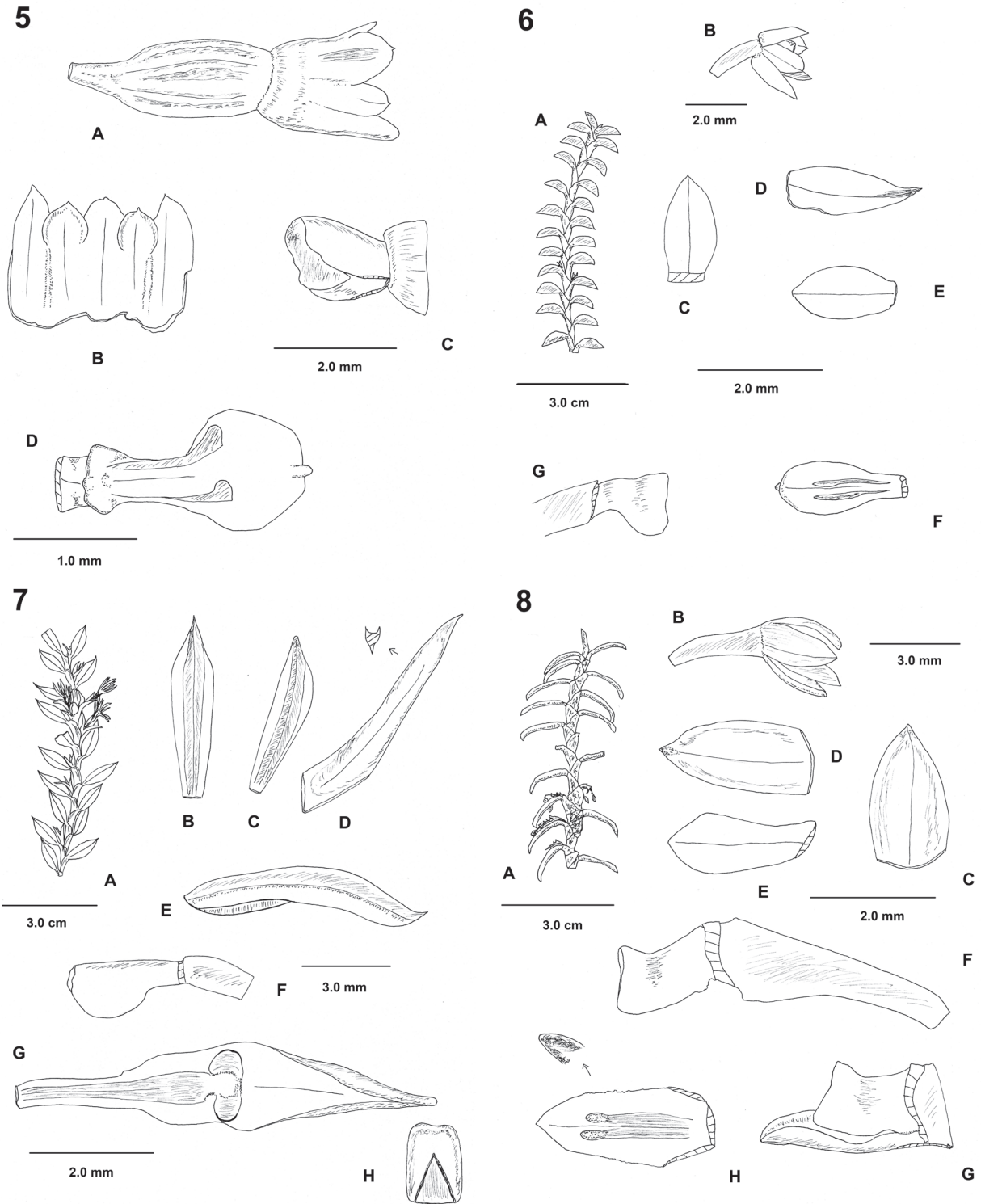


FIGURE 5–8. **5**, *Fernandezia antioquiensis* (Szlach., Kolan. & Mystk.) Molinari. **A**, flower; **B**, tepals (lateral sepal, petal, dorsal sepal, petal, lateral sepal); **C**, column; **D**, labellum. Drawn from Schultes *et al.* (AMES). **6**, *Fernandezia barnettiae* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype. **7**, *Fernandezia bilineata* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D–E**, lateral sepal (inside and lateral views); **F**, column; **G**, labellum; **H**, anther cap. Drawn from holotype. **8**, *Fernandezia callacallae* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, column; **G**, labellum and column; **H**, labellum. Drawn from holotype.

Epiphytic *herb*. *Roots* terete, 0.5–0.7 mm thick. *Stems* simple, sinuous to subsinuous, subdensely leafy, 18–21 cm long, 0.20 cm wide across leaf sheaths, 0.05–0.10 cm thick. *Leaves* oblong, apiculate, coriaceous, 9.0–13.0 × 3.0–3.5 mm, apiculus 0.8 mm long; leaf sheaths tubular, smooth, 4.5–5.0 mm long. *Inflorescence* 5.0–5.5 mm long; peduncle stout, ca. 3 mm long; sheathing bract subapical, ovate-lanceolate, acute, to 6 × 2–4 mm; rachis biflorous, 2.0–2.5 mm long; floral bracts lanceolate, acute, 3.0–5.0 × 1.5 mm. *Flowers* white with two purple lines on the lip. *Pedicellate ovary* clavate, triquetrous, ca. 3 mm long. *Dorsal sepal* ligulate-oblancheolate, acute, midline thickly carinate, 5.4 × 1.2 mm. *Lateral sepals* obliquely lanceolate, acute, highly and thickly carinate, joined basally for ca. 1.8 mm, 7.5 × 1.6 mm. *Petals* obliquely ligulate-oblancheolate, subacute, midline broadly low carinate, 4.8 × 1.2 mm. *Labellum* clawed, oblong-lanceolate, more or less sublobulate medially, upper margins involute, carinate below apex, claw ligulate, 2 mm long, blade 4.2 × 1.4 mm, in total 6.2 × 1.4 mm; callus of two elliptic to deltate, obtuse, parallel lobules just below upper half of blade. *Column* stalked, each side with a broad transverse wing, 3.1 mm long, 1.6–1.7 mm wide laterally.

Distribution: Bolivia.

Habitat: cloud forest, 2840 m.

Etymology: from the Latin compound *bi-*, meaning two, and *linea*, line, in reference to the two purple lines on the labellum.

As note above in the diagnosis this species is related to its Bolivian congener *Fernandezia mercadoi*. It is also similar to another Bolivian entity, *F. solomonii*, but differs from that in the flowers having a ligulate-oblancheolate (vs. narrowly oblong) dorsal sepal, narrower (1.2 vs. 1.8 mm) and thicker petals, and a narrower (1.4 vs. 2.0 mm) lip that is less distinctly subpandurate with calli spreading at right angles (vs. obliquely).

Fernandezia callacallae Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: Prov. Chachapoyas, Cerros Calla Calla, E side, 19 km above Leimebamba, on road to Balsas, 3100 m, 6 June 1964, P.C. Hutchison & J.K. Wright 5557 (Holotype: F; Isotypes: AMES, NY). Fig. 8.

Usage synonym: *Pachyphyllum falcifolium* auct. non Rchb.f., C. Schweinf., Fieldiana, Bot. 33: 79–80. 1970 *p.p.*

Related to *Fernandezia falcifolia* (Rchb.f.) M.W. Chase but the flowers with larger (2.0–2.3 vs. 1.1–1.2 mm), ovate-elliptic to elliptic (vs. suborbicular) sepals, and the column with an incurved (vs. rounded) back, and a truncate (vs. rounded) apex.

Epiphytic *herb*. *Roots* terete, 0.75–1.50 mm thick. *Stems* weakly flexuous, 2–3 branched (branches to 7.5 cm long), densely leafy throughout, 10.5–33.5 cm long, to 0.35 cm across leaf sheaths, to 0.15 cm thick. *Leaves* linear-ligulate, subacute, fleshy, semiterete, 6–13 mm long, 1.0–1.3 mm wide laterally; leaf sheaths deltate, truncate, surface smooth, striate. *Inflorescence* to 8.5 mm long; peduncle ca. 4 mm long; rachis few flowered, 3.0–4.5 mm long; floral bracts ovate-deltate, acute, to 1 mm long. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, 3 mm long; capsule

yellow. *Dorsal sepal* ovate-elliptic, acute, concave, thin, 2.0–2.3 × 1.20–1.35 mm. *Lateral sepals* obliquely elliptic, subacute to acute, concave, 2.2–2.3 × 1.15 mm. *Petals* oblong to oblong-oblancheolate, obtuse to subacute, 1.8–2.0 × 0.9 mm. *Labellum* oblong to ovate-oblong, obtuse to subacute, 2.2–2.7 × 1.15–1.40 mm; lower 2/3 divided by a low thickening that ends in 2 parallel, oblongoid to ellipsoid calli. *Column* rectangular in profile, incurved dorsally, 1.4–1.5 mm long, 0.9–1.0 mm wide laterally.

Distribution: Peru.

Additional specimen examined: PERU. Amazonas: Prov. Chachapoyas, Leimebamba to Lajabamba trail, no altitude, 28 June 1977, J.D. Boeke 2045 (MO, SEL).

Etymology: named after the Cerros Calla Calla, the type locality.

This species is allied to *Fernandezia falcifolia* (Rchb.f.) M.W. Chase from Ecuador, sharing with it a similar habit and lip shape. However, its flowers are twice as large with not so rounded segments, and the longer column has an incurved (vs. rounded) back with a truncate (vs. rounded) apex. According to the collectors of the type, the plant is a “rare epiphyte in masses.”

Fernandezia camposii Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: Luya Prov., Camporredondo, Cerro Huicsocunga, 2800–3000 m, 7 August 1988, J. Campos 716 (Holotype: MO). Fig. 9.

Similar to *Fernandezia denticulata* Ruiz & Pav. but the leaves more narrowly pointed, leaf sheaths subverruculose-rugulose (vs. smooth), and flowers with oblong-obovate (vs. elliptic) petals.

Lithophytic *herb*. *Roots* terete, white, to ca. 1.2 mm thick. *Stems* caespitose, densely leafy, simple or with up to 4 branches (these to 7 cm long), 14–15 cm long, 0.3–0.4 cm wide across leaf sheaths. *Leaves* ovate-lanceolate, acute, margins entire to minutely laxly denticulate, fleshy, 8–15 mm long, 2–3 mm wide laterally; leaf sheaths triangular, truncate, margin minutely denticulate, surface subverruculose-rugulose. *Inflorescence* to 6 mm long, up to 6 flowered; floral bracts ovate-deltate, acute, to 2 mm long. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, 2 mm long. *Dorsal sepal* elliptic, subacute, fleshy, concave, 1.5–1.6 × 0.8–0.9 mm. *Lateral sepals* obliquely oblong-elliptic, subacute, concave, midvein carinate, carina rounded apically, 1.7 × 0.75–0.80 mm. *Petals* oblong-obovate, obtuse, 1.40 × 0.85 mm. *Labellum* ovate, obtuse, slightly constricted medially, lower half 0.8 × 1.0 mm, upper half 0.70 × 0.85 mm, in total 1.5 × 1.0; lower half divided by a medial ridge, terminating medially in 2 fleshy, conical calli. *Column* stout, 0.95 mm long, apex 0.95 mm wide laterally.

Distribution: Peru.

Eponymy: named after J. Campos, collector of the type.

This species appears to be a member of the *Fernandezia distichoides* complex and is possibly related to two similarly small-flowered entities in that group, namely, *F. denticulata* and *F. harlingii*. From both of those taxa it differs in having more narrowly pointed leaves, subverruculose-rugulose (vs. smooth to striate) leaf sheaths, and flowers with oblong-obovate (vs. oblong to elliptic) petals.

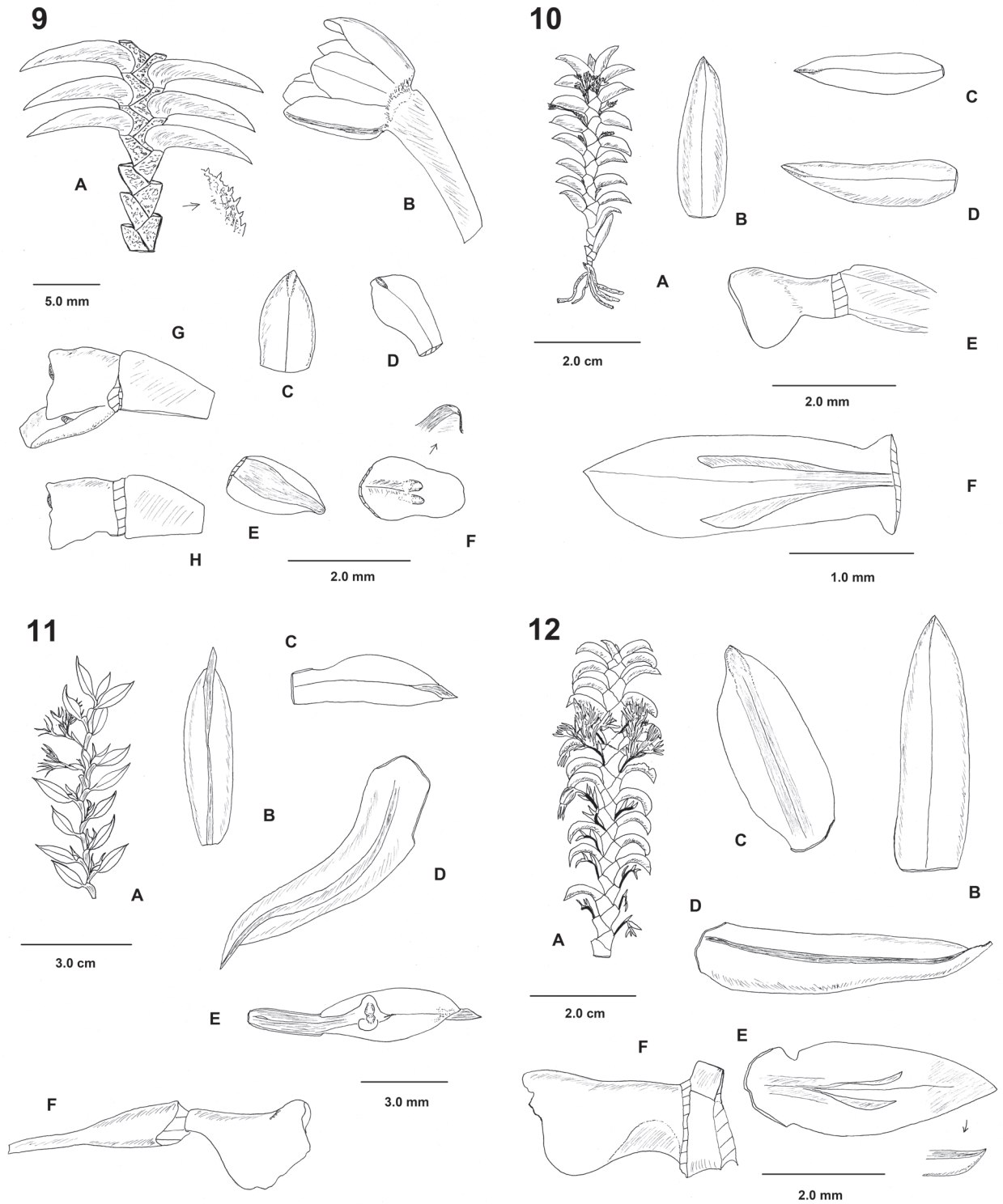


FIGURE 9–12. **9**, *Fernandezia camposii* Ormerod. **A**, stem fragment (leaf sheath margin arrowed); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column and labellum; **H**, column. Drawn from holotype. **10**, *Fernandezia carabayana* Ormerod. **A**, plant; **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, column; **F**, labellum. Drawn from holotype. **11**, *Fernandezia chaparensis* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, column. Drawn from holotype. **12**, *Fernandezia crassapex* Ormerod. **A**, stem; **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, column. Drawn from holotype.

Fernandezia carabayana Ormerod, *sp. nov.*

TYPE: PERU. Puno: Prov. Carabaya, Ackapampa to Juro-Juro, 3500 m, 31 December 1947, *C. Vargas C. 7038* (Holotype: AMES; Isotype: K, not seen). Fig. 10.

Usage synonym: *Pachyphyllum pectinatum* auct. non Rchb.f., *C. Schweinf.*, *Fieldiana*, Bot. 30, 4: 980. 1961 *p.p.*

Related to *Fernandezia ichneumonea* Ormerod but leaves acute (vs. long-apiculate), flowers with oblong-lanceolate (vs. oblong-oblancheolate) petals, and an oblong-oblancheolate (vs. oblancheolate) labellum.

Lithophytic herb. Roots terete, 0.5–0.8 mm thick. Stems simple to 2 branched (branches 2–3 cm long), densely leafy, 4–6 cm long, 0.2 cm wide across leaf sheaths, 0.1 cm thick. Leaves oblong-lanceolate, acute, fleshy, conduplicate, margins minutely denticulate towards apex, 6–7 mm long, 1.2–2.0 mm wide laterally; leaf sheaths smooth, striate, margins minutely denticulate. Inflorescence to 6 mm long; peduncle ca. 3 mm long; rachis few-flowered, 2.5–3.0 mm long; floral bracts deltate, acute, to 1.7 mm long. Flowers white. Pedicellate ovary clavate, triquetrous, 3.0–3.3 mm long. Dorsal sepal oblong-lanceolate, subacute, concave, 2.2 × 0.75 mm. Lateral sepals obliquely lanceolate, acute, carinate near apex, 2.7 × 0.8 mm. Petals narrowly oblong-lanceolate, acute, 2.2 × 0.7 mm. Labellum oblong-oblancheolate, acute, carinate below tip, 2.20 × 0.85–0.90 mm; lower 1/5 of lip divided by a low, thickened midline that divides into 2 divergent lamellae. Column broadly stalked, each side with an obliquely suborbicular wing, 1.4 mm long, 1.2 mm wide laterally.

Distribution: Peru.

Habitat: on rocks, 3500 m.

Etymology: named after the Province of Carabaya, the type locality.

In Peru this taxon is most closely related to *Fernandezia ichneumonea* but does not have long-apiculate leaves, flowers have petals that are not widened toward the apex, and the lip is not so markedly narrowed toward the base.

Fernandezia chaparensis Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, road between Cochabamba and Villa Tunari, 2800 m, 18 January 1983, *C. Luer, J. Luer, R. Vasquez, T. Mulder, D. Mulder & A. Vogel 12884* (Holotype: K; Isotype: MO, not seen). Fig. 11.

Related to *Fernandezia mercadoi* Ormerod but the flowers with a prominently apiculate (vs. acute) dorsal sepal, and petals with a shorter, broader claw.

Epiphytic herb. Roots terete, 0.5–0.7 mm thick. Stems flexuous, 3 branched (branches 11.0–11.5 cm long), subluxly leafy, to 46 cm long, 0.10–0.15 cm thick. Leaves oblong-lanceolate, acute to subacuminate, thinly coriaceous, margins minutely denticulate near the apex, 9.0–13.0 × 3.2–4.0 mm; leaf sheaths tubular, margins minutely denticulate, surface smooth. Inflorescence to 7 mm long; peduncle 3 mm long; rachis 2–3 flowered, to 4 mm long; floral bracts widely ovate, acute, to 5 × 3 mm. Flowers greenish-white, with a red dot on the lip. Pedicellate ovary clavate, triquetrous, 5.5 mm long. Dorsal sepal narrowly oblong, acute, midvein

carinate, prominently so at apex, gently upcurved, 6.0 × 1.2 mm. Lateral sepals obliquely ligulate-lanceolate, acute, subsigmoid, high carinate, basal 2.5 mm joined to lip, ca. 7.5 × 2.0 mm. Petals oblong-lanceolate from a shortly and broadly clawed base, acute, midvein carinate near apex, gently upcurved, 5.0 × 1.5 mm. Labellum narrowly oblong from a clawed base, carinate below tip, acute, claw ligulate, 2.2 mm long, blade 4.8 × 1.8 mm, in total 7.0 × 1.8 mm; callus of 2 semiprostrate, semicircular to semielliptic lobes joined by a transverse, bicallous thickening in lower half of lip blade. Column each side with broad, obliquely semicircular wing from a shortly clawed base, 3.8 mm long, 2 mm wide laterally.

Distribution: Bolivia.

Additional specimen examined: BOLIVIA. Cochabamba: Prov. Chapare, along the road to Villa Tunari, 2900 m, 22 January 1980, *C. Luer, J. Luer & R. Vasquez 4878* (SEL).

Habitat: roadside forest, 2800–2900 m.

Etymology: named after the type locality, Chapare Province.

Fernandezia chaparensis is a member of the *F. brevicornata* complex. It differs from the Peruvian *F. brevicornata* in having a narrower dorsal sepal, more distinctly carinate and apiculate near the apex, the calli of the lip joined (vs. separate) by a fleshy bicallous process, and the column with wider wings. The differences with its Bolivian congener *F. mercadoi* are mentioned above in the diagnosis, and further discussed under the latter taxon.

Fernandezia crassapex Ormerod, *sp. nov.*

TYPE: PERU. Cusco: Prov. Quispicanchis, edge of roadside between Marcapata and Abra Hualla Hualla, 3340 m, 15 October 1976, *D.C. Wasshausen & F. Encarnacion 829* (Holotype: US; Isotypes: MO, NY). Fig. 12.

Similar to *Fernandezia minor* (Schltr.) M.W. Chase var. *boekeorum* Ormerod but flowers with an ovate-lanceolate (vs. ovate-elliptic to elliptic) labellum much thickened in the upper 1/3.

Epiphytic herb. Roots terete, numerous, 0.4–0.8 mm thick. Stems simple to 1–3 branched (branches 2.5–6.5 cm long), laxly to densely leaved, 10.5–24.0 cm long, 0.10–0.25 cm thick. Leaves oblong-lanceolate, apiculate, margins minutely denticulate, conduplicate, fleshy, 7–9 mm long, 1.8–2.0 mm wide laterally; leaf sheaths smooth, striate, apices shortly spreading away from stem, margins denticulate. Inflorescence to 10 mm long; peduncle to 5 mm long; rachis with up to 6 flowers at once, to 5 mm long; floral bracts deltate, acute, to 2 mm long. Flowers greenish white. Pedicellate ovary clavate, triquetrous, 3.8–4.0 mm long. Dorsal sepal oblong-lanceolate, subacute, concave, 3.8 × 1.2 mm. Lateral sepals obliquely ligulate-lanceolate, subacute, carinate, 4.2 × 1.1 mm. Petals elliptic, acute, midline broadly thickened, 3.05 × 1.15 mm. Labellum ovate-lanceolate, acute, upper third (1.2–1.3 mm) much thickened, 3.7 × 1.7 mm; lower part of lip divided by a broad thickening that divides into 2 weakly divergent lamellae. Column each side with a broad low, rounded wing, 2 mm long, 1.65 mm wide laterally.

Distribution: Peru.

Habitat: cloud forest near a rocky outcrop, 3340 m.

Etymology: from the Latin *crassus*, thick, and *apex*, summit, in reference to the thickened upper 1/3 of the labellum.

Among the Peruvian taxa in the *Fernandezia pectinata* alliance, this one has the largest flowers (sepals to 4.2 mm long), with a distinctive ovate-lanceolate lip that is much thickened in the upper 1/3. It most closely resembles *F. minor* var. *boekeorum* but that has a thinner, ovate-elliptic to elliptic lip.

Fernandezia crystallina (Lindl.) M.W. Chase, Phytotaxa 20: 29. 2011.

Basionym: *Pachyphyllum crystallinum* Lindl., Orch. Linden.: 18. 1846. TYPE: VENEZUELA. Merida, 3050 m, August 1843, *J. Linden 686* (Holotype: K-L, image seen). Fig. 13–14.

Heterotypic synonyms: *Pachyphyllum pasti* Rchb.f., Bonplandia 3: 239. 1855. TYPE: COLOMBIA. Narino: Volcan Pasto, 3660 m, 1849, *W. Jameson 439* (Holotype: W-R 19266; Isotypes: BM, BR, K, TCD, images seen).

Fernandezia pasti (Rchb.f.) M.W. Chase, Phytotaxa 20: 30. 2011.

Pachyphyllum micrangis Schltr., Rep. Sp. Nov. Regni Veg., Beih. 7: 203. 1920 *syn. nov.* TYPE: COLOMBIA. Cauca: without locality, 3000 m, *M. Madero s.n.* ([Holotype: B, destroyed; drawing AMES]. Lectotype [Christenson 2008: 286]: t.73, f.282 [in Schltr. 1929]).

Fernandezia micrangis (Schltr.) M.W. Chase, Phytotaxa 20: 30. 2011.

Pachyphyllum stuebelii Schltr., Rep. Sp. Nov. Regni Veg., Beih. 7: 204. 1920. TYPE: COLOMBIA. Tolima: Volcan Tolima, paramo, above 4000 m, November 1868, *A. Stuebel 213* ([Holotype: B, destroyed; drawing AMES]. Lectotype [Christenson 2008: 287]: t. 73, f.283 [in Schltr. 1929]).

Fernandezia stuebelii (Schltr.) M.W. Chase, Phytotaxa 20: 31. 2011.

(?) *Pachyphyllum bucarasicae* Kraenzl., in Engl., Pflanzenr. IV, 50, 83: 25. 1923 *syn. nov.* TYPE: COLOMBIA. Santander: near Bucarasica, 3300 m, December, *W. Kalbreyer 918* (Holotype: B, destroyed).

(?) *Fernandezia bucarasicae* (Kraenzl.) M.W. Chase, Phytotaxa 20: 29. 2011.

Pachyphyllum peperomioides Kraenzl., in Engl., Pflanzenr. IV, 50, 83: 27. 1923 *syn. nov.* TYPE: COLOMBIA. Narino: near La Vega, 3300 m, 2 June 1878, *F.C. Lehmann s.n.* (Holotype: W-R 6340, image seen).

Fernandezia peperomioides (Kraenzl.) M.W. Chase, Phytotaxa 20: 30. 2011.

Pachyphyllum foreroi Szlach. & Kolan., Nord. J. Bot. 32, 6: 745. 2014 *syn. nov.* TYPE: COLOMBIA.

Caldas: road between Manizales and the Hotel Termales del Ruiz, 3000–3500 m, 8 June 1966, *E. Forero, M. Murillo & N. Montenegro 513* (Holotype: COL, image seen).

Fernandezia foreroi (Szlach. & Kolan.) Molinari & Mayta, Richardiana 16: 43. 2015.

Pachyphyllum longipedicellatum Szlach., Kolan. & Oledr., Ann. Bot. Fenn. 51: 225. 2014 *syn. nov.* TYPE: COLOMBIA. Putumayo: Alto Cuenca of the Rio Putumayo, ridge of the Cordillera between El Encano and Sibundoy, paramo San Antonio del Bordoncillo, 3250 m, 4 January 1941, *J. Cuatrecasas 11698B* (Holotype: COL, image seen).

Fernandezia longipedicellata (Szlach., Kolan. & Oledr.) Molinari & Mayta, Richardiana 16: 43. 2015.

Distribution: Costa Rica, Panama, Venezuela, Colombia, Ecuador, Peru, Bolivia.

Additional specimens examined: COSTA RICA. Limon: Cordillera de Talamanca, Atlantic slope, Valle de Silencio, along the Rio Terbi, 0.5–1.5 km W of the Costa Rican/Panamanian border, 2300–2400 m, 9 September 1984, *G. Davidse, G. Herrera Ch. & M.H. Grayum 28782* (MO). Puntarenas/Limon: on border, Cordillera de Talamanca, Cerro Nai, on the continental divide, 3130 m, 27 March 1984, *G. Davidse, G. Herrera Ch. & R.H. Warner 26130* (MO). Puntarenas: Canton de Perez Zeledon, Parque Internacional La Amistad, Cordillera de Talamanca, Sendero Herradura to Uran, 3000–3800 m, 8 April 1995, *R. Aguilar & O. Garrote 3991* (MO). San Jose: along Interamerican Highway, ca. 25 km SW of road to La Cima, and 4.1 km NW of Cerro Asuncion, E end of abandoned section of road, 3180–3220 m, 11 September 1979, *W.D. Stevens 14280* (MO, SEL). San Jose/Cartago: Cerro de la Muerte, 3100 m, 16 September 1943, *C.H. Lankester 1508* (AMES, SEL). Cartago: KM 66.5 S of Cartago, near area of paramo on clay road, no altitude, 7 July 1986, *J.T. Atwood 86-8* (SEL). PANAMA. Chiriqui: “La Chumbada” above Guadalupe, 1900–2400 m, 18–21 October 1980, *R.L. Dressler 5928* (MO). VENEZUELA. Merida: without locality, *J.K. Moritz 1076* (BM); Distrito Sucre, Santa Cruz de Mora to Canagua, 34.4 km from turn off from paved road in Guayabal, 2800 m, 15 December 1984, *A.L. Weitzman & N.M. Holbrook 190* (AMES). Trujillo: Distrito Carache, Paramo Turmal, SE of Pico Jabon, 2900 m, 27 May 1988, *L.J. Dorr, L.C. Barnett, R. Rivero & W. Diaz 5296* (AMES); Paramo de Guaramacal, between Bocono and Guaramacal, 2800 m, 24 February 1971, *J.A. Steyermark 104821* (AMES, K); Bocono to Guaramacal road, 2135–2440 m, *G.C.K. Dunsterville & E. Dunsterville 656* (AMES). Sucre: Cerro Turumuquire, 2200–2500 m, 6 May 1945, *J.A. Steyermark 62568* (AMES). COLOMBIA. Santander: W slope of Paramo Rico, 3300–3600 m, 15–19 June 1927, *E.P. Killip & A.C. Smith 17777A* (AMES). Norte de Santander: SE of Pamplona, no altitude, 30 June 1945, *M. de Garganta F. 1031* (F). Antioquia: Medellin, El Boqueron, 2300 m, 9 August 1967, *L.A. Garay 986* (AMES); San Felix, 3330 m, July 1944, *H.T. Albert 2055* (AMES); Municipio Urrao, Inspeccion Jaipera, Vereda El Chuscal, Paramo de Frontino, Sitio Llanogrande, 3000–

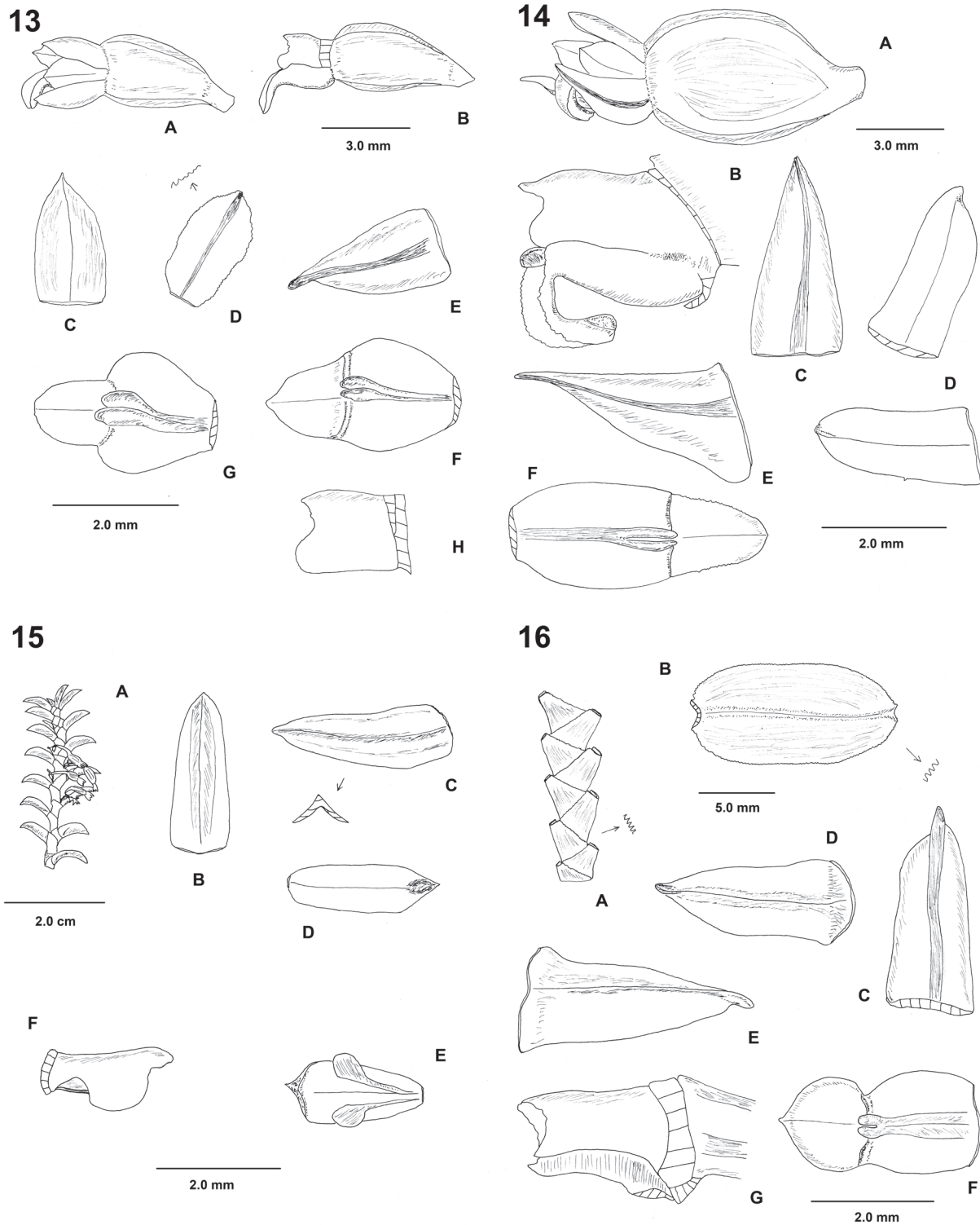


FIGURE 13–16. **13**, *Fernandezia crystallina* (Lindl.) M.W. Chase. Typical form. **A**, flower; **B**, flower minus tepals; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F–G**, labellums; **H**, column. **A–F**, **H**, from Pennell 9275 (AMES); **G** from Pennell 9786 (AMES). **14**, *Fernandezia crystallina* (Lindl.) M.W. Chase. *Pasti* form. **A**, flower; **B**, labellum and column; **C**, dorsal sepal; **D**, petals; **E**, lateral sepal; **F**, labellum. Drawn from Steyermark 53467 (AMES). **15**, *Fernandezia cuneata* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepal; **D**, petal; **E**, labellum; **F**, column. Drawn from holotype. **16**, *Fernandezia cuprea* Ormerod. **A**, stem fragment (minus leaves, no scale); **B**, leaf; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column. Drawn from holotype.

- 3390 m, 4 April 1989, *R. Callejas, J. Betancur, O. Escobar & J. Quintero 7501* (MO, NY); Municipio Urrao, on trail to Paramo de Frontino from finca La Quince, 3200–3600 m, 19 November 1988, *G. McPherson 13163* (MO); Paramo Frontino, near Llano Grande, 3450 m, 26 October 1976, *J.D. Boeke & J.B. McElroy 248* (MO, NY, SEL). Caldas: San Felix, high valley, 3330 m, July 1944, *Brother Tomas 2055* (US); Cordillera Central, “Pinares,” above Salento, 2600–2800 m, 2–10 August 1922, *F.W. Pennell 9275* (AMES); Cordillera Central, summit to “Cucarronera,” New Quindio trail, no altitude, 14 August 1922, *E.P. Killip 9786* (AMES). Cundinamarca: Macizo de Bogota, Paramo de Palccio (Hacienda La Siberia), El Tablon, 3350 m, 14 December 1959, *J. Cuatrecasas, M.T. Murillo & R. Jaramillo M. 21653* (US); Cordillera Oriental, 45 km S of Bogota, 10 km W of Gutierrez, Rio Blanco valley, N side of Quebrada San Roque, 2725 m, 27 July 1944, *M.L. Grant 9719* (US); Cordillera Oriental, Cerro Negro, Hato Grande, ridge E of Munchindote, 15 km E of Gachete, 3000 m, 13 June 1944, *M.L. Grant 9433* (US); Los Gaques, 3260 m, 13 March 1939, *A.H.G. Alston 7488* (BM); Paramo de Guasca, 3300–3500 m, 12 March 1939, *E.P. Killip 34117* (AMES); Paramo de Guasca, no altitude, 1919, *Brother Ariste-Joseph A411* (AMES); Paramo de Guasca, no altitude, 3 November 1956, *M. Ospina-Hernandez 13* (AMES); near Sueva, ca. 15 km W of Gachata, 2745 m, 5 July 1961, *L.A. Garay, C.E. McClennen & A. Kapuler 151* (AMES); Mt. Chuscal, W of Zipaquira, 3200–3300 m, 22 October 1917, *F.W. Pennell 2594A* (AMES, F, MO); 20 km E of Pacho, 3100 m, 1 August 1967, *L.A. Garay 963* (AMES); Quebrada del Chico, 3000 m, 4 November 1943, *M. Schneider 106* (AMES). Meta: confluence of Rio Arroz and Rio del Nevado, S slope of Paramo de Sumapaz, 2650 m, 31 August 1943, *F.R. Fosberg 20928* (US). Choco: Municipio San Hose del Palmar, Cerro del Torra, 2700–2800 m, 21 August 1988, *P. Silverstone-Sopkin, W.N. Paz, R.T. Gonzales, J.E. Ramos, L.H. Ramos & A. Henao 4686* (MO). Valle: Cordillera Central, W slope, Hoya del Rio Bugalagrande, Barragan: Paramo de Bavaya, Corrales, 3450–3520 m, 18–20 March 1946, *J. Cuatrecasas 20137* (F). Cauca: Paramo de Guanacas, 3000–3200 m, 3 August 1966, *L.A. Garay 924* (AMES); Paramo de Paletaria, 3000 m, 30 July 1961, *L.A. Garay, C.E. McClennen & A. Kapuler 349* (AMES); Tierra Adentro, Rio Palo basin, headwaters of Rio Lopez, 2500–3000 m, January 1906, *H. Pittier 1063* (AMES); above Monchique, W of Popayan, 2750 m, 26 July 1978, *C. Luer, J. Luer, J. Kuhn & R. Escobar 2993* (SEL); ca. 28 km E of Totoro, 3075 m, 6 May 1984, *J.L. Luteyn, R. Callejas & J.J. Pipoly 10186* (NY); Municipio Purace, Parque Nacional Purace, along road between Popayan and Neiva, at KM’s 147–148, 3300 m, 6 December 1980, *T.B. Croat 51969* (MO); Volcan Purace, ca. 1–2 km W of the Alto de San Rafael, 3300 m, 31 March 1972, *A.M. Cleef 2749* (SEL); Mecizo Colombiano, paramo de Las Papas, around the laguna of Cusiyaco, 3530 m, 11 October 1958, *H.G. Barclay & P. Juajibioy 6015* (AMES, MO); Paramo de Barbillas, SE of Popayan, 3070 m, 27 July 1978, *C. Luer, J. Luer, J. Kuhn & R. Escobar 3017 p.p.* (SEL); W slopes of the Paramo de Moras, 3000 m, 29 October 1882, *F.C. Lehmann 2043* (BM); near Pitayo, 3000–3400 m, 16 March 1884, *F.C. Lehmann 3750* (BM). Narino: “Provincia Pastoensi,” 3660 m, October, *W. Jameson 393* (BM, GH, K); without locality, 50 leagues (= 240 km) N of Quito (Ecuador), *W. Jameson s.n.* (GH); Cordillera Oriental, S side of Volcan Dona Juana, 3400–3600 m, 16 December 1944, *J. Ewen 16622* (AMES, BM, US); Municipio de la Cruz, Estivaciones del Volcan Dona Juana, 3550–3600 m, 29 October 1964, *L.E. Mora 3292* (AMES); NE ridge of Volcan Gualcala, 18 km SE of Piedrancha, 3600 m, 4–6 October 1943, *F.R. Fosberg 21136* (US); near crater lake on E slope of Volcan Galeras, 3200 m, 21 January 1979, *C. Luer & J. Luer 3747* (SEL); above Pueblo de Cumbal, Paramo de Cumbal, 3500 m, 4 July 1956, *S. Vogel 261* (AMES). Putumayo: Cordillera Portachuelo, along main road from Pasto to Mocoa, between Santiago and Pepino, 1900–2400 m, 2 August 1961, *L.A. Garay, C.E. McClennen & A. Kapuler 465* (AMES). ECUADOR. Carchi: Paramo W of Tulcan, 3800 m, 24 February 1992, *S. Dalstrom 1544* (SEL); Tulcan to Tufino, to Maldonado road, KM 50, 3100 m, 2 July 2000, *A. Alvarez & M. Alvarez 2628* (MO, NY); Tulcan to Maldonado, KM 39.2, 3620 m, 29 April 1993, *C.H. Dodson, E. Hagsater, N. Williams & A. Embree 19043* (MO); road to Tulcan and Maldonado, 3200 m, 16 March 1991, *A. Hirtz, C. Luer, J. Luer, J. del Hierro, F. Navarro, M. Navarro & X. Hirtz 5225* (SEL); Tulcan to El Angel road, ca. 30 km SW of Tulcan, near El Voladero, 3500 m, 23 February 1974, *G. Harling & L. Andersson 12098* (AMES, MO); El Angel, 3750 m, 15 July to 15 October 1983, *A. Hirtz 1161* (SEL); Maldonado to Tulcan road, near KM 35, 3100–3400 m, 3 October 1981, *L. Werling & S. Leth-Nissen LW 216* (MO); Tulcan to Maldonado, 3000 m, 4 April 1984, *S. Dalstrom & T. Hoijer 731* (SEL); Tulcan to Maldonado road, KM 45, 3600 m, 1 August 1985, *C.H. Dodson & A. Embree 16131* (MO, SEL); Tulcan to Maldonado road, 50–53 km from Tulcan, 3200–3500 m, 1 August 1976, *B. Ollgaard & H. Balslev 8315* (AMES, F, MO, NY, SEL); Tulcan to Maldonado, KM 55, 3500 m, November 1985, *Luther, E. Besse & Halton 870* (SEL); Huaca, Parroquia Mariscal Sucre, Estacion Biologica Guandera, 3300–3500 m, 4 January 2001, *A. Alvarez & E. Narvaez 2827* (NY). Imbabura: NE of Volcan de Cayambe, along trail to Rio Boqueron, 3810 m, 16 May 1944, *W.B. Drew E-236* (AMES); 10 km N of Ibarra, Hacienda Yura Cruz, 3700–3800 m, 25 May 1973, *L. Holm-Nielsen, S. Jeppesen, B. Lojtant & B. Ollgaard 6486* (AMES, MO, SEL); Paramo de Adjanda, above Otavalo, 3400–3600 m, July 1886, *F.C. Lehmann 6225* (K). Napo: slopes above Laguna Porjuantag, no altitude, 6 February 1953, *G.W. Prescott Exped. 549 p.p.* (NY); near Lake Porjuantag, no altitude, 10 February 1953, *G.W. Prescott Exped. 344* (NY); San Miguel (Salcedo) to Puerto Nuevo (Napo) road, 54 km from San Miguel, 3200–3300 m, 29 September 1976, *B. Ollgaard & H. Balslev 9819* (NY); Papallacta, on lava, 3100–3300 m, 15–16 June 1968, *G. Harling, G. Storm & B. Strom 10345* (AMES); Playon de San Francisco, El Mirador, no altitude, 16 August 1978, *J.D. Boeke & J. Jaramillo A. 2729* (MO, NY, SEL). Pichincha: NW side of the Volcan Atacazo, 3900–4180 m, 29 November 1985, *V. Zak 712* (GH, K, MO); Atacazo, 3500 m, 15 July to 15 October 1983, *A. Hirtz 1057* (MO, SEL); road from Olmedo toward Laguna San Marcos, N slopes of Volcan Cayambe, 3700 m,

28 October 1983, *H. Balslev & W.C. Steere 4471* (NY); Reserva Ecologica Cayambe-Coca, area of the road toward Laguna de San Marcos, 3300–3500 m, 17 June 2000, *A. Alvarez & G. Alvarez 2604* (NY); Yanacocha road, on the NW slope of the Cerro Pichincha, no altitude, 30 September 1982, *H. Balslev & W.C. Steere 3252* (NY); Cayambe, Laguna San Marcos, 3420 m, 29 December 1999, *B. Cuamacas & E. Gudino 515* (MO); along the old road between Quito and Chiriboga, a few km W of the pass, 3400 m, 6 February 1979, *C. Luer, J. Luer & R. Escobar 3848* (SEL). Cotopaxi: Volcan Cotopaxi, along the road and at Limpio Punga, 3500–3850 m, 23 March 1984, *S. Laegaard 51852* (K). Tungurahua: Llanganetes Range, Patate to Lieto to El Triunfo, 3000 m, 5 October 1984, *A. Hirtz 1994* (MO); without locality, 3000 m, 12 October 1984, *A. Hirtz 1994* (MO); Tunguragua (presumably on the volcano), 4265 m, *Sutton-Hayes 1* (BM); Tunguragua, *R. Pearce s.n.* (K). Chimborazo: road from San Miguel de Pungala to Alao, KM 15, Sitio Pucara, 3050 m, 12 July 2000, *A. Alvarez, L. Suin & J.C. Valenzuela 2667* (NY). Canar/Morona-Santiago: pass between Gualaceo to Limon, 3200 m, 16 January 1986, *S. Dalstrom & T. Hoiyer 1045* (SEL). Azuay: Gualaceo to General Plaza (Limon) road, 0–5 km W of the pass, 3200–3450 m, 10 June 1979, *B. Lojtant & U. Molau 14487* (MO, NY); between Huagrancha and Loma de Galapagos, 3140–3505 m, 9 July 1943, *J.A. Steyermark 53467* (AMES, F); Sigsig to Gualaquiza, KM 25.6, at the pass on military post road, KM 3.3 from pass to military post, 3200–3300 m, 11 January 2000, *P.M. Jorgensen, C. Ulloa, E. Narvaez & M. Lara 1783* (MO); Cuenca to Gualaquiza, near Ave Maria Pass, 3300 m, 16 February 1986, *A. Embree 011* (MO). Morona-Santiago: 0–4 km E of below the pass on the Alao to Huamboya trail, 3650–3950 m, 5 January 1988, *U. Molau, B. Eriksen & B.B. Klitgaard 2372* (MO); Gualaceo to Loma de la Virgen to Limon Indanza road, KM 27, 3300 m, 19 July 2000, *A. Alvarez, L. Suin & J.C. Valenzuela 2737* (MO, NY); Gualaceo to El Limon road, from the pass towards El Limon, 3200–3400 m, 8 February 1989, *H. van der Werff & W. Palacios 10538* (MO); Gualaceo to Macas road, E of the pass, 2450 m, 23 October 1984, *P.M. Jorgensen, S. Laegaard & W.C. Steere 56247* (MO); E of pass on road from Cuenca to Limon, 2800–3100 m, 20 November 1989, *C.H. Dodson, N. Williams, E. Hagsater & M. Whitten 17725* (AMES, K, MO, SEL); Cuenca to Limon road via Gualaceo, 3400 m, 16 February 1996, *A. Hirtz, C. Luer, J. Luer & A. Embree 2760* (MO); Cuenca to Limon, KM 55, 2800 m, 29 November 1984, *C.H. Dodson, P.M. Dodson, S. Jaramillo & M. Barahona 15481* (AMES, MO); above Sigsig, 2850 m, 6 May 1981, *J. Kuhn, L. Kuhn, C. Luer & J. Luer 57* (MO). Loja: Jimbura to Zumba road, KM 24 at the pass, 3480–3600 m, 6 November 2000, *P.M. Jorgensen, C. Ulloa & J. Caranqui 2267* (MO); above Jimbura, 3350 m, 21–22 March 1984, *C. Luer, S. Dalstrom, T. Hoiyer & J. Kuijt 9640* (SEL); Villonaco, 2900 m, 5 October 1946, *R. Espinosa 737* (AMES); ex Saraguro, cult. Ecuagenera Gualaceo Facility, 3800 m, 11 July 2002, *A. Hirtz 8418* (SEL). Zamora-Chinchipe: Cerro Colorado, S of Nambija, 2500 m, 17–20 February 2002, *A. Hirtz, D. Neill,*

T. Delings, C. Cole, M. Manzanares, A. Egas & W. Quishpe 7992 (SEL). Without locality: *F.C. Lehmann 6865* (AMES). PERU. Amazonas: Prov. Bagua, Cordillera Colan, E of La Peca, ridge W of peaks, 2925 m, 28 August 1978, *P. Barbour 3258* (F, MO, SEL). Pasco: Prov. Oxapampa, Distrito Huancabamba, Santa Barbara, above Lanturachi, 3300–3500 m, 2 July 1985, *R.B. Foster 10460* with *B. d'Achille & A. Brack* (AMES); Santa Barbara, 3200–3300 m, 3 August 1984, *D.N. Smith 8171* (MO). Cajamarca: Prov. Jaen, Sallique, Localidad El Paramo, 3200 m, 23 June 1988, *J. Campos, C. Diaz & T. Guevera 5066* (F, MO); same data, *J. Campos, C. Diaz & T. Guevera 5089* (MO); Prov. Chota, forest of El Pargo, between Llama and Huambos, 3090 m, 15 August 1994, *S. Leiva G., P. Chuna & J. Cadle 1535* (F, GH); El Pargo, 16 km E of Tunas Pampa, ca. 42 km E of Llama on road to Huambos, 3000 m, 18 September 1991, *A. Gentry, C. Diaz & R. Ortiz 74908* (MO, SEL). Ayacucho: Prov. La Mar, E massif of the Cordillera Central, opposing the Cordillera Vilcabamba, between Tambo San Miguel, Ayna, and Hacienda Luisiana, Punccu Camp, ca. 4.5 km walking distance SW from Hacienda Luisiana and the Apurimac River, ca. 30 km from Hacienda Santa Rosa, ca. 10 km from Tambo, 3220 m, 24 August 1968, *T.R. Dudley 12061* (MO). Cusco: Prov. Urubamba, near Wenner Gren ruins, 3400–3600 m, 5–6 August 1942, *R.D. Metcalf 30756* (AMES, MO); same data, *R.D. Metcalf 30775* (AMES, GH, MO); Urubamba, on Puyupata to Sayacmarca trail, 3000 m, 5 August 1942, *C. Vargas C. 2895* (AMES). BOLIVIA. La Paz: Prov. Nor Yungas, 1.2 km E of Cotapata, on road between Unduavi and Chuspipata, 3100 m, 26 June 1986, *J.C. Solomon 15343* (MO, NY, SEL). Prov. Sud Yungas, E of Unduavi, 3100 m, 22 January 1984, *C. Luer, J. Luer & R. Vasquez 9419* (SEL); along Rio Unduavi, 3200 m, 28 January 1980, *C. Luer, J. Luer, R. Vasquez & R. Nara 4976* (SEL). Prov. Larecaja, Cocopunco, 3050 m, 24–29 March 1926, *G.H. Tate 336* (NY).

This species essentially has two races, one of which is mostly distributed from Costa Rica, Panama, and central and eastern Colombia to Venezuela, and complies with typical *Fernandezia crystallina* (see Fig. 13) in having small flowers (sepals 2.0–2.5 mm long). The occasional plant reaches to southern Ecuador (*Espinosa 737*). The other race (the “*pasti*” form, see Fig. 14) is most common in western Colombia, down the Andes through Ecuador and Peru to Bolivia, it has larger flowers (sepals 3–4 mm long and more). The two races agree in all floral characters, and occasional specimens with flowers intermediate in size do exist. In the “*pasti*” form there is quite some variation in labellum shape, which can vary from perfectly oblong to trilobed, but as is typical of the species the upper half or “midlobe” is decurved. There also occurs in the Province of Chota, Peru, a small-flowered variant of the “*pasti*” form (*Leiva et al. 1535*; *Gentry et al. 74908*), which I at one stage considered a separate species. However, all the deviating floral measurements are accounted for in the broader variability of *F. crystallina*.

Having become familiar with the vegetative variation (which is presumably linked to habitat and exposure in

some cases) of the species I see no reason to recognize taxa such as *Pachyphyllum peperomioides* (elliptic leaves), *P. longipedicellatum* (linear, canaliculate leaves), *P. micrangis* (fleshy curved leaves), and *P. stuebelii*. All florally agree with the species as I understand it.

In regard to *Pachyphyllum bucarasicae* from eastern Colombia, it cannot be known for certain that it is a synonym because the type is now lost. The description perfectly matches typical *Fernandezia crystallina* in vegetative and floral characters except for two points that require explanation. The leaf sheaths are said to be entire, but likely the margins were recurved and thus the true edge was not observed, since plants with strongly denticulate leaf margins do not have entire leaf sheath edges. The lip is said to be linear, sigmoid, and 0.5 mm wide. This seems unlikely since the petals are said to be 1 mm wide. After study of many species in the genus I find the lip is always around the same width as the petals, and never drastically half their width. Therefore, I suspect faulty observation or poor rehydration of the flower. Importantly the lip is said to be deflexed, another typical feature of *F. crystallina*. For these reasons I consider *Pachyphyllum bucarasicae* to be a synonym of *F. crystallina*.

I could not find separating characters for the recently described *Fernandezia foreroi*. The type is from the Department of Caldas in Colombia and agrees well vegetatively with specimens I have seen from there, except that the flowers are said to be about 3 mm long (sepals 2.0–2.4 mm long in material I studied), like in the “*pasti*” form. Among the paratypes cited for it is *Schneider 106* (COL) from La Rambla, however the specimen with this number in AMES is from Quebrada del Chico. Schneider sometimes gave the same number to what he thought was the same species. His specimen in AMES is typical *F. crystallina*.

Pachyphyllum longipedicellatum was recognized due to its narrow, canaliculate leaves, flowers with a long pedicellate ovary (5.5 mm long), and arose margins (not illustrated) of the lip. The type sheet of this taxon contains a mixture (the other specimens form the holotype of *P. putumayoensis*), and the type of *P. longipedicellatum* is in the upper half of the sheet between two specimens of *P. putumayoense*. However, on the lower lefthand side of the sheet is a typical specimen of *Fernandezia crystallina* with flat leaves that has been misidentified as *F. putumayoensis*. The specimen chosen as type of *P. longipedicellatum* is in my opinion a plant found in an exposed area. The elongate pedicellate ovary (5.5 mm) could not be confirmed. Flowers that I measured from the image had a 3.5-mm-long pedicellate ovary. The floral characters of *P. longipedicellatum* therefore match *F. crystallina* in sepal, petal, and lip shape (including the recurved “epichile”). The column appears to have collapsed down a little; its shape as illustrated is not representative of the genus.

Fernandezia cuneata* Ormerod, *sp. nov.

TYPE: BOLIVIA. La Paz: Prov. Nor Yungas, 8.7 km below Chuspipata on road to Yolosa, 2400 m, 23 January 1983, J.C. Solomon 9321 (Holotype: MO). Fig. 15.

Related to *Fernandezia angusta* Ormerod var. *angusta* but with shorter (5–6 vs. 5–10 mm), oblong-lanceolate (vs. ligulate) leaves, shorter (3–4 vs. 5 mm) inflorescence peduncles mostly hidden (vs. exposed) in the leaf sheaths, and flowers with a cuneate (vs. oblong-oblongeolate) labellum.

Epiphytic herb. Roots terete, 0.8 mm thick. Stems weakly flexuous, 5–6 branched (branches 3–4 cm long), subclaxly leafy, 8 cm long, 0.10–0.17 cm thick, 0.2 cm across leaf sheaths. Leaves oblong-lanceolate, acute, minutely denticulate near apex, fleshy, conduplicate, 5–6 × 3.2–3.4 mm; leaf sheaths obliquely obtuse in lateral view, margin recurved, minutely denticulate, surface smooth, striate. Inflorescence 5–7 mm long; peduncle 3–4 mm long, mostly hidden in leaf sheath; rachis few-flowered, 2–3 mm long ca. 2.5 mm long. Dorsal sepal oblong-lanceolate, acute, thickened along midvein, 2.3 × 0.8 mm. Lateral sepals obliquely oblong-lanceolate, acute, thickened along midvein, 2.65 × 0.90–0.95 mm. Petals oblong, acute, thickened below apex, 2.15 × 0.75 mm. Labellum cuneate, subacute, carinate below tip, 2 × 1 mm; lower 2/3 of lip with divergent lamellae that overlap the sides of the lip, apices flap-like, semicircular to subquadrate. Column shortly clawed, each side with semicircular wing, 1.6 mm long, 0.8 mm wide laterally.

Distribution: Bolivia.

Habitat: cloud forest with little disturbance, 2400 m.

Etymology: from the Latin *cuneatus*, wedge-shaped, in reference to the lip shape.

As noted above this species seems closely related to *Fernandezia angusta*, differing from the typical variety of that entity in having shorter, oblong-lanceolate (vs. ligulate) leaves, inflorescences with slightly shorter peduncles that are mostly hidden (vs. exposed) by the leaf sheaths, slightly larger flowers, and a cuneate (vs. oblong-oblongeolate) lip.

Fernandezia cuprea* Ormerod, *sp. nov.

TYPE: ECUADOR. Loja: Cordillera de Las Lagunitas, Amaluzza to Jimbura to Zumbura road, KM 36, 3390 m, 22 November 1994, P.M. Jorgensen, C. Ulloa, S. Leon, H. Vargas & P. Lozano 739 (Holotype: MO). Fig. 16.

Related to *Fernandezia kosnipatae* Ormerod but with shorter (10–15 vs. 17–26 mm) elliptic (vs. oblong) leaves, and flowers with a transversely elliptic (vs. suborbicular-subquadrate) front part of the labellum.

Terrestrial herb. Roots terete, 0.8–1.5 mm thick. Stems simple, densely leafy, 8–21 cm long, 0.5–0.8 cm wide across leaf sheaths, to 0.3 cm thick. Leaves elliptic, subacute, coriaceous, margins minutely denticulate, carinate below tip, drying a coppery color, 10.0–15.0 × 4.5–6.5 mm; leaf sheaths with exposed part triangular, margins minutely denticulate, smooth, dorsal edge 7.5 mm long. Inflorescence 10–12 mm long; peduncle 5 mm long; rachis secund, densely 3–5 flowered, 5–7 mm long; floral bracts deltate, acute, to 3 mm long. Flowers white and light green. Pedicellate ovary clavate, triquetrous, 4 mm long; capsule green. Dorsal sepal oblong, bluntly apiculate, fleshy, midvein thickly carinate, 3.0 × 1.3 mm. Lateral sepals obliquely oblong-

lanceolate, subacute, fleshy, midvein carinate, 3.40×1.30 – 1.75 mm wide. *Petals* oblong-lanceolate, subacute, midline thickened, 2.9×1.1 mm. *Labellum* elliptic-subpandurate, apiculate, lower part 1.8×1.8 mm, upper part transversely elliptic, 1.1×1.6 mm, in total 2.9×1.8 mm; lower half of lip divided by a thick midline ending in 2 parallel, fleshy, oblong, obtuse calli. *Column* rectangular in profile, 2 mm long, 0.8–1.0 mm wide laterally.

Distribution: Peru.

Habitat: shrubby vegetation and surrounding paramo and subparamo, 3390 m.

Etymology: from the Latin *cuprum*, copper, in reference to the color the leaves dry.

This species is related to the Peruvian *Fernandezia kosnipatae*, both drying a reddish to brownish color. From the latter it may be distinguished by its more compact habit, densely leaved stems, elliptic (vs. oblong) leaves, and flowers in which the lip has a transversely elliptic (vs. suborbicular-subquadrate) upper half or “midlobe.”

Fernandezia cymbiformis Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: between Leimebamba and Balsas, 3050 m, 25 August 1980, C. Luer, J. Luer, W. Koeniger & H. Koeniger 5425 (Holotype: SEL). Fig. 17.

Related to *Fernandezia solomonii* Ormerod but flowers with less oblique, narrower (1.0 vs. 1.8 mm) petals, a narrower (1.1 vs. 2.0 mm), almost evenly (vs. strongly unequally) pandurate labellum, and a shorter (2.1 vs. 3.2 mm) column.

Epiphytic herb. *Roots* terete, ca. 1 mm thick. *Stems* simple, subdensely leafy, 10.5 cm long, 0.18–0.20 cm wide across leaf sheaths, 0.06 cm thick. *Leaves* oblong, subacute, coriaceous, 7.0 – 9.5×3.0 – 4.0 mm; leaf sheaths tubular, truncate, margins entire, not fully covering internodes, 3.5 – 4.5 mm long. *Inflorescence* 6.0–6.5 mm long; peduncle mostly hidden in leaf sheath, ca. 4 mm long; rachis few-flowered, 2.0–2.5 mm long; floral bracts deltate, acute, to 3×2 mm. *Flowers* cream. *Pedicellate ovary* clavate, triquetrous; capsule triquetrous, 7 mm long (including pedicel 1 mm long). *Dorsal sepal* ligulate, subacute, midvein low carinate, 3.7×1.0 mm. *Lateral sepals* obliquely lanceolate, acute, midvein carinate, joined to each other and petals for c. 1 mm, 4.8×1.2 mm. *Petals* obliquely oblong-ligulate, acute, midline thickened, 3.5×1.0 mm. *Labellum* clawed, subpandurate, joined to synsepal for c. 0.9 mm, claw ligulate, 1.15×0.25 mm, blade 2.75 mm long (lower part 0.9 mm wide, upper part cymbiform 1.1 mm wide), in total 3.9×0.9 – 1.1 mm; callus of two relatively large semi-elliptic, parallel lamellae. *Column* shortly and broadly stalked, each side with a suborbicular wing, 2.1 mm long, ca. 1.3 mm wide laterally.

Distribution: Peru.

Habitat: cloud forest, 3050 m.

Etymology: from the Latin *cymbe*, boat, and *forma*, shape or form, in reference to the shape of the upper half of the labellum.

Among taxa in the *Fernandezia breviconnata* (Schltr.) M.W. Chase group this species has the smallest flowers and

shortest column. It appears to be most similar to *F. solomonii* from Bolivia, but the flowers have narrower petals, and an almost evenly pandurate lip with larger, parallel (not oblique) calli.

Fernandezia denticulata Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 1: 240. 1798.

TYPE: PERU. Huanuco: Pillao, H. Ruiz & J. Pavon s.n. (Holotype: MA, image seen; Isotype: BM). Fig. 18.

Homotypic synonym: *Pachyphyllum denticulatum* (Ruiz & Pav.) Schltr., Rep. Sp. Nov. Regni Veg., Beih. 9: 180. 1921.

Lithophytic and epiphytic herb. *Roots* terete, 0.7–0.8 mm thick. *Stems* simple, densely leafy, 7–17 cm long, 0.3–0.4 cm wide across leaf sheaths, ca. 2 mm thick. *Leaves* ligulate, subacute, weakly curved, shallowly canaliculate, margins minutely denticulate, fleshy, 8 mm long, ca. 2 mm wide laterally; leaf sheaths broadly deltate-infundibuliform, margins minutely denticulate, smooth, striate. *Inflorescence* to 7 mm long; peduncle ca. 3 mm long; rachis up to 5 flowered, to 4 mm long; flora ca. 3 mm long. *Dorsal sepal* ovate, subacute, concave, 1.9×1.1 mm. *Lateral sepals* obliquely ovate-elliptic, subacute, midvein carinate, most notably in upper 1/3, 1.9×1.0 mm. *Petals* elliptic, subacute, margins minutely denticulate, midvein low carinate, 1.75 – 1.80×0.90 mm. *Labellum* subpandurate, subacute, lower part 1.10×1.15 mm, upper part 0.8×0.8 mm, in total 1.90×1.15 mm; lower half divided by a low thick ridge that ends apically in 2 parallel, oblongoid calli. *Column* stout, 1.2–1.3 mm long, ca. 0.9–1.0 mm wide.

Distribution: Peru.

The above description is based on the BM isotype and is provided to augment knowledge of the species. Despite study of numerous Peruvian specimens, no later collections were found, perhaps indicating that the plant is a local endemic.

Fernandezia diazii Ormerod, *sp. nov.*

TYPE: PERU. Cajamarca: Prov. Cutervo, KM 10 from San Andres towards Socota, on property of Senor Vitelo Diaz, 2500 m, 19 April 1988, C. Diaz & S. Baldeon 2812 (Holotype: MO). Fig. 19.

An isolated species of section *Lamellata* characterized by having flowers with obovate-oblancoate petals, a pandurate labellum with 2 elongate lamellae, and a relatively long-stalked column.

Epiphytic herb. *Roots* terete, 0.3–0.7 mm thick. *Stems* simple or occasionally one branched (branch to 3.4 cm long), flexuous, laxly leafy, 6.5–12.5 cm long, 0.17 cm wide across leaf sheaths, 0.05 cm thick. *Leaves* ligulate, subacute, often shortly decurved near apex, 10.0 – 15.0×2.0 – 2.4 mm; leaf sheaths often not fully covering stem, smooth. *Inflorescence* to 8.5 mm long; peduncle 5.0–5.5 mm long; rachis 4–5 flowered, to 3 mm long; floral bracts lanceolate-deltate, acute, to 1.7 mm long. *Flowers* greenish-white. *Pedicellate ovary* clavate, triquetrous, 3.3 mm long. *Dorsal sepal* oblong-ligulate, obtuse, midvein low carinate near the apex, 1.95×0.75 – 0.80 mm. *Lateral sepals* obliquely

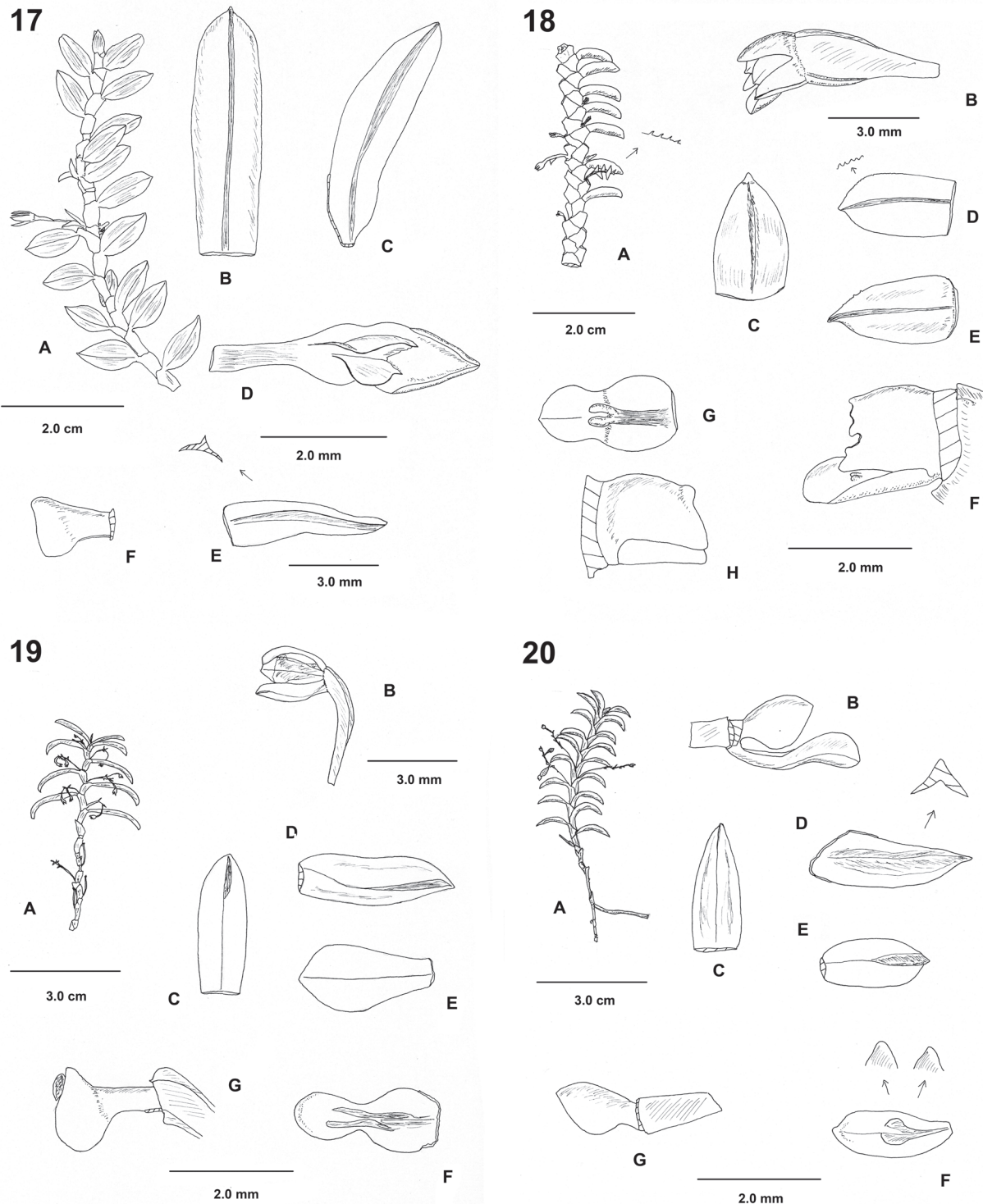


FIGURE 17–20. **17**, *Fernandezia cymbiformis* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D**, labellum; **E**, lateral sepal; **F**, column. Drawn from holotype. **18**, *Fernandezia denticulata* Ruiz & Pav. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum and column; **G**, labellum; **H**, column. Drawn from isotype (BM). **19**, *Fernandezia diazii* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype. **20**, *Fernandezia dorriana* Ormerod. **A**, plant; **B**, labellum and column; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype.

oblong-ligulate, acute, midvein carinate toward apex, 2.20 × 0.75 mm. *Petals* obovate-oblongate, subacute, 1.95 × 1.00 mm. *Labellum* pandurate, obtuse, lower part 1.10 × 0.95–1.00 mm, upper part 0.9–1.0 × 0.8 mm, in total 2.10 × 0.95–1.00 mm; lower half divided by a low, thick ridge that diverges into 2 lamellae on the upper half of the lip. *Column* clawed, expanded each side into a broad semicircular wing, 1.5 mm long, 1.2 mm wide laterally.

Distribution: Peru.

Eponymy: named after Camilo Diaz, Peruvian biologist and botanist, and collector of the type.

This species resembles *Fernandezia callacallae* and *F. falcifolia* in habit, but its floral characters (stalked column, lamellae on lip) indicate it belongs in section *Lamellata*. It may be recognized by a suite of characters such as the obovate-oblongate petals and pandurate, rounded lip.

Fernandezia distichoides M.W. Chase, *Phytotaxa* 20: 30. 2011.

Basionym: *Pachyphyllum distichum* Kunth, *Nov. Gen. Sp.* 1: 339. 1816.

TYPE: ECUADOR. Near Loja and Gonzanam, 1955 m (1070 hexap.), July 1802, A.J.A. Bonpland & F.W.H.A. von Humboldt 2123 p.p. (Lectotype, here chosen: P 00669643 righthand plant, image seen).

Distribution: Ecuador.

The type material of this taxon comprises four sheets kept in Paris. At least three species appear to be present on these sheets, but only sheet 00669643 has material (on the righthand side) matching the illustration in the protologue (Kunth 1816). The lefthand plant on this sheet has laxer, shorter, more pointed leaves, I believe it represents *F. hamiltonii*, newly described below.

While *Fernandezia distichoides* likely occurs in Peru I have preferred not to accredit specimens to it until a more detailed study can be made to ascertain the specific limits of the taxon.

Fernandezia dorriana Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Carrasco, Serrania Siberia, 20–35 km W of Comarapa (Dept. Santa Cruz), on the old Cochabamba to Santa Cruz road (Highway 4), 2000 m, 14–15 January 1990, L.J. Dorr & L.C. Barnett 7026 p.p. (Holotype: GH; Isotypes: MO, NY). Fig. 20.

Related to *Fernandezia jordaniae* Ormerod var. *jordaniae* but the flowers with acute (vs. obtuse) sepals, petals with a thick carina (vs. absent) on the petals, and the labellum sessile (vs. clawed).

Epiphytic (?) *herb.* *Roots* terete, 0.4–1.2 mm thick. *Stems* simple, subslaxly leafy, 6–18 cm long, 0.05–0.10 cm thick. *Leaves* oblong-lanceolate to lanceolate, acute, fleshy, margins minutely denticulate near the apex, 8 × 4 mm; leaf sheaths semitubular, margins entire to occasionally denticulate, surface smooth, 5 mm long. *Inflorescence* 12–14 mm long; peduncle 7–8 mm long; rachis 5–8 flowered, 5–6 mm long; floral bracts deltate, acute, 2.0–2.5 × 1.6 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, 2.8–3.9 mm long. *Dorsal sepal* oblong to oblong-lanceolate, acute, fleshy, 1.70–1.85 × 0.75–0.80 mm. *Lateral sepals* obliquely oblong-lanceolate, acute,

midvein thickly carinate, 2.05–2.20 × 0.75–0.90 mm. *Petals* oblong to oblong-obovate, acute, midvein high carinate on outside in upper half, 1.65–1.75 × 0.75 mm. *Labellum* oblong to rhombic from a cuneate base, obtuse, carinate below tip, 1.7–1.8 × 0.8–0.9 mm; lower half with a low, narrow, median thickening dividing midway on the lip into 2 triangular lamellae. *Column* each side medially dilated into a low broad wing, 1 mm long, 0.7–0.9 mm wide laterally.

Distribution: Bolivia.

Additional specimens examined: BOLIVIA. Cochabamba: near Siberia, between Comarapa and Cochabamba, 2500–2600 m, 18 January 1983, C. Luer, J. Luer, E. Besse & R. Vasquez 8530 p.p. (SEL). Santa Cruz: La Siberia, 2550 m, 3 December 1978, R. Vasquez 203 (SEL).

Eponymy: named after Laurence J. Dorr (1953–), specialist in the Malvales based at US and one of the collectors of the type.

The holotype of this species is a mixed collection; the other specimen present represents the holotype of *Fernandezia barnettii*, described above. The isotypes in MO and NY, however, have only material of *F. dorriana* on them. From *F. barnettii*, *F. dorriana* may be distinguished by its fleshier, oblong-lanceolate (vs. elliptic) leaves, strongly keeled lateral sepals and petals, and lip with calli raised into triangular flaps (vs. 2 long lamellae). However, its closest ally appears to be *F. jordaniae* var. *jordaniae* from the same region, a taxon with a similar habit and floral size. The two seem to differ in details of the sepals (acute vs. obtuse), petals (carinate vs. ecarinate), and labellum (sessile vs. clawed).

Fernandezia ecallosa (D.E. Bennett & E.A. Christenson) M.W. Chase, *Phytotaxa* 20: 30. 2011.

Basionym: *Pachyphyllum ecallosum* D.E. Bennett & E.A. Christenson, *Icon. Orch. Peruv.*: t.738. 2001.

TYPE: PERU. Huancavelica: Prov. Taycaja, Distrito Huachocolpa, Capcasoro, 3400 m, 15 June 1999, M. Leon M. 3067 (Holotype: MOL [including two samples in spirit], not seen). Fig. 21G.

Leaves ligulate, acute, upper margin shortly fimbriate-denticulate, upper surface rugose, often secund, 7–16 × 1.8–3.5 mm. *Flowers* green with tips of petals becoming yellow as the capsule develops. *Dorsal sepal* oblong, obtuse, slightly thickened in upper 1/3 along midvein, upper half with minutely denticulate-papillose margins, 3 × 1.2 mm. *Lateral sepals* obliquely oblong-ligulate, apex irregular, upper half with denticulate margins, thickened along midvein, weakly curved, 2.6–2.8 × 0.95–1.00 mm. *Petals* oblong, apex irregular, upper half with denticulate margins, thickened along midvein, 2.8 × 1.2 mm. *Labellum* ovate, acute, upper half with minutely papillose margins, 2 × 1.5 mm; lower half divided by an obscure ridge that diverges apically into 2 short, parallel, decrescent ridges. *Column* short, broad, each side with a short, suborbicular, downward-pointing wing, 1 × 1 mm.

Distribution: Peru.

Additional specimen examined: PERU. San Martin: Distrito Huallaga, valley of the Rio Apisoncho, 30 km above Jucusbamba, 3600 m, 12 August 1965, A.C. Hamilton & P.M. Holligan 1261 (K).

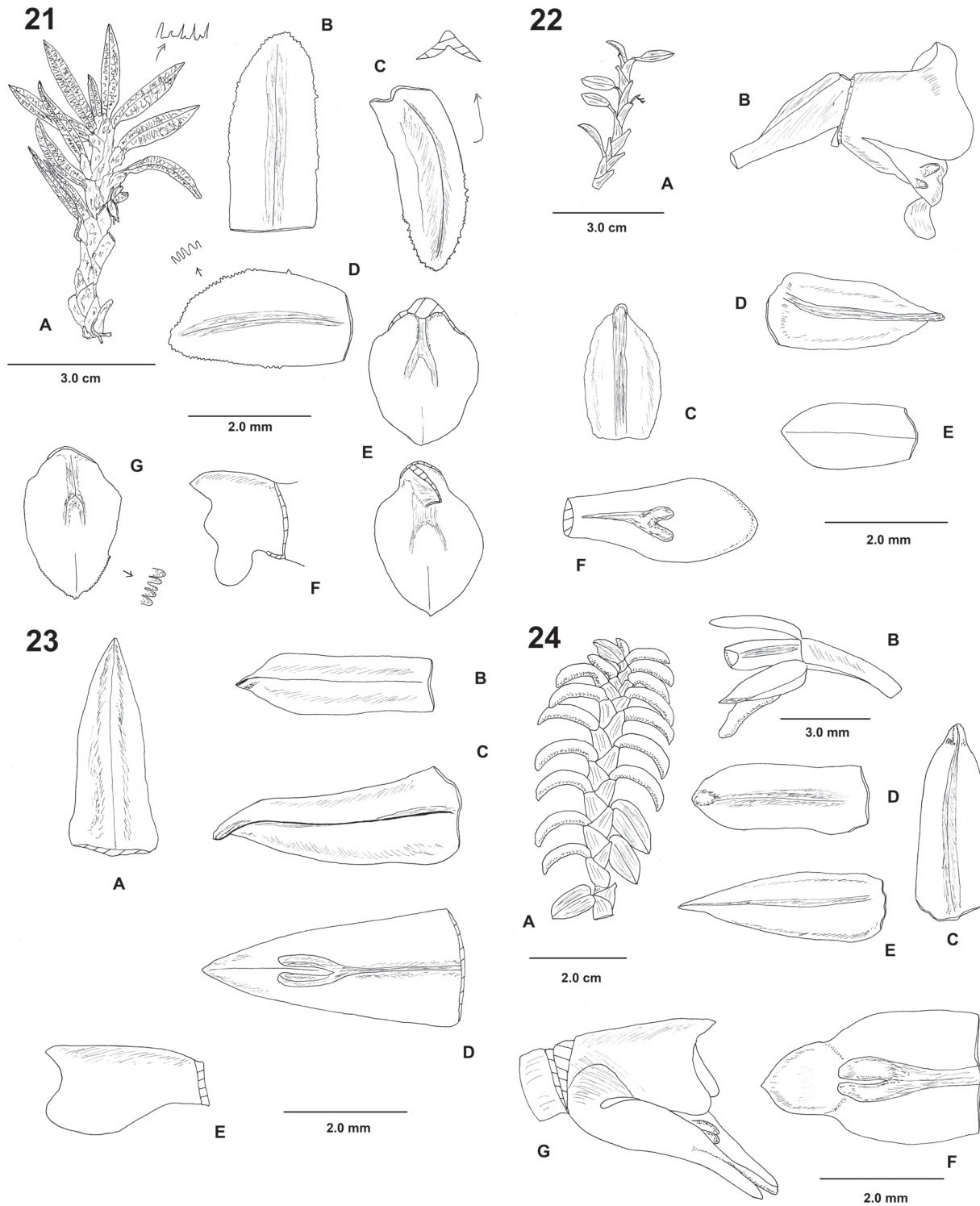


FIGURE 21–24. **21, A–F**, *Fernandezia ecallosa* (D.E. Benn. & E.A. Chr.) M.W. Chase var. *cundinamarcae* Ormerod. **A**, plant; **B**, dorsal sepal; **C**, lateral sepal; **D**, petal; **E**, labellum; **F**, column (no scale). **G**, *Fernandezia ecallosa* var. *ecallosa*. **G**, labellum. **A–F** from holotype; **G** from *Hamilton & Holligan 1261* (K). **22**, *Fernandezia espinosae* Ormerod. **A**, stem (upper part); **B**, flower minus tepals; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum. Drawn from holotype. **23**, *Fernandezia hamiltonii* Ormerod var. *hamiltonii*. **A**, dorsal sepal; **B**, petal; **C**, lateral sepal; **D**, labellum; **E**, column. Drawn from *Luer et al. 2543* (SEL). **24**, *Fernandezia hamiltonii* Ormerod var. *hamiltonii*. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, labellum and column. Drawn from holotype.

This species is closely related to *Fernandezia tortuosa* (Foldats) M.W. Chase but with much more strongly rugose surfaces on the leaves, which tend to not be so narrowed toward the apex. Christenson (2008) recorded *F. tortuosa* from Peru, but judging from a photograph of the specimen (Cusco: Machu Picchu, Winay Wayna, 3100 m, 2 June 1998, *W. Nauray & Acuriol 181* [CUZ, photo.: F]), it appears more likely to be *F. ecallosa*. *Fernandezia tortuosa* does occur in nearby Ecuador, however, and has also been reported for Bolivia (Kolanowska and Szlachetko, 2014).

The above short description based on the cited specimen is provided to augment the protologue, since the taxon was only known from the type.

***Fernandezia ecallosa* var. *cundinamarcae* Ormerod, var. nov.**

TYPE: COLOMBIA. Cundinamarca: Highlands of Bogota, Paramo de Pradera, 2800–3200 m, March 1892, *F.C. Lehmann 8831* (Holotype: K; Isotype: K). Fig. 21A–F.

Differing from *Fernandezia ecallosa* (D.E. Bennett & E.A. Christenson) M.W. Chase var. *ecallosa* in the flowers having a labellum with entire (vs. minutely papillose) margins, and broader (1.8 vs. 1.0–1.3 mm) column wings.

Epiphytic herb. *Roots* terete, to 1 mm thick. *Stems* densely leafy, to 12 leaved, 5.0–6.5 cm long, to 0.8 cm wide across leaf sheaths, 0.3 cm thick. *Leaves* lanceolate, apex oblique, acute to subacute, upper margins fimbriate-denticulate, upper surface rugose, 10.0–17.5 × 2.5–5.0 mm; leaf sheaths with shortly denticulate margins. *Inflorescence* 11.5 mm long; peduncle compressed, 10 mm long; rachis very short, probably 2 flowered; primary floral bracts paired, ovate-oblong, acute, 5 × 4 mm. *Flowers* yellowish to greenish yellow. *Pedicellate ovary* not seen unfertilized; capsule ellipsoid, rounded triangular in section, 5 × 4 mm. *Dorsal sepal* oblong-elliptic, apex irregular, upper half with minutely papillose-denticulate margins, slightly thickened along midvein, 2.9 × 1.2 mm. *Lateral sepals* obliquely oblong, obtuse, weakly curved, thickened along midvein, upper third to half with minutely denticulate margins, 2.8 × 1 mm. *Petals* elliptic, apex irregular, upper half with minutely papillose-denticulate margins, slightly thickened along midvein, 2.8 × 1.5 mm. *Labellum* broadly ovate, subacute to obtuse, 2 × 1.75 mm; lower half divided by a low, narrow ridge (this rarely united to the column) that diverges apically in two, i.e., Y-shaped. *Column* short and broad, each side with a broadly elliptic, downward-pointing wing, 1 × 1.8 mm.

Distribution: Colombia.

Additional specimen examined: COLOMBIA. Cundinamarca: W of Zipaquira, Mt. Chuscal, 3200–3300 m, 22 October 1917, *F.W. Pennell 2595* (US).

Etymology: named after the type locality, the Department of Cundinamarca.

This taxon differs from the typical Peruvian entity in having entire lip margins, and much broader column wings (1.8 vs. 1.0–1.3 mm).

***Fernandezia espinosae* Ormerod, sp. nov.**

TYPE: ECUADOR. Loja: Horta-Naque, 2500 m, 9 September 1946, *R. Espinosa 1024* (Holotype: AMES). Fig. 22.

Related to *F. crystallina* (Lindl.) M.W. Chase but the flowers with an entire (vs. trilobed to entire) oblong-obovate (vs. oblong to ovate-elliptic) labellum.

Epiphytic herb. *Roots* terete, 0.5–1.0 mm thick. *Stems* 1–3 branched apically (branches 5–12 cm long), subaxillary leafy, 12–30 cm long, 0.2–0.4 cm wide across leaf sheaths, to 0.15 cm thick. *Leaves* oblong, acute, thinly coriaceous, 8.0–10.0 × 2.5–4.0 mm; leaf sheaths deltate, smooth. *Inflorescence* to 7.5 mm long; peduncle to 5 mm long; rachis 3–4 flowered, 2.0–2.5 mm long; floral bracts ovate-lanceolate, acute, up to 2 mm long. *Flowers* lemon yellow, white on the edges. *Pedicellate ovary* clavate, triquetrous, 2.1 mm long. *Dorsal sepal* elliptic, subacute, midvein thickly carinate, 2.00 × 1.15–1.20 mm. *Lateral sepals* obliquely oblong-elliptic, subacute, midvein thickly carinate, 2.6 × 1.0 mm. *Petals* oblong-elliptic, subacute, 2.00 × 0.95 mm. *Labellum* oblong-obovate, subacute, 2.7 × 1.5 mm; lower half divided by a narrow ridge that divides apically into 2 divergent, fleshy calli. *Column* more or less rectangular, each side apically with a forward-pointing, rounded wing, ca. 1.7 mm long, 1.65 mm wide laterally.

Distribution: Ecuador.

Eponymy: named after Dr. Reinaldo Espinosa (1898–1950) from the University of Loja, who collected the type.

This species shares its habit and small flowers with the type form of *Fernandezia crystallina* but differs from it in having an oblong-obovate lip. The column was somewhat distorted from pressing in the flower studied, so that the apical part of the clinandrium was upturned. It appears in reality to be forward-pointing as in most other *Fernandezia*.

***Fernandezia falcifolia* (Rchb.f.) M.W. Chase, Phytotaxa 20: 30. 2011.**

Basionym: *Pachyphyllum falcifolium* Rchb.f., *Linnaea* 41: 32. 1876.

TYPE: ECUADOR. Loja, September, *W. Jameson s.n.* (Holotype: W-R, image seen; Isotype: AMES). Fig. 34G–I.

Epiphytic herb. *Roots* terete, thin. *Stems* caespitose, wiry, to 100 mm long, to 2 mm wide across leaf sheaths. *Leaves* linear, acute, fleshy, falcate, to 8 mm long, ca. 0.75 mm wide laterally; leaf sheaths tubular, obliquely truncate, not covering all of stem, smooth. *Inflorescence* few flowered. *Flowers* yellow. *Pedicellate ovary* triquetrous; capsule triquetrous, shortly pedicellate, 2.8 mm long. *Dorsal sepal* ovate, obtuse, midvein low carinate, 1.3 × 1.0 mm. *Lateral sepals* obliquely ovate, subacute, midvein low carinate, 1.65 × 1.15 mm. *Petals* elliptic to obovate-elliptic, subacute to obtuse, 1.10–1.15 × 0.70–0.85 mm. *Labellum* oblong-lanceolate, oblong, to subpandurate, obtuse, lower part elliptic, ca. 1.1 × 0.9 mm, upper part ovate-elliptic, ca. 0.70–0.75 × 0.40–0.50 mm, in total 1.70–1.85 × 0.70–0.90 mm; lower half divided by a low thickening that ends in 2 fleshy calli. *Column* short, stout, 0.9–1.0 mm long, ca. 0.8 mm wide laterally.

Distribution: Ecuador.

Additional specimens examined: ECUADOR. Azuay: E cordillera, 4–5 km N of Sevilla de Oro, 2745–3050 m, 14 August 1945, *W.H. Camp E-4680* (AMES, NY); E cordillera, 1–8 km N of Sevilla de Oro, 2440–2745 m, 27 July to 12 August 1945, *W.H. Camp E-4444* (AMES, NY).

Zamora-Chinchi: few kilometers E of “El Tiro” Pass, between Loja and Zamora, 2600 m, 22 October 2004, *F.A. Werner 1241* (MO); “El Tiro” Pass, ca. 15 km from Loja, 2900 m, 8 July 2004, *F.A. Werner 1078* (MO).

The above description is supplied to augment knowledge of the species. It is closest to *Fernandezia callacallae* from Peru (see discussion under the latter) but is also similar to *F. micrantha*. This species probably occurs in Peru, but I did not confirm records from there. One collection previously recorded by Schweinfurth (1970) is referred here to *F. callacallae*, described above.

Fernandezia hamiltonii Ormerod, *sp. nov.*

TYPE: PERU. San Martin: Distrito Huallaga, valley of Rio Apisoncho, 30 km above Jucusbamba, 3500 m, 12 August 1965, *A.C. Hamilton & P.M. Holligan 1259* (Holotype: K; Isotype: AMES). Fig. 23–24.

Related to *Fernandezia distichoides* M.W. Chase but with more laxly leaved stems, shorter (5–17 vs. to 30 mm long) leaves, and smooth (vs. rugulose) leaf sheaths.

Epiphytic herb. *Roots* terete, thick and fleshy, 0.5–2.0 mm thick. *Stems* simple, subaxillary many-leaved, 3–31 cm long, 0.3–0.6 cm wide across leaf sheaths, 0.20–0.25 cm thick. *Leaves* ligulate in lateral view, acute, minutely denticulate along margins, slightly curved, fleshy, 5–17 mm long, 2.0–2.5 mm wide laterally; leaf sheaths deltate in lateral view, truncate, margins denticulate, surface smooth. *Inflorescence* to 6.5 mm long; peduncle ca. 2.5 mm long; rachis arched, 6 flowered, to 4 mm long; floral bracts deltate, acute, margins denticulate, to 2.5 × 2.0 mm. *Flowers* green, yellow to yellowish. *Pedicellate ovary* clavate, triquetrous, 3.2–3.5 mm long. *Dorsal sepal* oblong-lanceolate, acute, midvein low carinate, 3.00–3.15 × 1.10–1.40 mm. *Lateral sepals* obliquely oblong-lanceolate, acute, midvein low carinate, 2.9–3.7 × 1.0–1.6 mm. *Petals* oblong, obtuse, thickened along midvein, 2.7–2.9 × 0.9–1.0 mm. *Labellum* elliptic in lower 2/3, apical 1/3 subquadrate to elliptic, acute, lower part 2.00 × 1.95–2.00 mm, upper part 1.20–1.40 × 1.10–1.15 mm, in total 3.20–3.40 × 1.95–2.00 mm, or more rarely ovate-lanceolate and 3.8 × 2.0 mm; lower part divided by low ridge that divides apically into 2 parallel, conical calli. *Column* cuneate in profile, each side at apex with an obtuse, forward-pointing wing, 2.0–2.1 mm long, 1.1–1.3 mm wide laterally.

Distribution: Ecuador; Peru.

Additional specimens examined: ECUADOR. Loja: pass 54 km N of Loja, 3000 m, 12 February 1978, *C. Luer, J. Luer & M. Portilla 2453* (SEL). PERU. San Martin: Distrito Huallaga, valley of Rio Apisoncho, 30 km above Jucusbamba, 2800 m, 6 September 1965, *A.C. Hamilton & P.M. Holligan 1291* (K).

Habitat: epiphyte growing among moss on trunks of small trees, in upper limit of montane forest (type), growing 5 ft (= ca. 1.5 m) above ground on tree trunk (*Hamilton & Holligan 1291*), cloud forest (*Luer et al. 2543*), 2800–3500 m.

Eponymy: named after A. C. Hamilton (1945–), one of the collectors of the type.

The collection *Hamilton & Holligan 1291* from Peru is reported as having pink flowers, but no trace of any such

color can be detected in the well-preserved material at hand. The specimen from Ecuador has larger flowers than those from Peru and a simple ovate-lanceolate (almost triangular) lip (see Fig. 23). The latter shape agrees with the depiction of the lip in the protologue of *Pachyphyllum distichum* (Kunth, 1816), however that taxon (now *Fernandezia distichoides*) differs in having densely leafy stems, longer (to 30 vs. 5–17 mm), fleshier leaves, and strongly rugulose (vs. smooth) leaf sheaths.

Fernandezia hamiltonii seems to have been first collected in Ecuador by Humboldt and Bonpland in July 1802, as evidenced by the specimen (lefthand plant) present on the lectotype of *Pachyphyllum distichum* in Paris.

Fernandezia hamiltonii* var. *jaenensis Ormerod, *var. nov.*

TYPE: PERU. Cajamarca: Prov. Jaen, Sallique, Localidad de Lanchal: La Cocha, 2960 m, 16 June 1998, *C. Diaz, J. Campos, T. Guevera & E. Tineo 9602* (Holotype: GH; Isotypes: GH; MO, not seen). Fig. 25.

Differing from *Fernandezia hamiltonii* Ormerod var. *hamiltonii* in having smaller (sepals 2.2–2.6 vs. 2.9–3.7 mm long) flowers and a narrower (1.40 vs. 1.95–2.00 mm) labellum.

Roots terete, 0.5–1.5 mm thick. *Stems* single or caespitose, simple or branching (branches 2.0–3.5 cm long), densely leafy, 5–35 cm long, 0.3–0.6 cm wide across leaf sheaths. *Leaves* narrowly oblong, acute to subacute, fleshy, to 13 × 4 mm; leaf sheaths dilatate in lower half, slightly narrowed in upper half, truncate, smooth. *Inflorescence* to 9 mm long; peduncle ca. 5 mm long; rachis to 5 flowered, to 4 mm long; floral bracts deltate, acute, to 2 mm long. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, ca. 3 mm long; capsule triquetrous, 4 mm long (incl. 1-mm-long pedicel). *Dorsal sepal* oblong-lanceolate, subacute, 2.2 × 1 mm. *Lateral sepals* obliquely lanceolate, acute, carinate, 2.6 × 1.1 mm. *Petals* oblong, obtuse to subacute, 2.30 × 0.85 mm. *Labellum* ovate-lanceolate, subacute, slightly constricted midway, lower part 1.7 × 1.4 mm, upper part 1.2 × 0.9 mm, in total 2.9 × 1.4 mm; lower half divided by a broad low thickening that ends apically in 2 thick, conical to ellipsoid, obtuse calli. *Column* each side with an apical, forward-pointing, elliptic, obtuse wing, 1.9 mm long, 1.2–1.3 mm wide apically.

Distribution: Peru.

Etymology: named after the Province of Jaen, the type locality.

This variety differs from typical *Fernandezia hamiltonii* in having the leaf sheaths sublobulate midway (vs. in the lower 1/3), smaller flowers (sepals 2.2–2.6 vs. 2.9–3.7 mm), and a narrower lip (1.40 vs. 1.95–2.00 mm).

Fernandezia harlingii Ormerod, *sp. nov.*

TYPE: ECUADOR. Loja: Loma de Loro, 6 km SE of Saragure, on road to Loja, 3200 m, 11 February 1985, *G. Harling & L. Andersson 21904* (Holotype: AMES). Fig. 26.

Related to *Fernandezia denticulata* Ruiz & Pav. but the flowers having a labellum with larger calli, and the column with a broad apical extension.

Epiphytic and terrestrial (on road cutting) herb. *Roots* terete, emitted from base of stem, to 0.8 mm thick. *Stems*

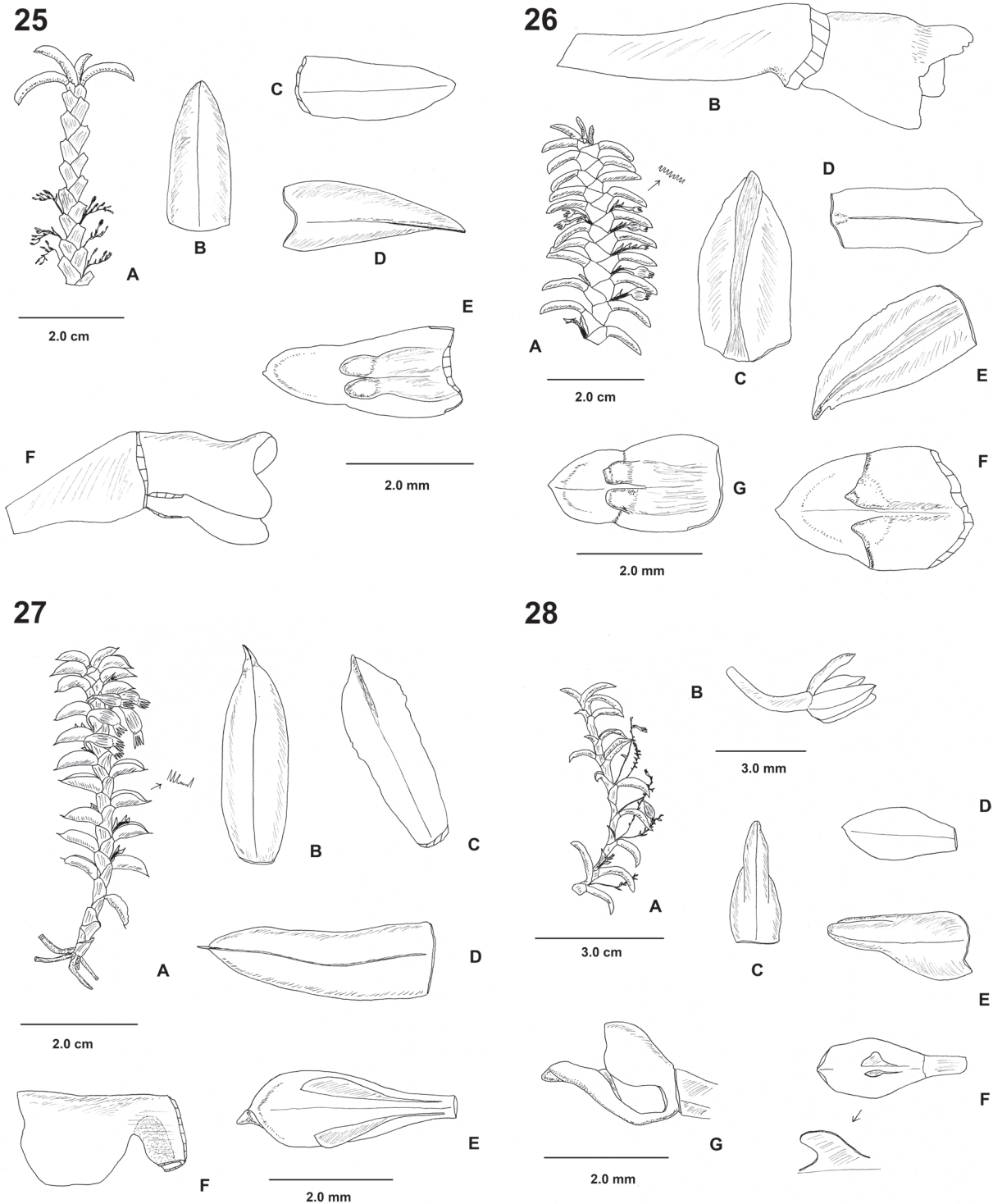


FIGURE 25–28. **25**, *Fernandezia hamiltonii* Ormerod var. *jaenensis* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, column. Drawn from holotype. **26**, *Fernandezia harlingii* Ormerod. **A**, stem (upper part); **B**, column; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F–G**, labellums. **A–F** from holotype; **G** from *Madison et al.* 7470 (MO). **27**, *Fernandezia ichneumonea* Ormerod. **A**, plant; **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, column. Drawn from holotype. **28**, *Fernandezia jordaniae* Ormerod var. *jordaniae*. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, labellum and column. Drawn from holotype.

densely leafy, simple to 3–4 branched apically, 10.0–20.5 cm long, 0.35 cm wide across leaf sheaths, 0.15 cm thick. *Leaves* oblong-lanceolate, weakly falcate, acute, margins minutely denticulate, 6–10 mm long, 1.3–2.2 mm wide laterally; leaf sheaths triangular, truncate, margins minutely denticulate, surface finely transversely rugulose. *Inflorescence* ca. 6 mm long; peduncle 2.5 mm long; rachis 5–6 flowered, ca. 3.5 mm long; floral bracts deltate-cymbiform, acute, to 3 mm long. *Flowers* green, or with green sepals, white petals and lip. *Pedicellate ovary* clavate, triquetrous, 3.5 mm long. *Dorsal sepal* ovate-elliptic, acute, carinate medially, 2.2–2.8 × 1.05–1.20 mm. *Lateral sepals* obliquely oblong-lanceolate, acute to subacute, medially carinate, 2.20–2.75 × 1.05–1.25 mm. *Petals* oblong, acute to subacute, 2.0–2.1 × 0.8–1.0 mm. *Labellum* ovate to ovate-elliptic, acute to subacute, lower half 1.4 × 1.6–1.8 mm, upper half 1.00–1.35 × 1.2–1.6 mm, in total 2.40–2.75 × 1.6–1.8 mm; lower half divided by a ridge that diverges into 2 conical to subquadrate, medial calli. *Column* 1.8 mm long, apex 1 mm wide laterally.

Distribution: Ecuador.

Additional specimen examined: ECUADOR. Loja: Cordillera de Sabanilla, ca. 15 km S of Yangana, 2480 m, 31 December 1980, *M.T. Madison, D. Madison, L. Besse & A. Besse 7470* (MO).

Habitat: moist montane scrub, on road cut (type), and wet montane forest (*Madison et al. 7470*), 2480–3200 m.

Eponymy: named after Gunnar Harling (1920–2010), collector of the type. He was the founder and Chief Editor of *The Flora of Ecuador* series, and participated in several expeditions to Ecuador.

This species appears to be most similar to *Fernandezia denticulata* from Peru, sharing with it a similar habit and small flowers with similarly shaped segments. However, *F. harlingii* differs in having flowers with a larger labellum (2.40–2.75 × 1.60–1.80 vs. 1.90 × 1.15 mm) with larger calli, and a column with a prominent apical extension of the clinandrium.

The collectors of the second specimen noted it to have cleistogamous flowers but this was not evident in the one that was studied, though it did have smaller measurements.

Fernandezia ichneumonea Ormerod, *sp. nov.*

TYPE: PERU. Cusco: Prov. Quispicanchi, between Abra Walla Walla and Marcapata, 210 km from Cusco, 2800–4600 m, 21–25 April 1988, *P. Nunez, F. Loaysa & W. Loaysa 9038* (Holotype: SEL; Isotypes: F, MO, NY). Fig. 27.

Related to *Fernandezia weberbaueri* Ormerod var. *weberbaueri* but the leaves with an apiculus to 2 mm (vs. to 1 mm) long, the flowers with a subacuminate (vs. acute) dorsal sepal, and narrower (1.3 vs. 1.5–1.6 mm wide) column wings.

Epiphytic *herb*. *Roots* terete, 0.4–0.8 mm thick. *Stems* simple or rarely branched (branch to 3.5 cm long), densely leafy, 4.5–19.0 cm long, to 0.2 cm thick. *Leaves* oblong-lanceolate, apiculate, margins minutely denticulate, to 8.5 mm long, ca. 2 mm wide laterally, apiculus to 2 mm long; leaf sheaths deltate, truncate, margin minutely denticulate,

surface smooth, striate. *Inflorescence* to 6 mm long; peduncle to 3 mm long; rachis up to 3 flowered, to 3 mm long; floral bracts deltate, acute, to 2.2 mm long. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, trilobate, 2.8–3.0 mm long. *Dorsal sepal* oblong, subacuminate, 3.15 × 1 mm. *Lateral sepals* obliquely oblong-lanceolate, acute, carinate medially near apex, carina apiculate, 3.5 × 1 mm. *Petals* oblong-oblancheolate, acute, carinate medially near apex, 3 × 1 mm. *Labellum* oblancheolate, subacute, carinate below apex with an obtuse carina, 3.1 × 1.2 mm; carinae 2, lamellate, divergent, ending in upper 2/3 of lip. *Column* with broad semicircular wings, 2 mm long, 1.3 mm wide laterally.

Distribution: Peru.

Etymology: from the Classical Greek *ichneumon*, used for a small wasp in some cases, in reference to prominent stinger-like apiculi on the tips of the leaves and lateral sepals.

This species is closely allied to *Fernandezia weberbaueri* var. *weberbaueri*, coming from the same province in Peru. It appears to differ in being a stouter plant with broader leaf sheaths, in having conduplicate (vs. flat) leaves with a longer apiculus (2 vs. 1 mm long), fewer-flowered (up to 3 vs. up to 5 flowers) inflorescences, flowers with a subacuminate (vs. acute) dorsal sepal, and narrower column wings.

Fernandezia jordaniae Ormerod, *sp. nov.*

TYPE: BOLIVIA. Santa Cruz: Prov. Caballero, road to Siberia, 26 km from Comarapa, around the Campamento, 2600 m, 15 April 2003, *C.G. Jordan & I.G. Vargas 394* (Holotype: MO). Fig. 28.

Related to *Fernandezia dorriana* Ormerod but the flowers with obtuse (vs. acute) sepals, obovate-oblong (vs. oblong-elliptic) petals without a thick carina, and a clawed (vs. sessile) labellum.

Epiphytic (?) *herb*. *Roots* terete, 0.5 mm thick. *Stems* simple, subclaxly leafy, 4–9 cm long, 0.10–0.15 cm thick. *Leaves* oblong, acute, minutely denticulate near apex, coriaceous, 8–10 × 3.5–4.2 mm; leaf sheaths obliquely oblong-lanceolate in lateral view, smooth, striate, margin revolute, minutely denticulate. *Inflorescence* 17 mm long; peduncle 10 mm long; rachis subclaxly 7 flowered, 7 mm long; floral bracts deltate, acute, 2 × 1.6 mm. *Flowers* white. *Pedicellate ovary* triquetrous, 2.8–3.0 mm long. *Dorsal sepal* ovate-lanceolate, obtuse, fleshy, concave on lower inside half, 1.75–1.80 × 0.8 mm. *Lateral sepals* obliquely ovate-lanceolate, obtuse, fleshy, concave on lower inside 1/3, 2 × 0.95–1.00 mm. *Petals* obovate-oblong, acute, 1.75 × 0.8 mm. *Labellum* elliptic-oblancheolate, obtuse, carinate below tip, 2 × 0.9 mm; lower half divided by a linear ridge that diverges into low lamellae that are raised apically into obliquely subquadrate terminations. *Column* shortly and broadly stalked, each side with a low, broad, semicircular wing, 1.1 mm long, 0.8 mm wide laterally.

Distribution: Bolivia.

Habitat: Very wet “yungueno” forest on a montane ridge, 2600 m.

Eponymy: named after Claudia G. Jordan, co-collector of the type.

Among those taxa in the broad *Fernandezia pectinata* alliance, this species may be recognized by its flat leaves, long inflorescence peduncles, and very fleshy flowers with obtuse sepals. Its closest ally appears to be *F. dorriana* from the same region, the latter differing in having more oblong petals with a thick carina, and a sessile (not clawed) lip.

***Fernandezia jordaniae* var. *trullata* Ormerod, var. nov.**

TYPE: BOLIVIA. Santa Cruz: Manuel M. Caballero, near Siberia, above Comarapa, 2500 m, 1–2 December 1978, C. Luer, J. Luer, L. Kuhn, J. Kuhn & F. Fuchs et al. 3596 (Holotype: SEL). Fig. 29.

Differs from the typical variety in having thinner sepals, trullate labellum and a sessile column.

Epiphytic (?) *herb.* *Roots* terete, 0.4–0.8 mm thick. *Stems* 2–4 branched (branches 2.0–5.5 cm long), sublaxly leafy, 14–17 cm long, 0.1 cm thick. *Leaves* oblong-lanceolate, acute, laxly minutely denticulate towards apex, 9.5 × 3.5 mm; leaf sheaths smooth, striate, half spreading away from stem, exposing internodes. *Inflorescence* to 16 mm long; peduncle 6–7 mm long; rachis 7–10 flowered, 5–9 mm long; floral bracts deltate, acute, to 1.8 mm long. *Flowers* white. *Pedicellate ovary* narrowly clavate, triquetrous, 2.5 mm long. *Dorsal sepal* oblong-lanceolate, obtuse, concave, 1.75 × 0.75 mm. *Lateral sepals* obliquely lanceolate, acute, midvein thickly carinate in upper half, 2.1 × 0.8 mm. *Petals* oblong-oblancheolate, acute, 1.65 × 0.80 mm. *Labellum* trullate, obtuse, carinate below tip, 1.7 × 0.9 mm; lower 1/3 of lip divided by a weakly thickened midline that raises apically into 2 parallel, triangular to elliptic lamellae. *Column* sessile, each side with a low, rounded wing, 0.9 mm long, 0.8 mm wide laterally.

Distribution: Bolivia.

Habitat: cloud forest, 2500 m.

Etymology: from the Latin *trullatus*, trowel shaped, in reference to the labellum shape.

This variety differs from typical *Fernandezia jordaniae* in having thinner sepals, a trullate lip, and sessile column.

***Fernandezia kosnipatae* Ormerod, sp. nov.**

TYPE: PERU. Cusco: Prov. Paucartambo, Kosnipata: forest ridge of Accanacu, Manu National Park and Pillahuata forests, 1900 m, 20 March 1991, P. Nunez & N. Alanya 13221 (Holotype: MO). Fig. 30.

Related to *F. dalstroemii* (Dodson) M.W Chase but the plant with more laxly leaved stems, and the inflorescences with more (6 vs. 3) flowers.

Epiphytic *herb.* *Roots* terete, to 1 mm thick. *Stems* 2–3 branched (branches to 6.5 cm long), flexuous, laxly leafy, 34 cm long, 0.3 cm thick, 0.4 cm wide across leaf sheaths. *Leaves* oblong to weakly oblong lanceolate, apiculate, coriaceous, drying brownish, 17–26 × 4.5–9.5 mm; leaf sheaths obliquely ovate in lateral view, truncate, surface smooth, striate, not fully enclosing stem, 8 mm long dorsally. *Inflorescence* ca. 10 mm long; peduncle ca. 4 mm long; rachis pectinate, up to 6 flowered, to 6 mm long; floral bracts broad ovate, acute, to 2.5 × 2.0 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, ca. 3 mm long; capsule triquetrous, ca. 8 mm long (incl. 2 mm long

pedicel). *Dorsal sepal* broadly oblong-lanceolate, acute, midvein broadly carinate, 3.6 × 1.5 mm. *Lateral sepals* obliquely lanceolate, acute, midvein carinate, 4.1 × 1.7 mm. *Petals* broadly oblong-lanceolate, acute, weakly ridged medially, 3.00–3.15 × 1.2 mm. *Labellum* subpandurate, acute, lower half 2.2 × 2.0 mm, upper half 1.70 × 1.65 mm, in total 3.9 × 2.0 mm; lower half divided by a ridge that ends in 2 parallel conical calli. *Column* almost rectangular in lateral view, 2.1–2.3 mm long, 1.2 mm wide laterally.

Distribution: Peru.

Etymology: named after the Kosnipata District, the type locality.

This species appears to be related to the Ecuadorian *Fernandezia dalstroemii* (Dodson) M.W. Chase but differs from it in drying a brownish (vs. greenish) color, being more laxly leaved, and having more flowers (6 vs. 3). Though it seems unlikely that *F. kosnipatae* is related closely to *Pachyphyllum dalstroemii* Dodson, when consulting the protologue of that taxon one notes that the type specimen (*S. Dalstroem* & *T. Hoijer* 802 [SEL, image seen]) shows a rather different plant to that figured. Furthermore, I am extremely doubtful about the floral details depicted, such as oblong-oblancheolate petals, an oblong-oblancheolate lip, and an obliquely clavate column. These are quite rare characters (but see *F. espinosae* and *F. salliquensis*, which have such a lip shape) outside of certain groups in southern Peru and Bolivia. The oblong-oblancheolate lip can be seen in herbarium material but disappears once the lip is spread. However, spreading the lip would lead to breaking it if spirit material (which seems to be the case) was at hand.

***Fernandezia luerorum* Ormerod, sp. nov.**

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, along road to Villa Tunari, 2840 m, 13 & 16 January 1981, C. Luer, J. Luer, E. Besse & R. Vasquez 5616 (Holotype: SEL). Fig. 31.

A singular entity with flat, oblong leaves, flowers with reflexed dorsal sepal and petals, basally united, splayed forward lateral sepals, a long-clawed lip with an elliptic blade that bears a single lobulate callus, and a dolabriform column.

Epiphytic (?) *herb.* *Roots* terete, ca. 1 mm thick. *Stems* simple, laxly leafy throughout, 6.2 cm long, ca. 0.08 cm thick. *Leaves* oblong to oblong-obovate, apiculate, 5.5–7.0 × 2.0–3.0 mm; leaf sheaths tubular, slightly inflated toward apex, somewhat truncate, smooth, ca. 3.5 mm long, 1.5 mm wide across apex. *Inflorescence* 6 mm long; peduncle 3 mm long; rachis successively flowered, 5–6 flowered, 3 mm long; floral bracts ovate-lanceolate, acute, 2.0–3.0 × 0.5–0.7 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, 5 mm long. *Dorsal sepal* oblong-ligulate, acute, midvein carinate near apex, reflexed, joined to petals for 0.8 mm, ca. 4.5 × 1.3 mm. *Lateral sepals* obliquely ligulate, acute, midvein carinate and ending in a deltate apiculus, joined to each other basally for ca. 3 mm, after this divergent and splayed forward, 7.0 × 1.8 mm. *Petals* obliquely oblong, acute, reflexed, joined basally to dorsal sepal for 0.8 mm, 4.5 × 1.7 mm. *Labellum* long-clawed with an elliptic, acute blade, claw linear, ca. 3.3 mm long, blade ca. 2.8 × 1.6 mm, in total 6.2 × 1.6 mm; callus on basal 1/3 of lip blade, fleshy,

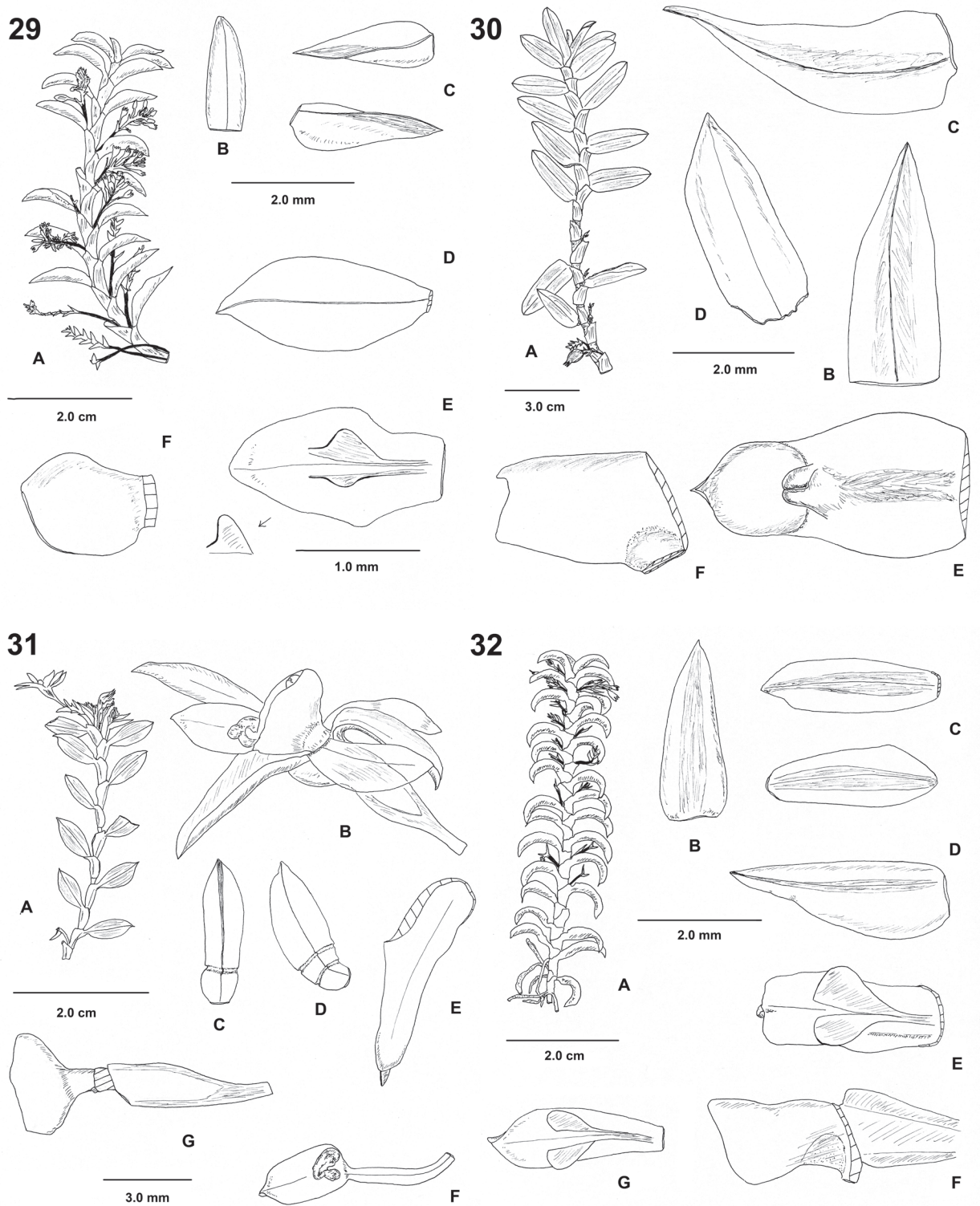


FIGURE 29–32. **29**, *Fernandezia jordaniae* Ormerod var. *trullata* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepals; **D**, petal; **E**, labellum; **F**, column. Drawn from holotype. **30**, *Fernandezia kosnipatae* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepal; **D**, petal; **E**, labellum; **F**, column. Drawn from holotype. **31**, *Fernandezia luerorum* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column. Drawn from holotype. **32**, *Fernandezia mandonii* Ormerod. **A**, plant; **B**, dorsal sepal; **C**, petals; **D**, lateral sepal; **E**, labellum; **F**, column. *Fernandezia pectinata* (Rchb.f.) M.W. Chase. **G**, labellum. A–F from holotype; G from isotype.

in a rough inverted V-shape, at base each side with a deltate to elliptic, obtuse lobe. *Column* dolabriform, 2.5 mm long, 3 mm wide laterally.

Distribution: Bolivia.

Eponymy: named after Carl and Jane Luer, who helped collect the type of this species, along with so many other species of orchids throughout the Andean countries.

This rather singular species of the *Fernandezia breviconnata* (Schltr.) M.W. Chase complex may be distinguished from other members of that group by its flowers that have the lateral sepals splayed forward (rather than curved upward), by its relatively long clawed labellum with a short blade (vs. a short claw and relatively long blade), and column that is widened both dorsally and ventrally (vs. ventrally only).

Fernandezia mandonii Ormerod, *sp. nov.*

TYPE: BOLIVIA. La Paz: Prov. Larecaja, near Sorata, Mt. Chileca, 3100 m, October 1859, *G. Mandon 1152 p.p.* ([Holotype: AMES 76407 [= GH 6731], two lower left plants; Isotypes: G, S, P, images seen). Fig. 32A–F.

Related to *Fernandezia pectinata* (Rchb.f.) M.W. Chase but with larger flowers (sepals 2.8–3.8 vs. 2.0–2.4 mm long) and a cuneate (vs. oblong-oblancoelate) labellum.

Epiphytic *herb.* *Roots* terete, 0.8–1.0 mm thick. *Stems* simple, densely leafy, 6.5–9.5 cm long, 0.2–0.3 cm wide across leaf sheaths, 0.1–0.2 cm thick. *Leaves* lanceolate, acute, canaliculate, fleshy, margins minutely denticulate near apex, 8–9 mm long, 1.7–2.5 mm wide laterally; leaf sheaths with minutely denticulate margins, dorsal exposed edge 3 mm long. *Inflorescences* to 9 mm long; peduncle ca. 4 mm long; rachis up to 5 flowered, to 5 mm long; floral bracts deltate, acute, ca. 2.6 mm long. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, 2.5–3.0 mm long. *Dorsal sepal* lanceolate to ligulate-lanceolate, acute to subacute, carinate, 2.80–3.15 × 0.95–1.00 mm. *Lateral sepals* obliquely lanceolate, acute, carinate, 3.2–3.8 × 1.2–1.5 mm. *Petals* ligulate-oblancoelate, acute, 2.65–3.00 × 0.80–1.00 mm. *Labellum* narrowly cuneate, apiculate, 2.7–3.0 × 1.0–1.6 mm; lower 1/3 divided by low parallel lamellae that raise and diverge on the middle of the lip. *Column* each side with an obliquely suborbicular low wing, 1.7–1.9 mm long, 1.0–1.3 mm wide laterally.

Distribution: Bolivia.

Additional specimen examined: BOLIVIA. La Paz: Gran Poder, small gold mine ca. 40 km N of Sorata, narrow wooded valley below Tacacoma, 3170 m, 3 June 1950, *W.M.A. Brooke 6433* (BM, NY).

Eponymy: named after Gilbert Mandon (1799–1866), a French mining engineer and botanist. He was director of a mine at Tipuani from 1848–1861 and collected over 1800 plants between Tipuani and Sorata during this time.

The collection *Mandon 1152* was originally thought to contain two elements. One is a taxon with coriaceous flat leaves, and flowers with a clawed lip expanding into a pentagonal blade. That entity became the type of *Pachyphyllum pseudodichaea* Rchb.f. The other plant had conduplicate, fleshy leaves, and flowers with a cuneate to oblong-oblancoelate lip. This second entity became the

type of *Pachyphyllum pectinatum* Rchb.f. However, it is now evident that this second entity is a mixture of two distinct species, one with a cuneate lip (here described as *F. mandonii*) and one with an oblong-oblancoelate lip (the lectotype of *F. pectinata*).

Fernandezia mercadoi Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Carrasco, Parque Nacional Carrasco, c. 2 km from the Monte punk-selvercas entrance, 3100 m, 15 September 1995, *M. Mercado MM 309* (Holotype: MO). Fig. 33.

Related to *Fernandezia chaparensis* Ormerod but the dorsal sepal acute (vs. apiculate), petals with a narrower, longer claw (vs. shorter and broader), and the column with longitudinally broader wings.

Epiphytic *herb.* *Roots* terete, 0.5–1.3 mm thick. *Stems* flexuous, 4–5 branched (branches 8.0–9.5 cm long), 0.08–0.15 cm thick. *Leaves* oblong-lanceolate, apiculate, upper margins minutely denticulate, thinly coriaceous, 11.5–16.0 × 3.5–5.0 mm, shortly petiolate (petiole 1–2 mm long); leaf sheaths tubular, smooth, margins often recurved, minutely denticulate, 4.5–5.0 mm long. *Inflorescence* ca. 5.5 mm long; peduncle ca. 4.5 mm long; rachis 2–3 flowered, ca. 1 mm long; floral bracts lanceolate, acute, to 4.5 × 2.4 mm. *Flowers* yellow. *Pedicellate ovary* clavate, triquetrous, 4.5 mm long. *Dorsal sepal* ligulate, acute, carinate, gently upcurved, 5 × 1 mm. *Lateral sepals* obliquely ligulate-lanceolate, high carinate, gently upcurved, 6.0 × 1.9 mm. *Petals* obliquely oblong-lanceolate from a clawed base, acute, gently upcurved, basally joined to sepals, 4.8 × 1.2 mm. *Labellum* ovate-lanceolate from a clawed base, claw 2.5 mm long, blade 4.0 × 1.8 mm, in total 6.5 × 1.8 mm; lower half medially thickened and ending in 2 semi-elliptic lamellae. *Column* clawed, each side dilated into a semicircular wing, ca. 3.2 mm long, 2 mm wide laterally, claw 0.8 mm wide.

Distribution: Bolivia.

Eponymy: named after M. Mercado, Bolivian botanist and collector of the type.

Fernandezia mercadoi is a member of the *F. breviconnata* (Schltr.) M.W. Chase complex; it differs from the latter in having a ligulate (oblong-elliptic) dorsal sepal and clawed (vs. sessile) petals. Another similar taxon is its Bolivian congener *F. chaparensis*, but the latter has a prominent apiculus on the dorsal sepal, more shortly, broadly clawed petals, and longitudinally wider column wings.

Fernandezia micrantha (Schltr.) M.W. Chase, *Phytotaxa* 20: 30. 2011.

Basionym: *Pachyphyllum micranthum* Schltr., *Rep. Sp. Nov. Regni Veg.*, Beih. 7: 204. 1920.

TYPE: COLOMBIA. Cauca: without locality, *M. Madero s.n.* ([Holotype: B, destroyed; drawing AMES]. Lectotype (designated by Christenson 2008: 286): t. 73, f. 282 [in Schlechter, 1929]). Fig. 34A–F.

Heterotypic synonyms: *Pachyphyllum nubivagum* L.O. Williams, *Lilloa* 3: 483. 1938 *syn. nov.*

TYPE: COLOMBIA. Santander: W slope of Paramo de las Puentes, above La Baja, 3300–3400 m, 25–31 January 1927, *E.P. Killip & A.C. Smith 18161* (Holotype: AMES).

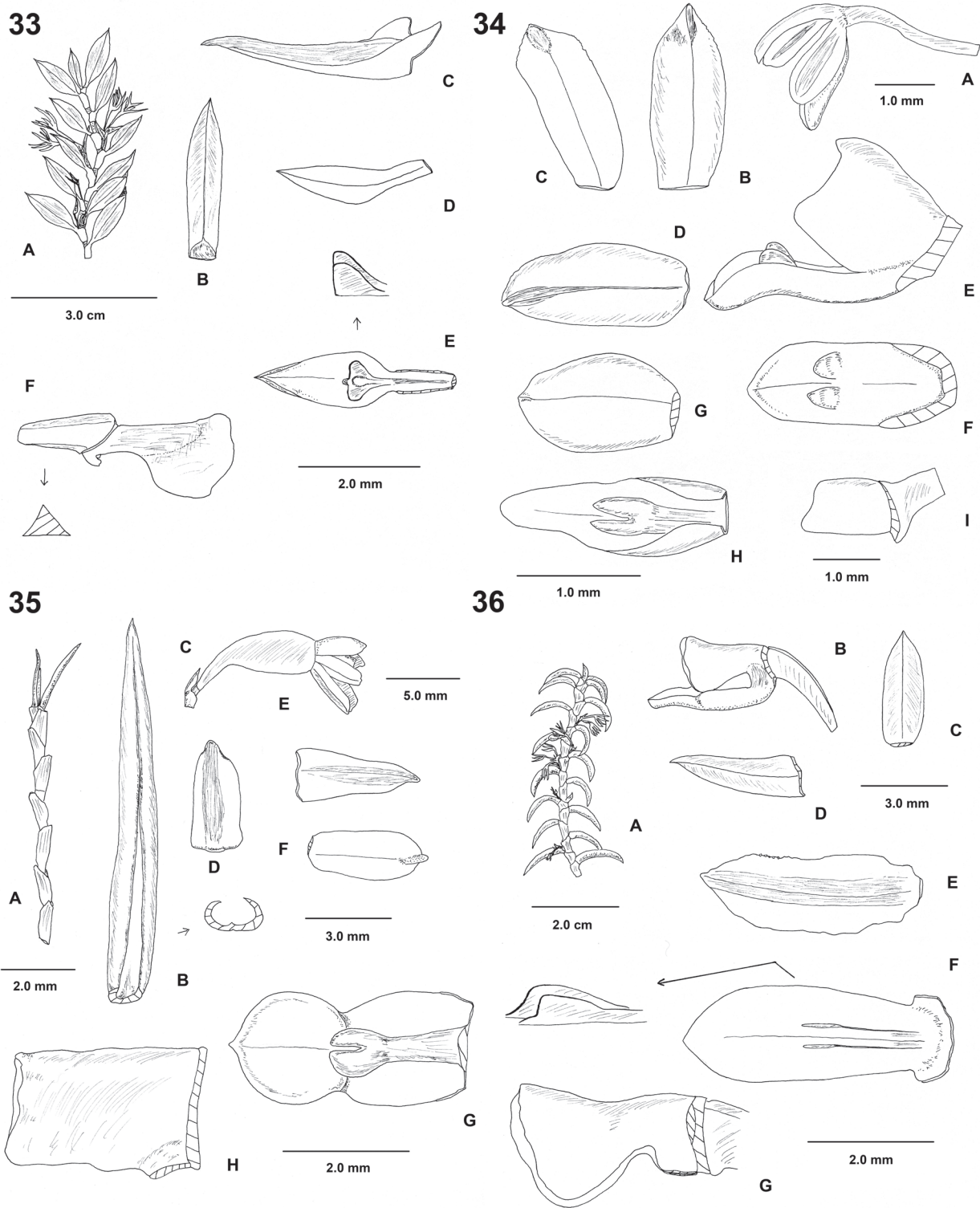


FIGURE 33–36. **33**, *Fernandezia mercadoi* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepal; **D**, petal; **E**, labellum; **F**, column. Drawn from holotype. **34**, *Fernandezia micrantha* (Schltr.) M.W. Chase. **A**–**F**. *Fernandezia micrantha* (Schltr.) M.W. Chase. **A**, flower; **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum and column; **F**, labellum. **G**–**I**. *Fernandezia falcifolia* (Rchb.f.) M.W. Chase. **G**, petal; **H**, labellum; **I**, column. **A**–**F** from Luer & Escobar 6572 (SEL); **G**–**I** from Werner 1241 (MO). **35**, *Fernandezia militaris* Ormerod. **A**, stem (upper part); **B**, leaf; **C**, flower; **D**, dorsal sepal; **E**, lateral sepal; **F**, petal; **G**, labellum; **H**, column. Drawn from holotype. **36**, *Fernandezia minor* (Schltr.) M.W. Chase var. *minor*. **A**, stem (upper part); **B**, labellum and column; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from Solomon 8663 (MO).

Fernandezia nubivaga (L.O. Williams) M.W. Chase, Phytotaxa 20: 30. 2011.

Pachyphyllum idroboi Szlach. & Kolan., Nord. J. Bot. 32, 6: 748. 2014 *syn. nov.* TYPE: COLOMBIA. Cauca: Macizo Colombiano, Paramo de Las Papas, La Hoyola, 2910 m, 18 September 1958, J.M. Idrobo, P. Pinto & H. Bischler 3436 (Holotype: COL, image seen).

Fernandezia idroboi (Szlach. & Kolan.) Molinari & Mayta, Richardiana 16: 43. 2015.

Distribution: Colombia; Ecuador; Peru.

Additional specimens examined: COLOMBIA. Santander: W slope of Paramo Rico, 3300–3600 m, 15–19 June 1927, E.P. Killip & A.C. Smith 17777 (AMES); Paramo de Romeral, 3800–4100 m, 29–30 January 1927, E.P. Killip & A.C. Smith 18569 (AMES); E slope of Paramo de Coloradas, above La Baja, 3900 m, 27 January 1927, E.P. Killip & A.C. Smith 18387 (AMES); vicinity of Las Vegas, 2600–3000 m, 21–23 December 1926, E.P. Killip & A.C. Smith 15875 (AMES). Norte de Santander: Paramo de Jurisdicciones, 3400 m, 30 April to 1 May 1982, C. Luer, J. Luer, R. Escobar & D. Portillo 7662 (SEL). Santander del Sur: E of Bucuramanga, towards Berlin, 3250 m, 3–5 November 1981, C. Luer & R. Escobar 6572 (SEL); same data, 8 November 1981, C. Luer, J. Luer & R. Escobar 6616 (SEL); between Bucuramanga and Berlin, 3200 m, 27–28 April 1982, C. Luer, J. Luer, R. Escobar & D. Portillo 7610 (SEL). Antioquia: Medellin, El Boqueron, 2300 m, 9 August 1967, L.A. Garay 996 (AMES). Valle: Cordillera Central, W slope, Hoya del Rio Bugalagrande, Barragan: Paramo de Bavaya, Corrales, 3400–3550 m, 9 April 1946, J. Cuatrecasas 20548 (AMES, F, US). Cauca: Paramo de Barbillas, SE of Popayan, 3070 m, 27 July 1978, C. Luer, J. Luer, J. Kuhn & R. Escobar 3017 p.p. (SEL); Paramo de Paletaria, 3000 m, 30 July 1961, L.A. Garay, C.E. McClennan & A. Kapuler 465 (AMES). ECUADOR. Zamora-Chinchipec: without locality, *leg. L. Mendoza in A. Hirtz 7178* (SEL). PERU. Cajamarca: Prov. Contumaza, Las Quinuas to El Mojon, 3200 m, 14 June 1981, A. Sagastegui, E. Garcia, S. Lopez & J. Mostacero 10107 (MO, NY, SEL).

This is a neat little species with falcate, fleshy leaves generally 5–7 mm long, and tiny flowers about 1 mm long, with a simple oblong to oblong-lanceolate lip. In Schlechter's drawing of the type the calli of the lip are shown as divaricate when usually they are parallel. I have noticed that when the lip rehydrates poorly, the calli can tend to spread in a V, also the lip shape can be falsely subpandurate.

I could not find any characters justifying the separation of *Pachyphyllum nubivagum*, and Williams did not offer any in the protologue. Nor could any discriminating characters be found for *P. idroboi*, which was not compared with *P. micranthum* or *P. nubivagum*. The shape of the lip depicted for *P. idroboi* I believe to be erroneous, in part because of poor rehydration and difficulty in working with the tender, small flowers.

Specimens from Ecuador and Peru represent new distributional records for those countries.

Fernandezia militaris Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: Luya Prov., Distrito Camporedo, Tullanya, Cerro Hiucocunga, 3320 m, 8 December 1996, R. Vasquez & R. Rojas 22012 (Holotype: MO). Fig. 35.

Similar to *Fernandezia theodorii* M.W. Chase florally but the plant much more laxly leaved, and the leaves lanceolate and semitubular (vs. narrowly oblong and V-shaped in section).

Roots terete, 1.0–1.2 mm thick. *Stem* simple to 3 branched (branches immature, to 2.5 cm long), flexuous, laxly leafy, 15.0–40.5 cm long, to 0.5 cm across leaf sheaths, to 0.2 cm thick. *Leaves* lanceolate, acute, semitubular, rigid, 15–20 mm long, 2 mm wide laterally; leaf sheaths tubular-infundibuliform, smooth, striate, not fully covering internodes, 9–12 mm long. *Inflorescence* to 13.5 mm long; peduncle ca. 6.5 mm long; rachis up to 10 flowered, to 7 mm long; floral bracts broadly ovate, acute, to 3 mm long. *Flowers* white. *Pedicellate ovary* clavate, triquetrous; capsule triquetrous, 9 mm long (incl. 3 mm long pedicel), one side 4.5 mm wide. *Dorsal sepal* oblong, subacute, midvein broadly and thickly low carinate, 3.3 × 1.5 mm. *Lateral sepals* obliquely oblong-lanceolate, subacute, midvein broadly and thickly carinate, 3.75 × 1.75 mm. *Petals* oblong, subacute, 3.75 × 1.60 mm. *Labellum* subpandurate, acute, lower part elliptic, 2.00 × 1.75 mm, upper part circular, acute, 1.8 × 1.7 mm, in total 3.80 × 1.75 mm; lower part divided by a thick medial ridge ending midway in 2 thick, semi-elliptic, parallel calli. *Column* rectangular in lateral view, 2.5 mm long, 1.75 mm wide laterally.

Distribution: Peru.

Habitat: in “Jalca” vegetation, the smallest trees of which 1.5 m tall (type), 3320 m.

Etymology: from the Latin *militaris*, relating to soldiers or war, in reference to the ranks of sharp, sword-like leaves.

The relationships of this species are unclear. It is quite distinct in its unique habit, with laxly leaved stems, and rigid, semitubular leaves. Details of the flowers resemble *Fernandezia theodorii* M.W. Chase, a more densely leaved plant, with broader, fleshier leaves. The collectors did not record what surface the plant was growing on.

Fernandezia minor (Schltr.) M.W. Chase, Phytotaxa 20: 30. 2011 as *minus*.

Basionym: *Pachyphyllum minus* Schltr., Rep. Sp. Nov. Regni Veg. 10: 460. 1912.

TYPE: BOLIVIA. La Paz: near Unduavi, 3200 m, November 1910, O. Buchtien s.n. ([Holotype: B, destroyed]. Lectotype [designated by Christenson 2008: 287]: t. 60, f. 239 [in Schlechter, 1930]). Fig. 36.

Epiphytic herb. *Roots* terete, 0.4–0.6 mm thick. *Stems* simple or branching (branches 1.5–7.5 cm long), densely leafy, 5–10 cm long, 0.08–0.10 cm thick. *Leaves* lanceolate, acute, margins minutely denticulate near apex, fleshy, conduplicate, 7–15 × 1.8–4.5 mm; leaf sheaths with entire to sparsely denticulate margins. *Inflorescence* 4.5–5.5 mm long; peduncle 3 mm long; rachis 3 flowered, 1.5–2.5

mm long; floral bracts deltate, acute, margins minutely denticulate, to 2 mm long. *Flowers* white. *Pedicellate ovary* clavate, 3 mm long. *Dorsal sepal* oblong, acute, 3.10–3.65 × 1.20–1.40 mm. *Lateral sepals* obliquely lanceolate to oblong-lanceolate, acute, 3.5–4.2 × 1.1–1.2 mm. *Petals* oblong, acute, 2.75–3.30 × 1.00–1.10 mm. *Labellum* oblong-oblongate, subacute, free part 3.2 × 1.2–1.6 mm; lower half of lip with 2 low lamellae that are highest in the middle of the lip. *Column* shortly clawed, each side with a semicircular wing, 2.0–2.6 mm long, 1.2–1.6 mm wide laterally.

Distribution: Bolivia.

Additional specimens examined: BOLIVIA. La Paz: Prov. Sud Yungas: 3.1 km SE of Unduavi bridge, below on old road, 3000 m, 6 November 1982, *J.C. Solomon 8663* (MO). Cochabamba: NE of Cochabamba, towards Villa Tunari, 2500 m, 26–30 November 1978, *C. Luer, J. Luer, J. Kuhn & F. Fuchs et al. 3554 p.p.* (SEL).

Habitat: in cloud forest with 4–8 m tall trees (*Solomon 8663*), 3000–3200 m.

This species was only known from the type (now lost), and a later floral analysis (Schlechter, 1930). I have therefore provided a description and illustration based on the specimens cited above to augment knowledge of it. The collection from Cochabamba had slightly smaller flowers (the lesser measurements in the description), but in lip shape agrees fully with the La Paz specimen.

***Fernandezia minor* var. *boekeorum* Ormerod, var. nov.**

TYPE: PERU. Puno: Prov. Carabaya, 10 km S of Ollachea, no altitude, 13 August 1980, *J.D. Boeke & S. Boeke 3002* (Holotype: NY; Isotypes: MO, SEL). Fig. 37.

Related to *Fernandezia minor* var. *breviflora* but with obovate-elliptic to unevenly elliptic (vs. oblong to elliptic) petals distinctly thickened along the midvein.

Lithophytic herb. *Roots* terete, 0.5–1.0 mm thick. *Stems* with up to 4 branches (these to 2.65 cm long), densely leafy, 3.0–12.5 cm long, ca. 0.3 cm wide across sheaths, 0.2 cm thick. *Leaves* oblong-lanceolate, acute to apiculate, fleshy, margins minutely denticulate, 6.5–7.0 mm long, 2 mm wide laterally; leaf sheaths deltate, truncate, margins minutely denticulate, revolute, surface smooth, striate. *Inflorescence* to 8 mm long; peduncle 4–5 mm long; rachis 2–5 flowered, 1.5–4.0 mm long; floral bracts deltate, acute, to 2 mm long. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, ca. 2.5 mm long. *Dorsal sepal* oblong to ovate-lanceolate, acute, low carinate medially, 2.7–3.0 × 1 mm. *Lateral sepals* obliquely lanceolate to ovate-lanceolate, acute, thickly to narrowly carinate medially, 3.00–3.30 × 0.95–1.20 mm. *Petals* elliptic-obovate to unevenly ovate-elliptic, acute, low ridged medially, 2.20–2.80 × 1.15–1.20. *Labellum* ovate-elliptic to elliptic, acute, carinate below tip, 2.75–2.80 × 1.30 mm; lower 1/4 of lip divided by a narrow ridge that diverges into 2 lamellate carinae that terminate about halfway. *Column* with 2 low semicircular wings, 1.8 mm long, 1.0–1.1 mm wide laterally.

Distribution: Peru.

Additional specimen examined: PERU. Puno: Prov.

Sandia, fields and houses around Ura-ayllu, 3400 m, 5 February 1986, *B. Bennett 2118* (NY).

Habitat: in deep moss on rocks (type), on rocks in old field (*Bennett 2118*), 3400 m.

Eponymy: named after Jef and Susanne Boeke, collectors of the type.

This variety is closest to *Fernandezia minor* var. *breviflora* but has differently shaped petals distinctly thickened along the midvein.

***Fernandezia minor* var. *breviflora* Ormerod, var. nov.**

TYPE: BOLIVIA. La Paz: Unduavi Valley, 2000–2600 m, 1925, *Brother Julio 451* (Holotype: US). Fig. 38.

Differing from typical *Fernandezia minor* in having an elliptic (vs. oblong-oblongate) labellum.

Epiphytic (?) herb. *Roots* terete, 0.4–0.8 mm thick. *Stems* stout, densely leafy, occasionally branching (branches 6–7 cm long), 3–12 cm long, 0.1–0.2 cm thick. *Leaves* oblong-lanceolate, acute, conduplicate, margin minutely denticulate near the apex, stiffly coriaceous, 8.0–9.7 × 4–5 mm; leaf sheaths smooth, striate, margins recurved, entire, 4.5 mm long. *Inflorescence* to 6.5 mm long; peduncle ca. 4 mm long; rachis 3–4 flowered, 2.0–2.5 mm long; floral bracts deltate, acute, ca. 2.8 × 2.0 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, 2.7–3.5 mm long. *Dorsal sepal* oblong-lanceolate, acute, carinate, 2.7–3.3 × 1.1–1.3 mm. *Lateral sepals* obliquely lanceolate, acute, carinate, 3.00–3.75 × 1.00–1.75 mm. *Petals* oblong to oblong-elliptic, acute to subacute, 2.45–2.80 × 0.95–1.20 mm. *Labellum* elliptic, acute to obtuse, 2.75–2.90 × 1.30–1.85 mm; midline of lip narrowly thickened before diverging into 2 lamellae. *Column* shortly stalked, each side with an obliquely semicircular wing, 1.65–1.90 mm long, 1.0–1.3 mm wide laterally.

Distribution: Bolivia.

Additional specimen examined: BOLIVIA. Cochabamba: valley below Pelechuco, 3050–3355 m, October 1864, *R. Pearce s.n.* (BM).

Etymology: from the Latin *brevis*, short, and *flora*, flower, in reference to the short appearance of the labellum.

This taxon differs from typical *Fernandezia minor* in having an elliptic (vs. oblong-oblongate) lip. The collection by Pearce has slightly smaller flowers; these form the lesser floral measurements in the description.

***Fernandezia nunezii* Ormerod, sp. nov.**

TYPE: PERU. Cusco: Prov. Paucartambo, Pillahuata, Tres Cruces, about 130 km Cusco on the road toward Pilcopta, 2000 m, 4 April 1987, *P. Nunez 7805* (Holotype: MO; Isotype: NY). Fig. 39.

Related to *F. unduaviae* Ormerod but the labellum with the claw half as long, and the rectangular (vs. oblong-elliptic to elliptic) blade with right-angled (vs. tapered) bases.

Epiphytic herb. *Roots* terete, ca. 0.7 mm thick. *Stem* simple to 4 branched (branches 1.5–7.0 cm long), flexuous, subclaxly leafy, 15 cm long, 0.07–0.10 cm thick. *Leaves* oblong to elliptic, subacuminate, margins minutely denticulate near apex, 7.0–13.0 × 3.5–3.7 mm; leaf sheaths

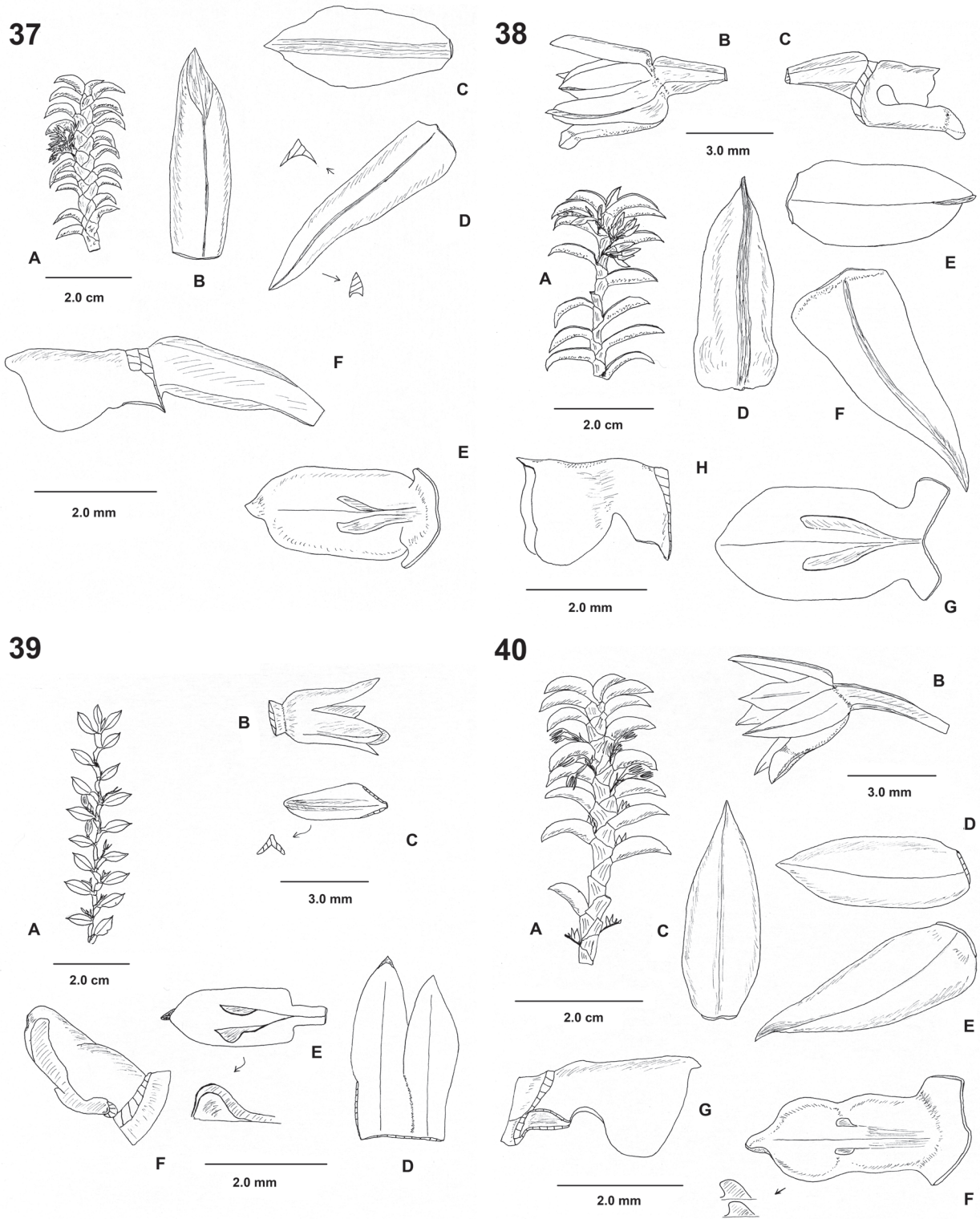


FIGURE 37–40. **37**, *Fernandezia minor* (Schltr.) M.W. Chase var. *boekeorum* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, column. Drawn from holotype. **38**, *Fernandezia minor* (Schltr.) M.W. Chase var. *breviflora* Ormerod. **A**, stem (upper part); **B**, flower; **C**, labellum and column; **D**, dorsal sepal; **E**, petal; **F**, lateral sepal; **G**, labellum; **H**, column. Drawn from holotype. **39**, *Fernandezia nunezii* Ormerod. **A**, stem (upper part); **B**, flower; **C**, lateral sepal; **D**, dorsal sepal and petal; **E**, labellum; **F**, column. Drawn from holotype. **40**, *Fernandezia pandurata* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column. Drawn from holotype.

semitubular, smooth, 4 mm long below leaf articulation. *Inflorescence* 5 mm long; peduncle 3 mm long; rachis 2 flowered, 2 mm long; floral bracts deltate, acute, to 2.8×2.0 mm. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, ca. 3 mm long. *Dorsal sepal* narrowly oblong, subacute, midvein low carinate, joined to petals and lateral sepals for 0.75 mm, 2.5×0.9 mm. *Lateral sepals* obliquely oblong-lanceolate, subacute, midvein carinate, joined to each other and dorsal sepal for 0.75 mm, 3×1 mm. *Petals* narrowly oblong-rhombic, acute, joined to dorsal sepal for 0.75 mm, low carinate, 2.3×0.9 mm. *Labellum* rectangular from a short claw, subacute, carinate below tip, claw ca. 0.5 mm long, blade 1.95×1.00 mm, in total ca. 2.3×1.0 mm; midvein on claw diverging on blade into 2 low lamellae that are raised apically into deltate to semi-elliptic lobes. *Column* each side at middle with an obliquely semicircular wing, 2 mm long, 0.95 mm wide.

Distribution: Peru.

Eponymy: named after Percy Nunez, Peruvian botanist and collector of the type.

Fernandezia nunezii is related to its Peruvian congener *F. gracillima* (C. Schweinf.) M.W. Chase but differs from the latter in having a narrowly clawed, rectangular (vs. broadly clawed, suborbicular) lip. Its other close relative is the Bolivian *F. unduaviae*, which differs in the lip having a twice-as-long claw, and tapered bases to the oblong-elliptic to elliptic blade.

The isotype in NY is a mixed collection, also containing material of *F. weberbaueri* var. *tricurucensis*.

Fernandezia pandurata Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, Pampatambo, no altitude, 8 November 1979, R. Vasquez 202 p.p. (Holotype: SEL). Fig. 40.

Related to *Fernandezia scimitaris* Ormerod but flowers with a pandurate (vs. ovate-lanceolate) labellum, and well-separated (vs. united) calli.

Epiphytic (?) *herb.* *Roots* terete, 0.3–0.8 mm thick. *Stems* simple, subslaxly leafy, 4.3–6.3 cm long, 0.25–0.30 cm wide across leaf sheaths, ca. 0.15 mm thick. *Leaves* oblong-lanceolate, apiculate, coriaceous, margins minutely denticulate, 6–8 mm long, 2.0–2.2 mm wide laterally; leaf sheaths semitubular, striate, smooth, margins recurved, minutely denticulate. *Inflorescence* to 11 mm long; peduncle 4 mm long; rachis 3–4 flowered, 3–7 mm long; floral bracts deltate, acute, 2.5×1.0 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, 3.0–3.8 mm long. *Dorsal sepal* oblong-lanceolate, acute, low carinate, 3.20×1.15 mm. *Lateral sepals* obliquely oblong-lanceolate, acute, carinate, especially near apex, 3.4×1.2 mm. *Petals* oblong-lanceolate, acute, 2.8×1.1 mm. *Labellum* pandurate, apex an obtuse lobule, lower part ca. 2.0×1.1 mm; upper part ca. 1.1×1.2 mm, in total ca. 3.1×1.1 – 1.2 mm; lower half of lip divided by a low, thickened midline that ends in 2 subquadrate, well-separated lamellate calli. *Column* shortly and broadly stalked, each side with a suborbicular wing, 2 mm long, 1.5 mm wide laterally.

Distribution: Bolivia.

Etymology: from the Late Latin *pandura*, itself from the Classical Greek *pandoura*, a kind of lute-like musical instrument, but now meaning violin shaped (i.e., constricted in the middle), in reference to the shape of the labellum.

This taxon is closely related to *Fernandezia scimitaris* but does not have the curved leaves of that taxon, and the flowers have a pandurate (vs. ovate-lanceolate) lip. The dorsal sepal also appears humped at the base because its carina is not in the direct line of the one on the ovary, whereas in *F. scimitaris* the dorsal sepal and ovary carina are in line. The holotype is a mixture of two species, the other specimen on the sheet forms the type of *F. scimitaris*.

Fernandezia parvifolia (Lindl.) M.W. Chase, *Phytotaxa* 20: 30. 2011 as *parviflora*.

Basionym: *Pachyphyllum parvifolium* Lindl., in W.J. Hook., *Icon. Plant.* 2: t.177. 1837.

TYPE: PERU. Amazonas: Prov. Chachapoyas, without locality, A. Mathews 1836 (Holotype: K). Fig. 41G.

Epiphytic *herb.* *Roots* terete, to 0.7 mm thick. *Stems* simple to occasionally branched (branches to 8.5 cm long), flexuous, 3.5–15.7 cm long. *Leaves* oblong to oblong-elliptic, acute, thinly coriaceous, 8.0 – 9.5×3.3 – 4.5 mm; leaf sheaths tubular, smooth. *Inflorescence* 6 mm long; peduncle ca. 4 mm long; rachis few flowered, to 2 mm long; floral bracts deltate, acute, 2.2×1.5 mm. *Flowers* green. *Pedicellate ovary* clavate, triquetrous, ca. 3 mm long. *Dorsal sepal* ligulate to narrowly oblong, acute, midvein carinate, 3.0 – 3.4×0.9 – 1.0 mm. *Lateral sepals* obliquely ligulate-lanceolate, acute, high carinate, partly joined to the other lateral sepal for 0.75–2.00 mm, 3.50 – 4.00×0.95 – 1.20 mm. *Petals* narrowly oblong to ligulate-oblong-lanceolate, acute, 2.8 – 3.5×0.9 – 1.0 mm. *Labellum* oblong to elliptic from a clawed base, obtuse, carinate below tip, claw to 1.2 mm long, in total 2.75 – 3.70×1.00 – 1.30 mm; lower half with a low medial thickening that ends in 2 obliquely subquadrate calli. *Column* clavate-cuneate in lateral view, 1.9 – 2.1 mm long, 0.9 – 1.6 mm wide laterally.

Distribution: Peru.

Additional specimens examined: PERU. Amazonas: Prov. Chachapoyas, Chachapoyas to Cajamarca road, Calla Calla, 20 km from Leimebamba, 3320 m, 4 September 1983, D.N. Smith & S. Vasquez S. 5017 (F, MO); Cerros Calla Calla, 18 km above Leimebamba, on the road to Balsas, 3100 m, 8 June 1964, P.C. Hutchison & J.K. Wright 5607 (AMES); S side of Molinopampa to Diosan Pass, 2700–3100 m, 8 August 1962, J.J. Wurdack 1639 (GH).

The illustration in the protologue did not depict the labellum. Examination of the holotype and later collections show this to be oblong to elliptic with 2 medially placed calli.

Fernandezia parvifolia var. *cajamarcae* Ormerod, *var. nov.*

TYPE: PERU. Cajamarca: Prov. Jaen, Sallique, Quebrada grande, road between La Cocha and Tablon, 2770–2900 m, 30 June 1998, C. Diaz, T. Guevara & E. Tineo 9795 (Holotype: MO). Fig. 41A–F.

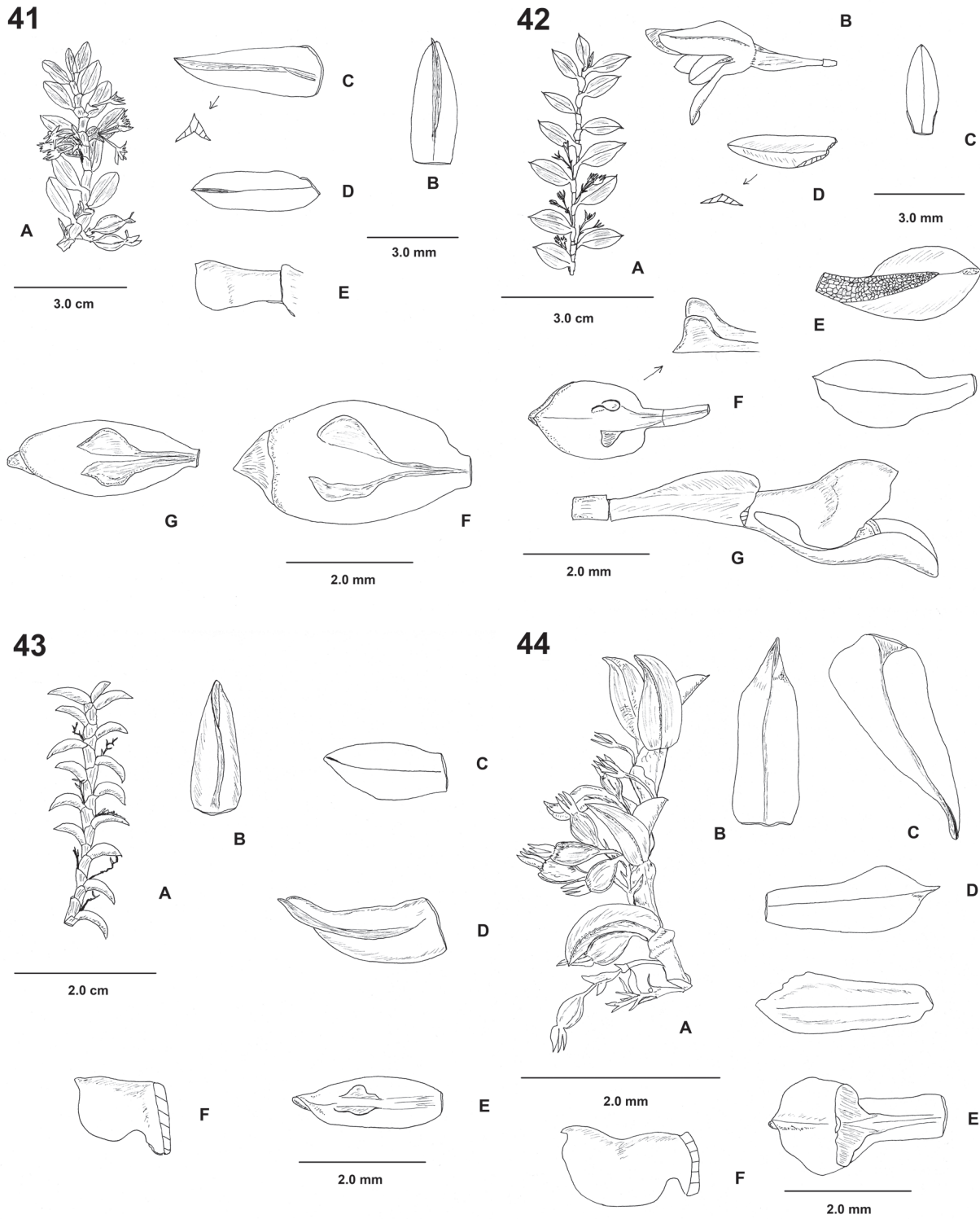


FIGURE 41–44. **41, A–F.** *Fernandezia parvifolia* (Lindl.) M.W. Chase var. *cajamarcae* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepal; **D**, petal; **E**, column; **F**, labellum. **G.** *Fernandezia parvifolia* (Lindl.) M.W. Chase var. *parvifolia*. **G**, labellum. **A–F** from holotype; **G** from Smith & Vasquez 5017 (MO). **42, Fernandezia pastinaca** Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petals (outside and inside); **F**, labellum; **G**, labellum and column. Drawn from holotype. **43, Fernandezia pectinata** (Rchb.f.) M.W. Chase var. *punoensis* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, column. Drawn from holotype. **44, Fernandezia pseudodichaea** (Rchb.f.) M.W. Chase. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepal; **D**, petals; **E**, labellum; **F**, column. Drawn from isotype (AMES).

Differing from typical *Fernandezia parvifolia* in having a much broader labellum (1.95 vs. 1.00–1.30 mm).

Epiphytic herb. Roots terete, ca. 1 mm thick. Stems flexuous, simple to occasionally branched (branches 2–3 cm long), subclaxly leafy, 13–14 cm long, ca. 0.1 cm thick. Leaves oblong, acute, margins near apex finely denticulate, 10–12 × 3.5–5.5 mm; leaf sheaths tubular, smooth, margins finely denticulate, not fully enclosing internodes, ca. 4 mm long. Inflorescence 5 mm long; peduncle 4 mm long; rachis 3 flowered, 1 mm long; floral bracts broadly ovate, acute, 3.0 × 3.5 mm. Flowers green. Pedicellate ovary clavate, trigonous, 4.75 mm long. Dorsal sepal narrowly oblong-lanceolate, acute, midvein carinate, 3.75 × 1.20 mm. Lateral sepals obliquely ligulate-lanceolate, acute, carinate, joined to other lateral sepal for 0.75 mm, 4.75 × 1.80 mm. Petals oblong, subacute, midvein carinate toward tip, 3.5–3.7 × 1.2 mm. Labellum elliptic, acute, 3.75 × 1.95 mm; lower half divided by a narrow ridge that ends in 2 semi-elliptic to trapezoid calli. Column clavate-cuneate in lateral view, 2.75 mm long, 1.2–1.3 mm wide laterally.

Distribution: Peru.

Habitat: in disturbed forest, 2770–2900 m.

Etymology: named after the Department of Cajamarca, the type locality.

Variety *cajamarcae* differs from typical *Fernandezia parvifolia* in having a broader labellum, and longer (2.75 vs. 2.00 mm) column.

Fernandezia pastinaca Ormerod, *sp. nov.*

TYPE: BOLIVIA. Santa Cruz: Prov. Manuel M. Caballero, 1.5 km to the SE of the town of Siberia, 2970 m, 29 November 2002, E. Calzadilla, I. Vargas, C. Jordan & D. Rocabado 56 (Holotype: MO). Fig. 42.

Related to *Fernandezia nunezii* Ormerod and *F. unduaviae* Ormerod but the labellum ovate-elliptic (vs. oblong-elliptic to rectangular), and column narrowly (vs. broadly) clawed.

Epiphytic herb. Roots terete, 0.6–1.2 mm thick. Stems weakly flexuous, occasionally branched (branches 4.0–12.5 cm long), subclaxly leafy, to 24.5 cm long, 0.07–0.08 cm thick. Leaves ovate-lanceolate, acute, margins minutely denticulate near apex, 5–9 × 3–4 mm; leaf sheaths semitubular, margins entire, not fully covering internodes. Inflorescence 5 mm long; peduncle 3 mm long; rachis 3 flowered, 2 mm long; floral bracts deltate, acute, 2.0 × 1.6 mm. Flowers white. Pedicellate ovary clavate, triquetrous, ca. 2 mm long. Dorsal sepal oblong, acute, thinly fleshy, basal 0.8 mm joined to lateral sepals, 2.8 × 1.1 mm. Lateral sepals obliquely lanceolate, subacute, fleshy, 3.0–3.3 × 1.1–1.5 mm. Petals elliptic from a clawed base, subacute, outside of claw and midvein thickened, 2.5 × 1.0 mm (incl. claw of 0.85 mm long). Labellum ovate-elliptic from a clawed base, subacute, claw ligulate, 0.9 mm long, blade 1.80–1.95 × 1.20 mm; in lower half midvein diverging into 2 widely separated, semi-elliptic lamellae. Column with a narrowly clawed base that expands each side into an obliquely semicircular wing, 2 mm long, ca. 1 mm wide.

Distribution: Bolivia.

Habitat: very humid “yungueno” forest on a mountain ridge, 2970 m.

Etymology: from the Latin *pastinaca*, stingray, in reference to the shape of the labellum.

Fernandezia pastinaca is most closely related to *F. nunezii* and *F. unduaviae* but may be distinguished from them by its ovate-elliptic (vs. oblong-elliptic to rectangular) lip, and narrowly (vs. broadly) stalked column.

A flowerless collection (I.G. Vargas 6902 [MO]) from Laguna Brava in the Province of Manuel M. Caballero probably also belongs here.

Fernandezia pectinata (Rchb.f.) M.W. Chase, *Phytotaxa* 20: 30. 2011.

Basionym: *Pachyphyllum pectinatum* Rchb.f., *Xenia Orch.* 3: 22. 1878.

TYPE: BOLIVIA. La Paz: Prov. Larecaja, near Sorata, Mt. Chilioca, 3100 m, October 1858, G. Mandon 1152 p.p. (Lectotype here designated: W-R 19256 [specimens with sepals 2.0–2.4 mm long, oblong-ob lanceolate lips, image seen]; drawing W-R 19257; Isotypes: AMES 76407, lower rhp, AMES 54448, BM; G, GOET, MICH, NY, S, images seen). Fig. 32G.

Distribution: Bolivia.

As noted above under *Fernandezia mandonii*, the collection Mandon 1152 from Mt. Chilioca is a mixture of two taxa. I have reserved the name *F. pectinata* for those plants with smaller flowers (sepals 2.0–2.4 mm long) and an oblong-ob lanceolate (vs. rectangular-cuneate) lip.

Fernandezia pectinata var. *punoensis* Ormerod, *var. nov.*

TYPE: PERU. Puno: Distrito Sandia, N side of Rio Awi to Awi Valley, between Aripo and Ura-ayllu, 3100 m, 8 April 1986, B. Bennett 2781 (Holotype: NY). Fig. 43.

Differs from the typical species in having thinner (1 vs. 3 mm) stems, and an oblong (vs. oblong-ob lanceolate) lip.

Epiphytic herb. Roots terete, 0.6–1.0 mm thick. Stems simple to occasionally 2–3 branched (branches to 5.5 cm long), subclaxly leafy, 6–14 cm long, ca. 1 mm thick. Leaves oblong-lanceolate, acute, conduplicate, margins minutely denticulate toward apex, 6 mm long, 1.0–1.5 mm wide laterally; leaf sheaths tubular, margins minutely denticulate, smooth, striate. Inflorescences to 8.4 mm long; peduncle 4.2 mm long; rachis flexuous, up to 6 flowered, 4.2 mm long; floral bracts ovate-lanceolate, acute, to 1.9 mm long. Flower color not known. Pedicellate ovary clavate, triquetrous; young capsule triquetrous, 4.8 mm long (incl. pedicel of 1.3 mm), one side 2 mm wide. Dorsal sepal lanceolate, acute, midvein thinly carinate, 2.00 × 0.75–0.80 mm. Lateral sepals obliquely lanceolate, acute, midvein high lamellate, 2.4 × 0.9 mm. Petals obliquely ovate-elliptic, acute, midvein shortly carinate near the apex, 1.90 × 0.85 mm. Labellum oblong, subacute, carinate below tip, 2.1 × 0.8 mm; calli 2, lamellate, remote, parallel, in upper half of lip, deltate, rounded to truncate. Column shortly stalked, each side with a low broad wing, ca. 1 mm long, 0.75 mm wide laterally.

Distribution: Peru.

Habitat: high elevation grassland and shrubland, 3100 m. **Etymology:** named after the type locality, the south Peruvian Department of Puno.

I have treated this plant as a variety of *Fernandezia pectinata* because it agrees in flower size (sepals 2.0–2.4

mm long), and has a somewhat similar lip. However, when compared side by side the two look rather different, since variety *punoensis* is a more slender, laxer leaved plant, and its lip calli are parallel (vs. weakly divergent) and more even (vs. oblique based) in shape. The shape of the column is not fully certain, since this organ was affected by the fertilization process.

Fernandezia pseudodichaea (Rchb.f.) M.W. Chase, *Phytotaxa* 20: 30. 2011.

Basionym: *Pachyphyllum pseudodichaea* Rchb.f., *Xenia Orch.* 3: 22. 1878.

TYPE: BOLIVIA. La Paz: Prov. Larecaja, near Sorata, Lancha de Cochipata, 3200 m, May 1860, *G. Mandon 1152 p.p.* (Holotype: W-R 19258, image seen; Isotypes: AMES 76407; G, P, S, images seen). Fig. 44.

Lithophytic herb. *Roots* terete, many emitted from leafless section of stem, ca. 0.9 mm thick. *Stem* simple, subslaxly leafy, 17.5 cm long, 0.05–0.10 cm thick. *Leaves* ovate-oblong, acute, upper margins laxly and minutely denticulate, coriaceous, 9.0–10.0 × 4.2 mm; leaf sheaths semitubular, truncate, margins recurved, laxly and minutely denticulate. *Inflorescences* to 8.5 mm long; peduncle 4 mm long; rachis 4–5 flowered, to 4.5 mm long; floral bracts deltate, acute, ca. 2.1 mm long. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, ca. 3 mm long. *Dorsal sepal* oblong, acute, carinate towards tip, 2.75–2.80 × 1.00 mm. *Lateral sepals* obliquely ovate-lanceolate, acute, midvein narrowly carinate, 3.2 × 1.5 mm. *Petals* ligulate-oblong, acute, 2.5–2.7 × 0.9 mm. *Labellum* claw rectangular, dilating into a suborbicular-pentagonal blade, claw 1.2 × 0.7 mm, blade 1.5 × 1.4 mm, in total 2.70–2.75 × 1.40 mm; claw of lip with 2 low medial lamellae that suddenly raise up into parallel, triangular, frontally truncate, apically rounded flat lobes that are situated on the base of the blade, each lobe can be spread to the edge of the lip or just over it. *Column* shortly constricted basally, each side with a low transverse wing, 1.7 mm long, 1 mm wide laterally.

Distribution: Bolivia.

Mandon assigned his number 1152 to this plant, collected almost two years after the specimens from Mt. Chilieca, which represent the types of *Fernandezia mandonii* and *F. pectinata*. It is easily distinguished from those two taxa by its flat leaves, flowers with a broadly clawed lip terminated by a pentagonal blade, and large pair of lamellae. I have provided a description and illustration of *F. pseudodichaea* based on the isotype in AMES.

Fernandezia pseudominor Ormerod, *sp. nov.*

TYPE: BOLIVIA. La Paz: Prov. Sud Yungas, along Rio Unduavi, 2900 m, 29 January 1980, *C. Luer, J. Luer, R. Vasquez & R. Nara 5003* (Holotype: SEL, lhp). Fig. 45.

Related to *Fernandezia minor* (Schltr.) M.W. Chase but flowers with an oblong, obtuse (vs. oblong-oblongeolate, subacute) labellum.

Epiphytic herb. *Roots* terete, 0.6–1.0 mm thick. *Stems* simple, subslaxly leafy, 12 cm long, 0.15 cm thick. *Leaves* oblong to oblong-lanceolate, acute, coriaceous, conduplicate, margins minutely denticulate, ca. 8 mm long,

1.5–2.0 mm wide laterally; leaf sheaths smooth, striate, margins minutely denticulate. *Inflorescence* ca. 8 mm long; peduncle ca. 4 mm long; rachis about 4 flowered, 4 mm long; floral bracts deltate, acute, to 2 mm long. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, 3.0–3.5 mm long. *Dorsal sepal* oblong-lanceolate, acute, 3.1 × 0.95 mm. *Lateral sepals* obliquely lanceolate, acute, 3.8 × 1.1 mm. *Petals* oblong, acute, midvein thickly carinate near tip, 2.75 × 0.80 mm. *Labellum* oblong, obtuse, shallowly cucullate, 2.7 × 0.9 mm; from near base 2 slightly divergent lamellae that raise up in their apical 1/3. *Column* shortly stalked, each side with a suborbicular wing, 1.75 mm long, 1 mm wide laterally.

Distribution: Bolivia.

Habitat: cloud forest, 2900 m.

Etymology: named for its resemblance to *Fernandezia minor*, literally false minor.

This species appears to be closely related to *Fernandezia minor*, but it differs in having flowers with a narrower (0.9 vs. 1.20–1.85), oblong (vs. oblong-oblongeolate), obtuse (vs. subacute) labellum.

Fernandezia putumayoensis (Szlach., Kolan. & Oledr.) Molinari & Mayta, *Richardiana* 16: 43. 2015.

Basionym: *Pachyphyllum putumayoense* Szlach., Kolan. & Oledr., *Ann. Bot. Fenn.* 51: 223. 2014.

TYPE: COLOMBIA. Putumayo: Alto Cuenca of the Rio Putumayo, ridge of the Cordillera between El Encano and Sibundoy, paramo de San Antonio del Bordoncillo, 3250 m, 4 January 1941, *J. Cuatrecasas 11698A* (Holotype: COL, image seen; Isotypes: AMES; US not seen). Fig. 46.

Distribution: Colombia.

Additional specimens examined: COLOMBIA. Caldas: La Vega, Rio Azul, W slopes of Paramo de Chili, 3690 m, 11 December 1944, *H. St. John 20894* (AMES). Risaralda: Municipio de Santa Rosa de Cabal, royal road between Termas de Santa Rosa and Hacienda La Sierra, 3370 m, 23 February 1986, *J. Wolf 751* (SEL); same area, Hacienda La Sierra, 3670 m, 24 March 1986, *J. Wolf 856* (SEL). Valle: Cordillera Occidental: Los Farallones, ridge of the cordillera, scrub of the Paramo and cerro La Torre, 3750 m, 10 October 1944, *J. Cuatrecasas 17854* (F, GH). Cauca: Volcan de Purace, 3000 m, 7 November 1948, *S.Y. Agredo, J.A. Molina & F.A. Barkley "18 Ca.125"* (US).

This is a rather characteristic species, its stems are often densely beset with little suborbicular to almost squarish, thinly and stiffly coriaceous leaves, the latter set on broadly triangular leaf sheaths. Thus the plant somewhat resembles a *Dichaea* Lindl. Apart from the distinctive leaves, it may be recognized by the relatively small-lobed, apical column wings. In the protologue it is said to have well-separated calli on the lip, but I find in the AMES isotype and other collections these are close together as in other species. However, the calli do tend to split medially when the lip is pressed flat for drawing.

The variation of the species may eventually include two other essentially identical Colombian collections (Cauca, *J. Cuatrecasas 14783* [F, GH]; Valle, *J. Cuatrecasas 17924* [F, GH]), which differ in having broader, more rounded

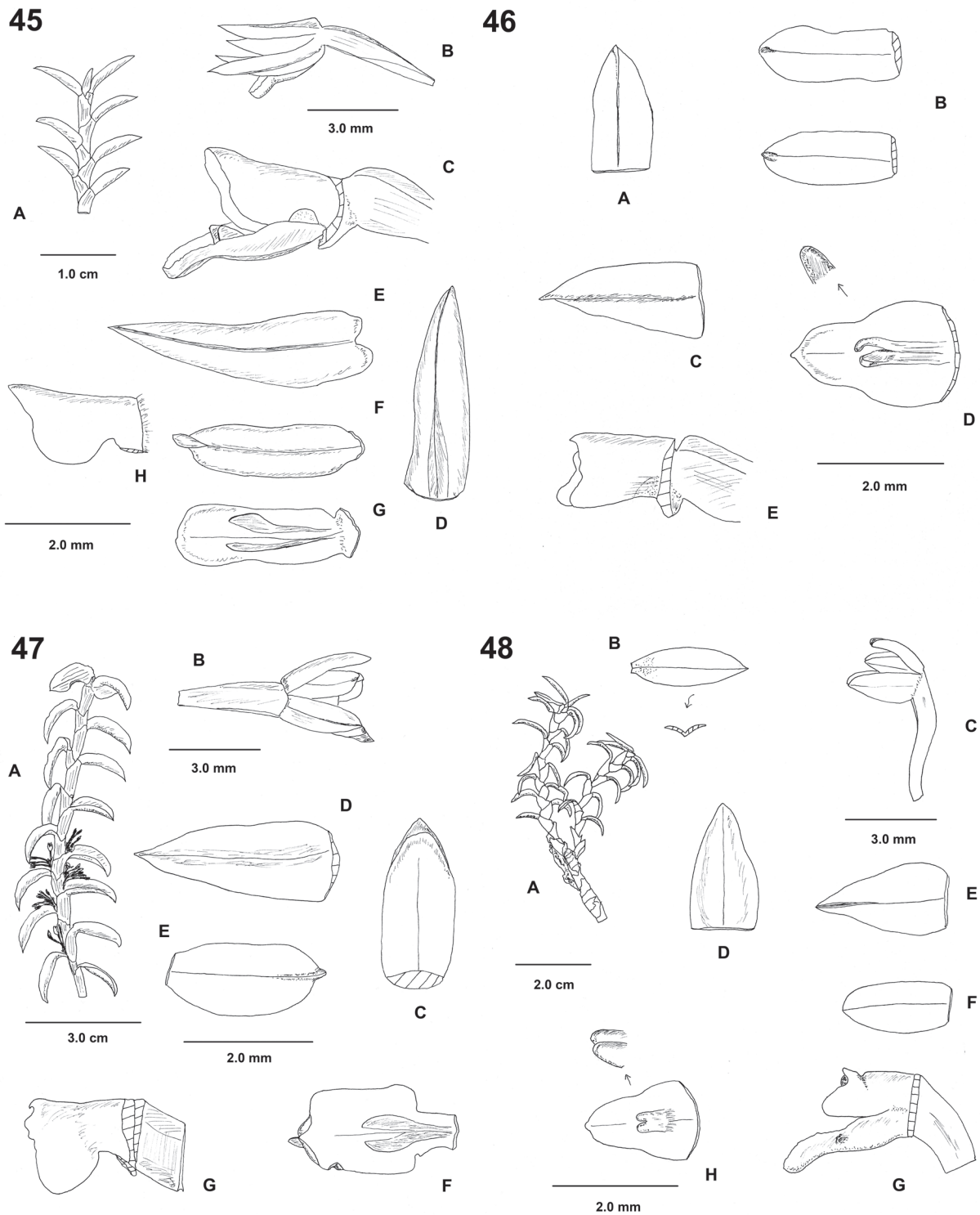


FIGURE 45–48. **45**, *Fernandezia pseudominor* Ormerod. **A**, stem (upper part); **B**, flower; **C**, labellum and column; **D**, dorsal sepal; **E**, lateral sepal; **F**, petal; **G**, labellum; **H**, column. Drawn from holotype. **46**, *Fernandezia putumayoensis* (Szlach., Kolan. & Oledr.) Molinari & Mayta. **A**, dorsal sepal; **B**, petals; **C**, lateral sepal; **D**, labellum; **E**, column. Drawn from isotype (AMES). **47**, *Fernandezia quadrangularis* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype. **48**, *Fernandezia rubescens* Ormerod. **A**, stem (upper part); **B**, leaf (no scale); **C**, flower; **D**, dorsal sepal; **E**, lateral sepal; **F**, petal; **G**, labellum and column; **H**, labellum. Drawn from holotype.

column wings. The first one (*Cuatrecasas 14783*) also differs in having the lip widest medially (vs. in basal half), and has denticulate petals. These aspects remind strongly of *Fernandezia crystallina*, giving the suspicion of a natural hybrid with that taxon. The second collection is in fruit, but florally agrees well with *F. putumayoensis* except for the broader column wings.

Another two Colombian collections (Caldas, *F.W. Pennell 10517* [US]; Cauca, *H. Antonio C. 70* [F]) probably belong to *F. putumayoensis*, but the material at hand was insufficient for positive identification.

Fernandezia quadrangularis Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Sacaba, Cerro San Benito, 2900 m, 15 November 1921, *J. Steinbach 5938* (Holotype: K). Fig. 47.

Related to *Fernandezia steinbachii* Ormerod but flowers with a quadrangular (vs. broadly elliptic) labellum.

Epiphytic (?) *herb.* Roots terete, several on old parts of stem, to 1 mm thick. Stems simple to 1 branched (branch 10 cm long), laxly leafy, 20.5 cm long, ca. 0.2 cm thick. Leaves oblong, acute, margins minutely denticulate, to 12 × 5 mm; leaf sheaths tubular, margin oblique, entire, exposed dorsal edge 4–5 mm long. Inflorescences ca. 10 mm long; peduncle mostly hidden in leaf sheath, ca. 6 mm long; rachis 4 flowered, ca. 4 mm long; floral bracts broadly ovate, acute, 2–3 × 2–3 mm. Flowers white. Pedicellate ovary clavate, triquetrous, 3.5–4.0 mm long. Dorsal sepal oblong-elliptic, acute, fleshy, 2.5 × 1.0 mm. Lateral sepals obliquely oblong-lanceolate, acute, 2.95 × 1.20 mm. Petals oblong-elliptic, subacute, midvein carinate at apex, 2.1 × 1.0 mm. Labellum subquadrate from a shortly clawed base, subacute, carinate below tip, claw broad cuneate, 0.8 mm long, blade 1.8 × 1.5 mm, in total 2.5 × 1.5 mm; on claw 2 low lamellae that broaden and diverge slightly on the lower half of the blade. Column shortly and broadly stalked, each side with an obliquely suborbicular wing, 1.5 mm long, 1 mm wide laterally.

Distribution: Bolivia.

Etymology: from the Latin *quadrangulus*, four cornered, in reference to the lip shape.

This taxon is probably related to *Fernandezia steinbachii*, but the flowers have a subquadrate (vs. broadly elliptic) lip. Another similar species is *F. tinquiana*, but it too has a broadly elliptic lip, and also smaller (sepals 1.8 mm long) flowers.

Fernandezia rubescens Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: Prov. Bagua, Cordillera Colan, SE of La Peca, third camp, 2455m, 6 October 1978, *P. Barbour 3770 p.p.* (Holotype: MO; Isotype: SEL). Fig. 48.

Related to *F. rubicunda* Ormerod but with smaller flowers (sepals 1.8–1.9 vs. 3.3–3.5 mm) and with rounded, forward projecting (vs. truncate) column wings.

Epiphytic *herb.* Roots terete, 1 mm thick. Stems simple or branching (branches 3–11 cm long), densely leafy, 11–24 cm long, 0.1–0.4 cm thick. Leaves oblong-ligulate, acute, thinly fleshy, 6.0–7.5 × 2.0–3.0 mm; leaf sheaths smooth, striate. Inflorescence to 7 mm long; peduncle slender, 3 mm long; rachis up to 6 flowered, to 4 mm long; floral bracts

deltate-lanceolate, acute, to 1.8 mm long. Flowers white. Pedicellate ovary narrowly clavate, triquetrous, 3.0–3.3 mm long. Dorsal sepal ovate, subacute, 1.8 × 1.0 mm. Lateral sepals obliquely ovate, acute, low carinate, 1.9 × 1.0–1.1 mm. Petals oblong, subacute, 1.7 × 0.9 mm. Labellum ovate-subpandurate, obtuse, lower part ca. 0.90 × 1.10–1.15 mm, upper part 0.85–0.90 × 0.70–0.75 mm, in total 1.70 × 1.10–1.15 mm; lower half of lip divided medially by a low thick ridge that ends in a pair of parallel, conical to ellipsoid calli. Column each side with an apical, forward-pointing, obtuse wing, 1.1–1.2 mm long, 0.7 mm wide laterally.

Distribution: Peru.

Additional specimen examined: PERU. Amazonas: Prov. Bagua, Cordillera Colan, SE of La Peca, third camp, 2440 m, 25 September 1978, *P. Barbour 3564* (MO).

Habitat: humid cloud forest (type), elfin bog (*Barbour 3564*), 2440–2455 m.

Etymology: from the Latin, *rubescens*, to redden or blush, in reference to the reddish color of the dried specimens.

This species appears to be closely related to *Fernandezia rubicunda*, under which the differences are discussed. The type of *F. rubescens* is a mixed collection; the other specimen forms the type of *F. transversalis*. The isotype in SEL is, however, not a mixed collection.

Fernandezia rubicunda Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: Prov. Bagua, Cordillera Colan, E of La Peca, ridge W of peaks, ridgetop with pajonal, 3140 m, 25 August 1978, *P. Barbour 3200* (Holotype: MO; Isotype: SEL). Fig. 49.

Related to *Fernandezia rubescens* Ormerod but with larger flowers (sepals 3.3–3.5 vs. 1.8–1.9 mm) and truncate (vs. rounded and projecting forward) column wings.

Epiphytic (?) and lithophytic *herb.* Roots terete, 0.8–2.0 mm thick. Stems simple to 6–10 branched above (branches 5–9 cm long), densely leafy, 6.5–33.0 cm long, 0.2–0.4 cm wide across leaf sheaths, 0.15–0.30 cm thick. Leaves oblong to elliptic, acute, coriaceous, margins denticulate near apex, base shortly conduplicate, 7.0–10.0 × 2.4–3.5 mm; leaf sheaths somewhat lobed in lower half, rectangular above in lateral view, truncate, smooth, striate. Inflorescence to 9 mm long; peduncle to 5 mm long; rachis 3–5 flowered, ca. 4 mm long; floral bracts ovate-lanceolate, acute, to 2 mm long. Flowers white. Pedicellate ovary clavate, triquetrous, 3 mm long. Dorsal sepal oblong-lanceolate, acute, midvein carinate, 3.3 × 1.3–1.4 mm. Lateral sepals obliquely lanceolate, acute, carinate, 3.5 × 1.5–1.6 mm. Petals oblong, subacute, midvein thickly low carinate, 2.90 × 1.15 mm. Labellum ovate, acute, concave, 2.9 × 2.0 mm; lower half divided by a thick ridge that ends in 2 parallel, fleshy, conical calli. Column each side with a low broad wing, 1.8 mm long, 1.2 mm wide laterally.

Distribution: Peru.

Additional specimen examined: PERU. Amazonas: Prov. Bagua, Cordillera Colan, E of La Peca, ridge W of peaks, 3140 m, 25 August 1978, *P. Barbour 3154* (MO, SEL).

Habitat: humid elfin forest, on thick moss mats (type), on exposed boulder (*Barbour 3154*), 3140 m.

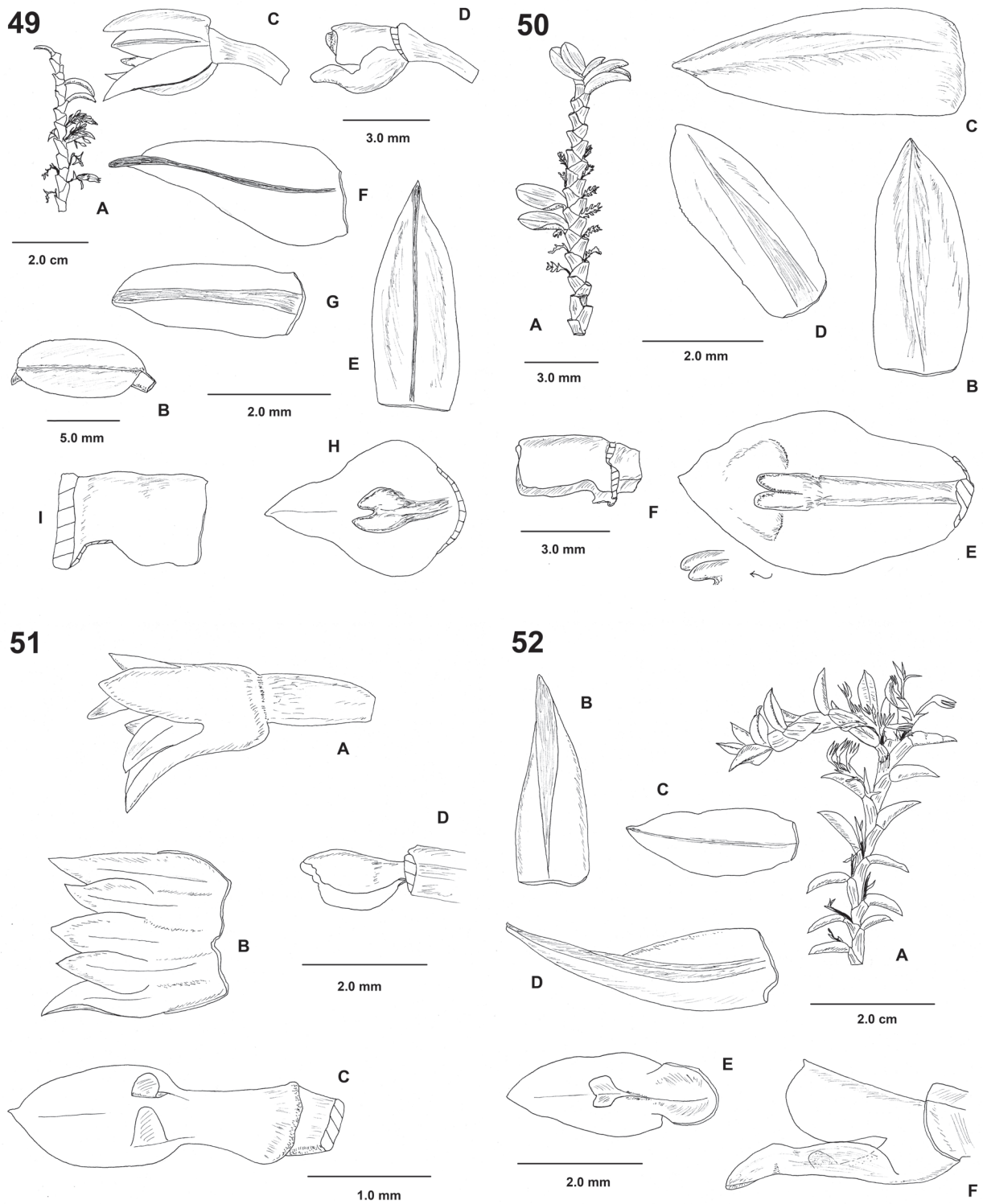


FIGURE 49-52. **49**, *Fernandezia rubicunda* Ormerod. **A**, stem (upper part); **B**, leaf; **C**, flower; **D**, labellum and column; **E**, dorsal sepal; **F**, lateral sepal; **G**, petal; **H**, labellum; **I**, column. Drawn from holotype. **50**, *Fernandezia salliquensis* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepal; **D**, petal; **E**, labellum; **F**, column. Drawn from holotype. **51**, *Fernandezia schultesii* (L.O. Williams) Carnevali & Dorr. **A**, flower; **B**, tepals (lateral sepal, petal, dorsal sepal, petal, lateral sepal); **C**, labellum; **D**, column. **A**–**C** from *Garcia-Barriga 17422* (AMES); **D** from holotype. **52**, *Fernandezia scimitaris* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, labellum; **F**, labellum and column. Drawn from holotype.

Etymology: from the Latin *rubicundus*, reddish, in reference to the color of the dried specimens.

The closest relative of this species appears to be its sister species *Fernandezia rubescens*, which occurs lower down on the same mountain range. *Fernandezia rubicunda* differs from *F. rubescens* in having larger flowers (sepals 3.3–3.5 vs. 1.8–1.9 mm), and truncate (vs. rounded and projecting forward) column wings.

Fernandezia salliquensis Ormerod, *sp. nov.*

TYPE: PERU. Cajamarca: Prov. Jaen, Sallique, Quebrada grande, route between La Cocha and Tablon, 2770–2900 m, 30 June 1998, C. Diaz, J. Campos, T. Guevara & E. Tineo 9791 (Holotype: MO). Fig. 50.

Similar to *Fernandezia distichoides* M.W. Chase but the flowers with an obovate (vs. ovate) labellum.

Epiphytic herb. Roots terete, 0.5–1.0 mm thick. Stems simple, densely leafy, 9–21 cm long, 0.7 cm wide across leaf sheaths, 0.3 cm thick. Leaves oblong to weakly ovate-oblong, shortly apiculate, coriaceous, margins minutely denticulate, drying brownish-red, 17–21 × 5.5–9.5 mm; leaf sheaths deltate, truncate, margins minutely denticulate. Inflorescence to 15 mm long; peduncle 6 mm long; rachis pectinate, up to 7 flowered, 9 mm long; floral bracts deltate, acute, 3 × 2 mm. Flowers green. Pedicellate ovary clavate, tripartite, 3.5 mm long. Dorsal sepal broadly oblong-lanceolate, obtuse, midvein thickly low carinate, 3.5 × 1.5 mm. Lateral sepals obliquely and broadly oblong-lanceolate, subacute, midvein carinate, carina thickest apically, 3.9–4.1 × 1.65. Petals oblong, subacute, midvein low carinate, 3.1 × 1.2 mm. Labellum obovate-elliptic, acute, 4 × 2.3 mm; lower half divided by a thick ridge that terminates in 2 parallel, oblongoid, slightly curved calli. Column rectangular in lateral view, 2.8 mm long, 1.7 mm wide laterally.

Distribution: Peru.

Etymology: named after the Sallique District, the type locality.

The relationships of this species are not clear. It resembles somewhat *Fernandezia distichoides* M.W. Chase in having rather broad leaf sheaths, and pectinate inflorescences, but the leaves are not so fleshy, and the lip is obovate (vs. ovate).

Fernandezia schultesii (L.O. Williams) Carnevali & Dorr, Smithsonian Contr. Bot. 100: 159. 2014.

Basionym: *Pachyphyllum schultesii* L.O. Williams, Caldasia 1, 3: 15. 1941. TYPE: COLOMBIA. Cundinamarca: SE of Bogota, Paramo de Chipaque, 3200 m, 25 September 1941, R.E. Schultes 1020 (Holotype: AMES). Fig. 51.

Homotypic synonym: *Orchidotypus schultesii* (L.O. Williams) Senghas, in Schltr., Die Orchideen ed. 3, I/B (31): 1923. 1995.

Heterotypic synonym: (?) *Orchidotypus vareschii* Foldats, Acta Biol. Venez. 2, 4: 28. 1957. TYPE: VENEZUELA. Tachira: Paramo el Batallon, 3200 m, V. Vareschi 4527B (Holotype: VEN, not seen).

Usage synonym: *Orchidotypus bryophytus* auct. non

(Schltr.) Senghas, Szlach., Kolan. & Mystk., Polish Bot. J. 59, 2: 168, f.4. 2014 p.p.

Distribution: Ecuador; Colombia; Venezuela (?).

Additional specimens examined: ECUADOR. Azuay: Gualaceo to Limon road, KM 13, 3200–3300 m, 4 March 1985, G. Harling & L. Andersson 22704 p.p. (AMES). COLOMBIA. Cundinamarca: Choconta, El Sisga, 2700–2800 m, 21 February 1962, H. Garcia-Barriga 17422 (AMES). Boyaca: road from Guateque to Santa Maria, between Santa Maria and Piedra Campana, “800–1200 m,” 10–12 March 1960, H. Garcia-Barriga 17209 (AMES, NY).

As noted under *Fernandezia vaginata*, this taxon may be distinguished from the latter by its larger flowers, with triangular free parts of the sepals, and ovate-lanceolate petals. The two Colombian specimens cited above were referred to *Orchidotypus bryophytus* by Szlachetko et al. (2014), but that taxon differs in having falcate, recurved leaves, smaller (sepals barely 2 mm long) flowers, and a narrowly rhombic lip lamina. I have seen no material matching *F. bryophyta* (Schltr.) M.W. Chase; it should be regarded as a species awaiting rediscovery.

Fernandezia scimitaris Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, Pampatambo, no altitude, 8 November 1979, R. Vasquez 202 p.p. (Holotype: SEL). Fig. 52.

Related to *Fernandezia teranii* Ormerod but flowers with longer sepals (3.15–3.90 vs. 1.90–2.50 mm), and labellum with calli basally joined to form a V (vs. parallel and separate).

Epiphytic (?) herb. Roots terete, ca. 0.8 mm thick. Stems simple, subclaxly leafy, 7.5 cm long, 0.05 cm thick. Leaves narrowly oblong-lanceolate, acute, margins minutely denticulate toward apex, rigid, subfalcate, conduplicate, 6–8 mm long, 1.5–2.5 mm wide laterally; leaf sheaths semitubular, smooth, margins minutely denticulate. Inflorescence to 10 mm long; peduncle ca. 5 mm long; rachis up to 5 flowered, to 5 mm long; floral bracts deltate, acute, to 2.7 mm long. Flower color not known. Pedicellate ovary clavate, triquetrous, ca. 3.5 mm long. Dorsal sepal oblong-lanceolate, acute, thickly carinate, 3.15 × 1.10 mm. Lateral sepals obliquely lanceolate, acute, strongly carinate, 3.9 × 1.3 mm. Petals oblong-lanceolate, acute, midline slightly thickened, carinate near apex, 2.75 × 1.00 mm. Labellum ovate-lanceolate, acute, low carinate under tip, ca. 2.2 × 1.4 mm (but 3 mm long if including 0.9-mm-long basal part united to column); callus in middle of lip, of two subquadrate lamellae united basally to form a V. Column shortly and broadly stalked, each side with an oblique, broadly suborbicular wing, 1.75 mm long, 0.9 mm wide.

Distribution: Bolivia.

Etymology: from the Italian *scimitarra*, itself possibly from the Persian *shamshir*, a curved sword usually broadening in its upper part, in reference to the shape of the lateral sepals.

This species appears to be related to its Bolivian congener *Fernandezia teranii* but has much larger flowers, and the lobes of calli on the lip are joined to form a V-shape,

rather than being parallel and separate. The type material is a mixture; the other specimen on the righthand part of the sheet forms the type material of *F. pandurata*.

Fernandezia shoveliformis Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, 23.8 km N of Colomi (junction of the road to Candelaria), on the road to Chapare, then 2.2 km NW (left) on side road, upper Rio Cayani, 2700 m, 19 October 1985, J.C. Solomon 14381 (Holotype: NY; Isotype: MO). Fig. 53.

Similar to *Fernandezia minor* (Schltr.) M.W. Chase but flowers with the labellum distinctly clawed (vs. sessile) and the blade with right-angled (vs. obtuse angled) corners.

Epiphytic herb. *Roots* terete, ca. 1 mm thick. *Stems* with 1–3, often basal branches (these 1.5–7.0 cm long), subdensely leafy, 5.5–13.0 cm long, 0.1–0.2 cm thick, 0.2–0.3 cm wide across leaf sheaths. *Leaves* oblong-lanceolate, acute, margins minutely denticulate toward apex, rigid, conduplicate, gently curved, 4–10 × 2–6 mm; leaf sheaths smooth, striate, margins minutely denticulate, dorsal exposed edge 3.5–4.0 mm long. *Inflorescences* to 11.5 mm long; peduncle ca. 9 mm long; rachis 4–6 flowered, 2.5 mm long; floral bracts deltate, acute, margins minutely denticulate, 2.0–2.2 × 3.0 mm. *Flowers* white. *Pedicellate ovary* narrowly clavate, triquetrous, 5.7 mm long. *Dorsal sepal* broadly oblong-lanceolate, acute, low carinate, 3.20 × 1.50–1.55 mm. *Lateral sepals* obliquely oblong-lanceolate, acute, low carinate, 3.5 × 1.5 mm. *Petals* oblong-elliptic, acute, midvein low carinate, 3.0 × 1.4 mm. *Labellum* oblong-elliptic from a shortly clawed base, obtuse, claw 0.95 mm long, blade ca. 2.5 × 1.5 mm, in total 3.4–3.5 × 1.8 mm; callus of 2 short, slightly divergent lamellae in the middle of the blade. *Column* shortly and broadly clawed, each side with a somewhat suborbicular wing, ca. 2 mm long, 1.65–1.70 mm wide.

Distribution: Bolivia.

Habitat: cloud forest, trees 8–10 m tall, dominant tree *Alchornea* spp., 2700 m.

Etymology: from the Old English *scofl*, spade, presumably derived from the Germanic *schaufel*, and *formis*, Latin for shape, in reference to the shape of the labellum.

This species is probably closely related to *Fernandezia minor* (Schltr.) M.W. Chase, sharing with it a similar habit, and similar details of the lip and column. *Fernandezia shoveliformis*, however, differs from *F. minor* in having a distinctly clawed lip with distinct basal corners.

Fernandezia shoveliformis* var. *inversa Ormerod, *var. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Chapare, along road to Villa Tunari, 2840 m, 13 & 16 June 1981, C. Luer, J. Luer, E. Besse & R. Vasquez 5614 (Holotype: SEL). Fig. 54.

Differs from typical *Fernandezia shoveliformis* in the flowers having the blade of the labellum narrower (vs. broader) in the basal part, and the apex deltate and obtuse (vs. rounded).

Epiphytic herb. *Roots* terete, 0.4–0.8 mm thick. *Stems* simple, subslaxly to densely leafy, 6–14 cm long, to 0.25 cm wide across leaf sheaths, ca. 0.15 cm thick. *Leaves* oblong,

acute, stiffly coriaceous, gently curved, 10–13 × 4–6 mm; leaf sheaths tubular, striate, not fully covering internodes. *Inflorescence* 11 mm long; peduncle ca. 6 mm long; rachis successively 6 flowered, 5 mm long; floral bracts deltate, acute, to 2.7 × 2.0 mm. *Flowers* white. *Pedicellate ovary* narrowly clavate, triquetrous, 7 mm long. *Dorsal sepal* oblong, subacute, 3.7 × 1.6 mm. *Lateral sepals* obliquely oblong-lanceolate to lanceolate, subacute, midvein shortly carinate near apex, 3.75 × 1.60 mm. *Labellum* shortly clawed, blade elliptic-subpandurate, obtuse, claw 0.3 mm long, blade 3.15 × 1.75 mm, in total ca. 3.45 × 1.75 mm; lower part of lip with a broadly thickened midline ending in 2 short lamellae. *Column* shortly and broadly clawed, each with a suborbicular wing, 2.65 mm long, 1.75–1.90 mm wide laterally.

Distribution: Bolivia.

Habitat: roadside cloud forest, 2840 m.

Etymology: from the Latin *inversus*, upside down, in reference to the inverted proportions of the labellum as compared with the typical variety.

This variety has larger leaves than typical *Fernandezia shoveliformis*, and also differs in the flowers having a lip of inverse proportions with less distinct corners at the base, and a more triangular (vs. broadly rounded) apex.

Fernandezia solomonii Ormerod, *sp. nov.*

TYPE: BOLIVIA. La Paz: Prov. Sud Yungas, 3.1 km E of Unduavi bridge, below on old road, 3000 m, 6 November 1982, J.C. Solomon 8665 (Holotype: MO; Isotype: SEL). Fig. 55.

Related to *Fernandezia breviconnata* (Schltr.) M.W. Chase but the flowers with a shortly (vs. long) clawed, subpandurate (ovate-lanceolate) labellum, and more broadly (2.3 vs. 1.6 mm) winged column.

Epiphytic herb. *Roots* terete, 0.3–0.7 mm thick. *Stems* pendent, 7–8 branched (branches 3.5–25.5 cm long), subslaxly leafy, flexuous, to 37 cm long, ca. 0.1 cm thick. *Leaves* lanceolate to oblong-lanceolate, acute, thinly coriaceous, margins minutely denticulate toward apex, 13.0–16.0 × 5.0–5.5 mm; leaf sheaths semitubular, smooth, margins recurved, minutely denticulate. *Inflorescence* to 8.5 mm long; peduncle 6.0–6.5 mm long; rachis 1–2 flowered, 1–2 mm long; floral bracts ovate-lanceolate, acute, to 5.5 × 3.0 mm. *Flowers* white. *Pedicellate ovary* narrowly clavate, triquetrous, 5 mm long. *Dorsal sepal* oblong-ligulate, acute, low carinate, recurved, 5.5 × 1.5 mm. *Lateral sepals* obliquely lanceolate, acute, carinate, upcurved, 8.8 × 2.2 mm. *Petals* obliquely oblong-oblancheolate, acute, lower margin joined to sepals for 0.75 mm, 5.2 × 1.8 mm. *Labellum* shortly clawed, subpandurate, acute, claw 0.8 mm long, blade 5 × 2 mm, in total 6 × 2 mm; lower half with a low median thickening ending in 2 semi-elliptic to trapeziform lamellae. *Column* stoutly clawed, each side with an obliquely semicircular wing, 3.2 mm long, 2.3 mm wide laterally.

Distribution: Bolivia.

Eponymy: named after Jim Solomon, collector of the type, and curator at Missouri Botanic Gardens herbarium (MO).

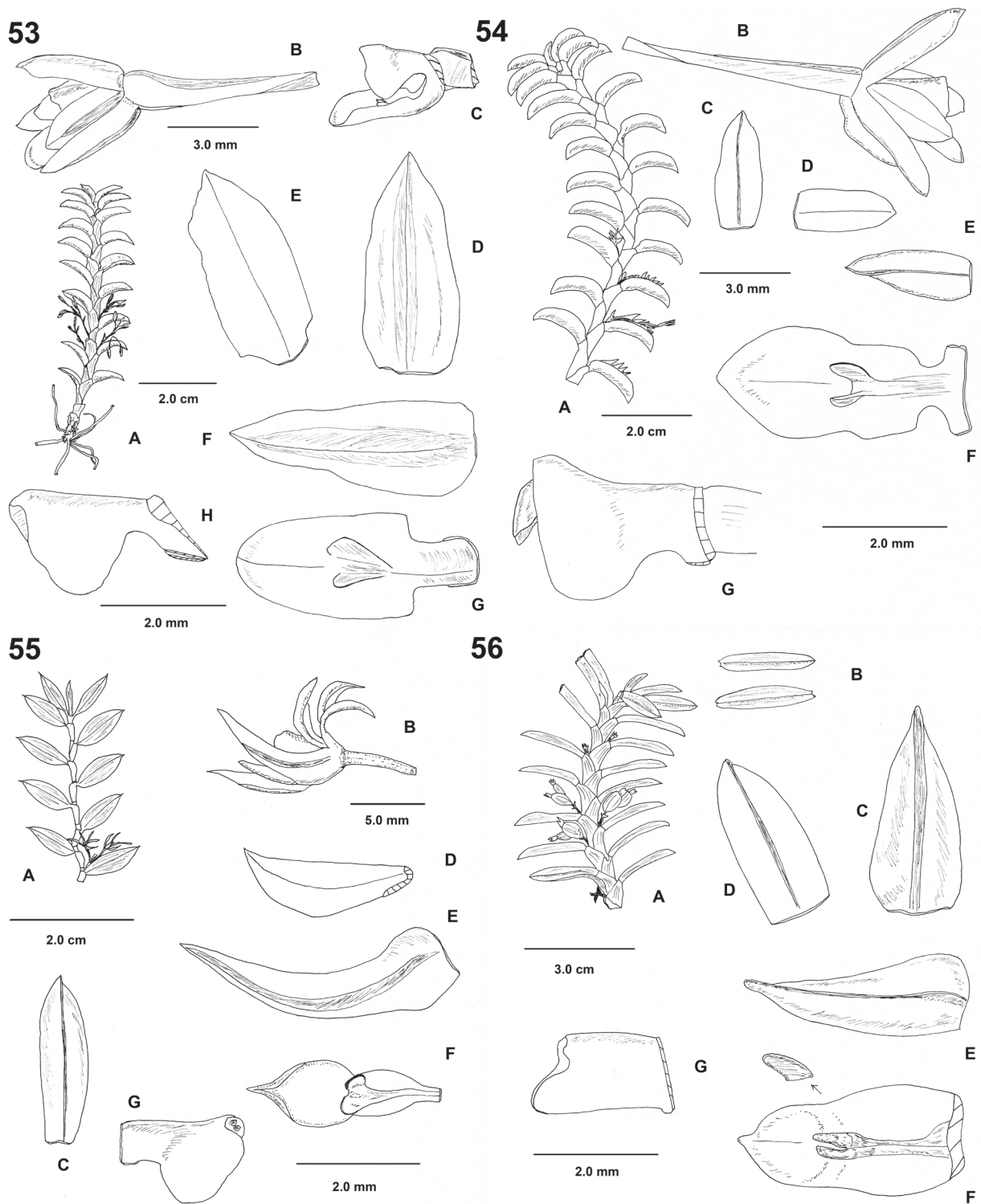


FIGURE 53–56. **53**, *Fernandezia shoveliformis* Ormerod var. *shoveliformis*. **A**, stem; **B**, flower; **C**, labellum and column; **D**, dorsal sepal; **E**, petal; **F**, lateral sepal; **G**, labellum; **H**, column. Drawn from holotype. **54**, *Fernandezia shoveliformis* Ormerod var. *inversa* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column. Drawn from holotype. **55**, *Fernandezia solomonii* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, lateral sepal; **F**, labellum; **G**, column. Drawn from holotype. **56**, *Fernandezia squarrosa* (Lindl.) M.W. Chase. **A**, stem (upper part); **B**, leaves; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column. **A**–**B**, **D**, **G** from Cuatrecasas 19188 (AMES); **C**, **E**–**F** from Marulanda & Betancur 470 (MO).

This species appears to be closest to *Fernandezia brevicornata* from Peru, but differs in having a narrower dorsal sepal, a subpandurate (vs. ovate-lanceolate), shortly (vs. long) clawed lip, and a more broadly (2.3 vs. 1.6 mm) winged column.

Fernandezia squarrosa (Lindl.) M.W. Chase, *Phytotaxa* 20: 30. 2011.

Basionym: *Pachyphyllum squarrosus* Lindl., *Ann. Mag. Nat. Hist.* 15: 107. 1845. TYPE: COLOMBIA. Cauca: woods of Pitaya, 3200 m, 1843, *K.T. Hartweg 1409* (Holotype: K-L; Isotypes: K, LD, images seen). Fig. 56.

Usage synonym: *Pachyphyllum hartwegii* auct. non Rchb.f., L.O. Williams, *Lilloa* 3: 482. 1938 *p.p.*

Epiphytic herb. *Roots* terete, to 1.5 mm thick. *Stems* simple to branching (1–4 branches, 3–12 cm long), densely leafy, to 33 cm long, to 0.6 cm wide across leaf sheaths, to 0.25 cm thick. *Leaves* oblong to ligulate, acute, thinly fleshy, 15–18 × 5 mm; leaf sheaths broad deltate, smooth. *Flowers* white. *Dorsal sepal* ovate, subacute, thickly carinate medially, 3 × 1.4 mm. *Lateral sepals* obliquely lanceolate, acute, medially carinate, carinae obliquely truncate apically, 3.2 × 1.2 mm. *Petals* oblong-obcuneate, acute, midvein ridged, 2.2 × 1.1 mm. *Labellum* ovate-oblong, subpandurate, subacute, lower half 2 × 1.8 mm, upper half 1.2 × 1.4 mm, in total 3.2 × 1.8 mm; lower half divided by a ridge that terminates just above the middle in two conical calli. *Column* 1.9 mm long.

Distribution: Colombia.

Additional specimens examined: COLOMBIA. Antioquia: Municipio Santa Rosa de Osos, Corregimiento Aragon, Finca Venecia, near the road from Santa Rosa de Osos to Aragon, 2600 m, 7 June 1986, *F.J. Roldan, O. Marulanda & J. Betancur 470* (MO). Cauca: Cordillera Central, W slope, headwaters of the Rio Palo, Quebrada de Santo Domingo, Campamento de los quineros, 2700–2800 m, 13 December 1944, *J. Cuatrecasas 19188* (AMES, MO); Cordillera Central, “Canaan,” Mt. Purace, 3100–3300 m, 11–13 June 1922, *F.W. Pennell & E.P. Killip 6603* (AMES, GH).

This species has some superficial similarities to *Fernandezia crystallina*, such as the forward produced lobes of the column wings, but the plants always have longer, ligulate leaves, and the flowers do not have denticulate margins to the petals and the upper half of the lip is straight (not recurved).

Its closest relative is another Colombian entity from the Department of Antioquia that Dr. Szlachetko intends to describe (four collections seen). This vegetatively similar entity differs in its smaller flowers (sepals ca. 2 mm long), broadly ovate-elliptic petals, and shorter (1.5 mm long) column.

Fernandezia steinbachii Ormerod, *sp. nov.*

TYPE: BOLIVIA. Santa Cruz: Comarapa, Cerro San Mateo, 2800 m, 24 October 1898, *J. Steinbach 8501* (Holotype: GH; Isotypes: AMES, BM, F, K, MO, NY). Fig. 57.

Similar to *Fernandezia barnettiae* Ormerod but a taller (stems to 19.5 vs. to 10.5 cm) plant, the flowers with a longer (5.0 vs. 1.5 mm) pedicellate ovary, and wider (1.2–1.5 vs.

0.8 mm) labellum that has divergent (not parallel) lamellae.

Epiphytic herb. *Roots* terete, elongate, 0.5–1.3 mm thick. *Stems* simple to branching, subdensely to laxly leafy, to 19.5 cm long, 0.10–0.25 cm thick. *Leaves* suborbicular to oblong, acute to subacuminate, margins minutely denticulate toward apex, coriaceous, 6.0–8.0 × 3.5–4.5 mm; leaf sheaths semitubular, margins recurved, entire to minutely denticulate, 5 mm long. *Inflorescence* 7 mm long; peduncle 3 mm long; rachis to 7 flowered, 4 mm long; floral bracts widely ovate, subacuminate, to 2.5 × 1.6 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, 5 mm long. *Dorsal sepal* elliptic, acute, weakly carinate near apex, 2.1 × 1.0 mm. *Lateral sepals* obliquely oblong-lanceolate, acute, low carinate, 2.4 × 1.1 mm. *Petals* elliptic, obtuse, 2.1 × 1.0 mm. *Labellum* broadly elliptic from a shortly clawed base, subacute, 2.15 × 1.20–1.30 mm; lower half with a low median thickening that divides into 2 divergent lamellae. *Column* shortly clawed, each side dilated into a subquadrate-suborbicular wing, 1.4 mm long, 1.0–1.1 mm wide laterally.

Distribution: Bolivia.

Additional specimen examined: BOLIVIA. Santa Cruz: near Comarapa, 2600 m, April 1911, *T. Herzog 1946 p.p.* (L, upper lhp; S, image seen).

Eponymy: named after Jose Steinbach (1875–1930), originally from Germany. He made several collections of plants and insects from Bolivia, including the type of this species.

Among Bolivian taxa with flat, coriaceous (vs. conduplicate, fleshy) leaves and long lamellate keels on the lip, *Fernandezia steinbachii* may be recognized by its long pedicellate ovaries (5 mm), elliptic petals, and broadly winged column. Another feature that may help identify *F. steinbachii* is that it seems to produce many long roots. See also the comparative notes under *F. barnettiae*. The collection *T. Herzog 1946* is the type number of *Pachyphyllum herzogii* Schltr.; both L and S duplicates are mixtures that contain material of *F. steinbachii*, which can be distinguished by its flat, coriaceous (vs. conduplicate, ensiform) leaves.

Five other collections from the type region (Comarapa to Serrania Siberia) that probably belong here, but lack flowers or are in bud, are *A.L. Arbelaez et al. 872* (MO), *J. Balcazar & L. Fernandez 902* (NY), *C.G. Jordan & I.G. Vargas 377* (MO), *N. Ritter & J. Wood 2891* (F), and *M. Saldias & M. Fernandez 4556* (NY).

Fernandezia teranii Ormerod, *sp. nov.*

TYPE: BOLIVIA. Cochabamba: Prov. Tiquipaya, Alto 1 Totolima, exposed NE slope, 2400 m, 2 May 2008, *J. Teran, Cespede, A. Soux & D. Soux 2534* (Holotype: MO). Fig. 58.

Similar to *Fernandezia amoroensis* Ormerod var. *amoroensis* in habit and flower size, but the labellum has in the middle (vs. in lower half) 2 short, subquadrate to circular (vs. two elongate) lamellae.

Epiphytic (?) herb. *Roots* terete, 0.3–0.8 mm thick. *Stems* simple to much branched (branches 1.5–5.5 cm long), leafy, 8–16 cm long, 0.1 cm thick, 0.2 cm wide across leaf sheaths. *Leaves* oblong-lanceolate, acute, coriaceous, conduplicate (in dry material), minutely denticulate near apex, 4.0–8.0

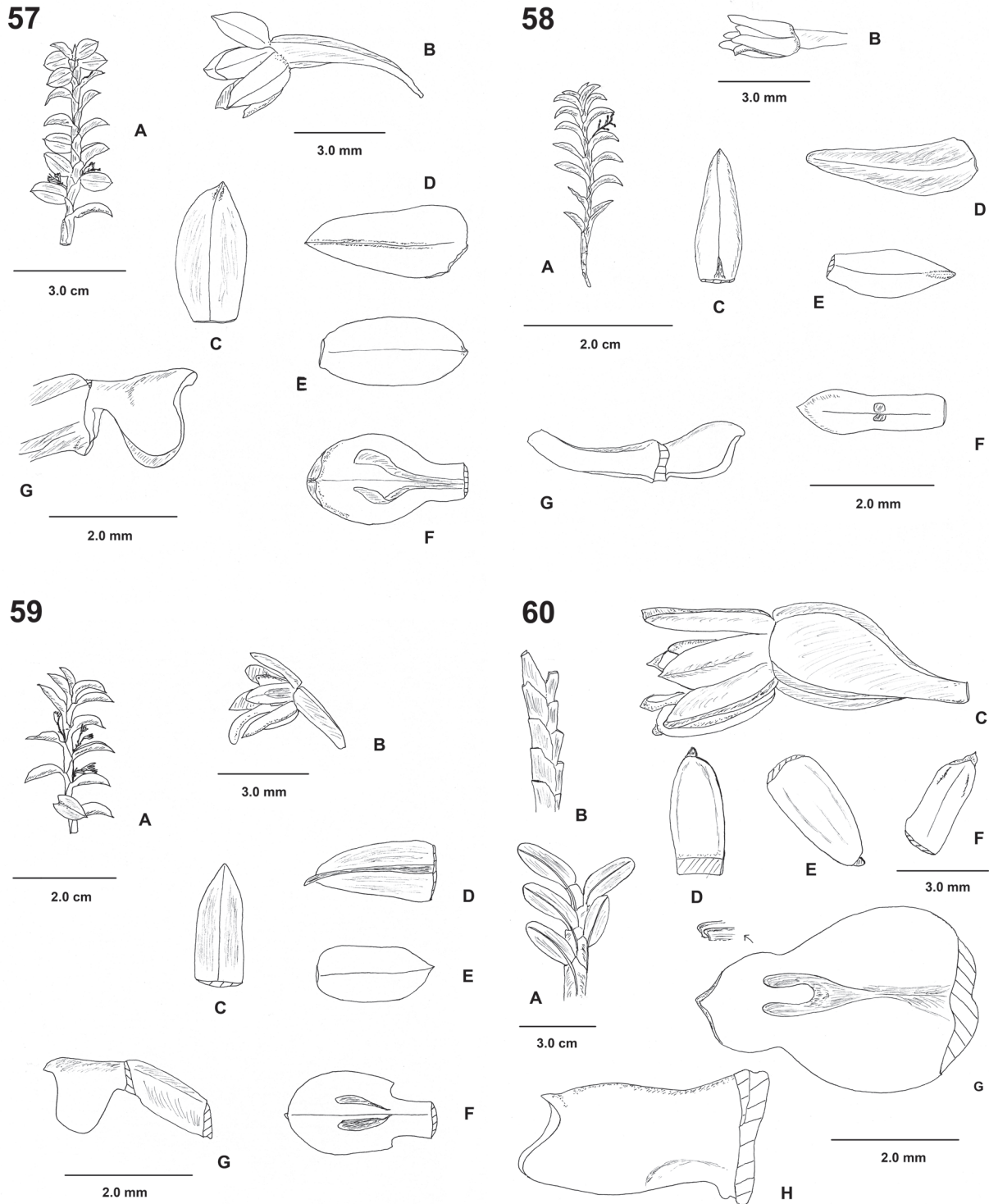


FIGURE 57–60. **57**, *Fernandezia steinbachii* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype. **58**, *Fernandezia teranii* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype. **59**, *Fernandezia tinquiana* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column. Drawn from holotype. **60**, *Fernandezia tintasensis* Ormerod. **A**, part of stem; **B**, part of stem minus leaves; **C**, flower; **D**, dorsal sepal; **E**, lateral sepal; **F**, petal; **G**, labellum; **H**, column. Drawn from holotype.

× 2.0–3.2 mm; leaf sheaths semitubular, smooth, striate, margins minutely denticulate. *Inflorescence* 8–21 mm long; peduncle 6–8 mm long (exposed part 4 mm long); rachis 6–10 flowered, 2–3 flowers open at once, 4–13 mm long; floral bracts widely ovate, acute, 1.5–2.0 mm long. *Flowers* white (anther cap purple-red in rehydrated flower of *Luer et al.* 4881). *Pedicellate ovary* weakly clavate, triquetrous, 1.8–2.7 mm long. *Dorsal sepal* lanceolate, acute, 1.9–2.0 × 0.7–0.8 mm. *Lateral sepals* obliquely lanceolate, obtuse, gently upcurved, thinly fleshy, 2.4–2.5 × 0.7–0.8 mm. *Petals* somewhat rhombic to narrowly oblong-elliptic, acute to subacute, 1.75–2.00 × 0.65–0.80 mm. *Labellum* ligulate-spatulate to broadly oblong-oblancheolate, acute to subacute, carinate below tip, 2.00 × 0.65–0.80 mm, lower half 0.60 mm wide; medially with 2 seemingly isolated subquadrate to semicircular lamellae. *Column* 1.0–1.1 mm long, 0.75 mm wide laterally.

Distribution: Bolivia.

Additional specimens examined: BOLIVIA. Cochabamba: Prov. Chapare, along road to Villa Tunari, 2400 m, 13 & 16 January 1981, *C. Luer, J. Luer, E. Besse & R. Vasquez* 5656 (SEL); along road NE of Cochabamba, toward Villa Tunari, 2500 m, 4 February 1983, *C. Luer, J. Luer, E. Besse & R. Vasquez* 8686 (SEL); along road to Villa Tunari, 2500 m, 22 January 1980, *C. Luer, J. Luer & R. Vasquez* 4881 (SEL).

Habitat: humid montane forest dominated by Melastomataceae, Rubiaceae, and Asteraceae. Forest dominated by Ericaceae, pteridophytes, and abundant bryophytes. Soil not very deep, covered with decomposing organic matter (type), cloud forest (*Luer et al.* 4881, 8686), 2400–2500 m.

Eponymy: named after J. Teran, one of the collectors of the type specimen.

This species resembles *Fernandezia amboroensis* var. *amboroensis* in habit and flower size but differs in the flowers having somewhat rhombic (vs. weakly obovate-elliptic) petals, and ligulate-spatulate (vs. oblong-elliptic) lip with 2 remote lamellae in the middle. Another species with a similar lip is *F. cardenasii* (L.B. Smith & S.K. Harris) M.W. Chase, but in that taxon the lip is twice the length (ca. 4 mm long), and strongly cymbiform near the apex, thus giving it a canoe-like appearance. The measurements of *Luer et al.* 4881 are not included in the description—it has rather shorter sepals but otherwise agrees in critical characters with the type. The deviant measurements are *dorsal sepal* 1.30 × 0.65 mm; *lateral sepals* 2.10 × 0.65 mm; *petals* 1.5 × 0.7 mm.

Fernandezia tinquiiana Ormerod, *sp. nov.*

TYPE: BOLIVIA. Santa Cruz: Prov. Manuel M. Caballero, near Tinquí Laguna (8 km to the N of Comarapa), 2500–2600 m, 12–16 November 1995, *I.G. Vargas* 4178 *p.p.* (Holotype: NY, upper rhp). Fig. 59.

Related to *Fernandezia quadrangularis* Ormerod but with smaller flowers (sepals 1.80 vs. 2.50–2.95 mm), a broadly elliptic (vs. quadrangular) lip blade, and a more shortly stalked column.

Epiphytic (?) *herb.* *Roots* terete, profuse, 0.5–0.7 mm thick. *Stems* simple or occasionally 1–2 branched (branches

2.5–9.0 cm long), subdensely leafy, 3.0–25.5 cm long, to 0.15 cm wide across leaf sheaths, 0.05–0.07 cm thick. *Leaves* ovate, apiculate, fleshy, margins minutely denticulate toward apex, 6.0–6.5 × 4.0–5.0 mm; leaf sheaths semitubular, margins recurved, surface smooth. *Inflorescence* to 12 mm long; peduncle 5 mm long; rachis 6–9 flowered, to 7 mm long; floral bracts widely ovate, acute, to 2.5 × 2.0–2.2 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, 2.3 mm long. *Dorsal sepal* oblong, subacute, 1.8 × 0.8 mm. *Lateral sepals* obliquely ovate-lanceolate, acute, midvein thickly carinate, 1.8 × 0.9 mm. *Petals* oblong-elliptic, acute, 1.75 × 0.80 mm. *Labellum* with a broadly elliptic blade from a short claw, obtuse, claw 0.5 mm long, blade 1.5 × 1.2 mm, in total 2.0 × 1.2 mm; callus of slightly divergent lamellae in the lower half of the blade. *Column* very shortly stalked, each side with a subquadrate-suborbicular wing, 1.15 mm long, 1 mm wide laterally.

Distribution: Bolivia.

Etymology: named after the type locality, Tinquí Laguna.

As noted above in the diagnosis, this taxon is related to *Fernandezia quadrangularis* but has smaller flowers and a broadly elliptic (not quadrangular) lip. The type sheet contains another element with narrower leaves, narrower leaf sheaths, and 3-flowered inflorescences.

Fernandezia tintasensis Ormerod, *sp. nov.*

TYPE: ECUADOR. Santiago-Zamora: slopes of Rio Tintas, SE of El Pan, 2895 m, 10 July 1943, *J.A. Steyermark* 53505 (Holotype: AMES). Fig. 60.

Related to *Fernandezia putumayoensis* (Szlach., Kolan. & Mystk.) Molinari but leaves longer (26.0–27.0 vs. 5.0–10.5 mm), flowers larger (sepals 3.50–3.80 vs. 2.30–2.65 mm), and column longer (2.8–3.0 vs. 1.9–2.0 mm).

Epiphytic (?) *herb.* *Roots* terete, to 1.6 mm thick. *Stem* simple, densely leafy, 35 cm long, to 1.2 cm wide across leaf sheaths, to 0.3 cm thick. *Leaves* oblong, obtuse, margin minutely denticulate toward apex, midvein low lamellate below, thinly coriaceous, 24–26 × 9–11 mm; leaf sheaths deltate, truncate. *Inflorescence* ca. 16 mm long; peduncle ca. 8 mm long, mostly hidden in leaf sheath; rachis pectinate, 7–8 mm long; floral bracts ovate, acute, 2.2 × 1.0 mm. *Flower* color not known. *Pedicellate ovary* clavate, triquetrous, ca. 3.0–3.5 mm long; capsule triquetrous, 6.2 mm long, one side 3.2–3.3 mm wide. *Dorsal sepal* oblong, acute, midvein broadly carinate, 3.50–3.80 × 1.25–1.75 mm. *Lateral sepals* obliquely oblong, obtuse to subacute, 3.75–3.80 × 1.20–1.75 mm. *Petals* oblong, acute, 3.3–3.5 × 1.0–1.4 mm. *Labellum* ovate-subpandurate, acute, lower part 2.3–2.4 × 2.0–2.5 mm, upper part 1.6 × 1.3–1.5 mm, in total 3.8–4.0 × 2.0–2.5 mm; lower half of lip divided by a thick ridge that ends in 2 parallel, fleshy, oblongoid calli. *Column* rectangular in lateral view, each side at apex with a forward-pointing rounded wing, 2.8–3.0 mm long, 1.5–1.6 mm wide laterally.

Distribution: Ecuador.

Additional specimen examined: ECUADOR. Loja, Saraguro, 3300 m, cult. at Ecuagenera Gualaceo facility, 11 July 2002, *A. Hirtz* 8419 (SEL).

Etymology: named after the Rio Tintas, near the type locality.

This species shares with the Colombian *Fernandezia putumayoensis* characters such as densely leafy stems and thinly coriaceous leaves set on broad triangular leaf sheaths. It differs in having longer leaves, larger flowers, and a longer column.

Fernandezia transversalis Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: Prov. Bagua, Cordillera Colan, SE of La Peca, third camp, 2455 m, 6 October 1978, P. Barbour 3770 *p.p.* (Holotype: MO). Fig. 61.

A singular species characterized by the flowers having the labellum broadly clawed in the lower 2/3 while the upper 1/3 is transversely elliptic.

Epiphytic herb. Roots terete, 0.5–0.8 mm thick. Stems simple, laxly leafy, 10.5–25.0 cm long, 0.2–0.3 cm wide across leaf sheaths, 0.15 cm thick. Leaves narrowly oblong to elliptic, acute, coriaceous, 7.5–12.0 × 3.0–5.0 mm; leaf sheaths tubular, smooth, striate. Inflorescence hidden in leaf sheath and leaf base, ca. 5 mm long; peduncle ca. 3 mm long; rachis biflorous, ca. 2 mm long; floral bracts not seen. Flowers white. Pedicellate ovary clavate, triquetrous, ca. 5 mm long. Dorsal sepal ovate-oblong, acute, carinate, 3.3 × 2.0–2.2 mm. Lateral sepals obliquely ovate-lanceolate, acute, carinate, 3.90 × 1.75–1.80 mm. Petals oblong-elliptic to elliptic, subacute, 3.65–3.80 × 2.1–2.2 mm. Labellum oblong-subpandurate in lower 2/3, upper 1/3 transversely elliptic, acute, lower 2/3 2.2–2.3 × 1.2–1.5 mm, upper 1/3 1.5–2.0 × 2.65–2.80 mm, in total 3.8–4.2 × 2.8 mm; lower 2/3 divided by a low ridge that becomes bilamellate in its upper part and ends in 2 triangular tips. Column somewhat elongate, with a low dorsal hump, 3.2 mm long, 1.7 mm wide laterally.

Distribution: Peru.

Additional specimens examined: PERU. Amazonas: Prov. Bagua, Cordillera Colan, SE of La Peca, third camp, 2455 m, 6 October 1978, P. Barbour 3769 (MO); same area, 2440 m, 25 September 1978, P. Barbour 3563 (MO).

Habitat: humid cloud forest (type; Barbour 3769), elfin bog (Barbour 3563), 2440–2455 m.

Etymology: from the Latin *transversus*, crosswise, going across, in reference to the transversely elliptic upper 1/3 of the labellum.

This unique species lacks close relatives in the genus *Fernandezia*. It is somewhat intermediate in habit between *F. subbiflora* Ruiz & Pav. and *F. crystallina*, but florally it resembles neither. The column is relatively long like in some species of *Fernandezia* related to *F. subbiflora*, but not broadly winged. The labellum shape is unique in the genus, with the narrower lower 2/3 suddenly expanded into a transversely elliptic “midlobe.”

Fernandezia unduaviae Ormerod, *sp. nov.*

TYPE: BOLIVIA. La Paz: Prov. Sud Yungas, 3.1 km E of Unduavi bridge, below on old road, 3000 m, 6 November 1982, J.C. Solomon 8664 (Holotype: MO). Fig. 62.

Related to *Fernandezia gracillima* (C. Schweinf.) M.W. Chase but with a narrowly clawed lip bearing an oblong to elliptic blade (vs. shortly and broadly clawed lip with a suborbicular blade).

Epiphytic herb. Roots terete, 0.5–0.6 mm thick. Stems simple to 8 branched (branches 1.5–11.0 cm long), densely leafy, flexuous, 4–20 cm long, 0.03–0.10 cm thick. Leaves oblong, oblong-lanceolate, to elliptic, apiculate, thinly coriaceous, margins minutely denticulate near the apex, 5.0–8.0 × 1.5–4.0 mm; leaf sheaths semitubular, margins minutely denticulate. Inflorescence to 9 mm long; peduncle 3–5 mm long; rachis up to 5 flowered, to 4 mm long; floral bracts ovate-lanceolate, acute, 1.0–2.0 × 0.6–1.6 mm. Flowers white. Pedicellate ovary narrowly clavate, triquetrous, 1.5–2.7 mm long. Dorsal sepal oblong, subacute, low carinate, joined to petals for 0.5–0.8 mm basally, 1.70–2.30 × 0.65–0.90 mm. Lateral sepals obliquely oblong-lanceolate, subacute, low carinate, joined to each other and claw of lip for 1.2 mm, joined to petals for 0.5–0.8 mm, 1.9–2.8 × 0.8–0.9 mm. Petals oblong from a shortly clawed base, acute, midvein prominently carinate near apex, 1.7–2.0 × 0.7–0.8 mm. Labellum oblong to elliptic from a narrowly clawed base, acute, carinate below tip, claw ligulate, 0.80–1.15 mm long, blade 1.30–1.35 × 0.8–0.9 mm; callus of 2 semi-elliptic to obliquely deltate, obtuse lobes with low lamellate bases, the calli may or may not overlap the sides of the lip. Column each side medially dilated into a low suborbicular wing, 1.1–1.5 mm long, 0.7–0.9 mm wide laterally.

Distribution: Bolivia.

Additional specimens examined: BOLIVIA. La Paz: Prov. Nor Yungas, old road to La Paz, SW of Coroico, 2800 m, 4 February 1980, C. Luer, J. Luer, R. Vasquez & R. Nara 5114 (SEL). Cochabamba: Prov. Chapare, near Siberia, between Comarapa and Cochabamba, 2500–2600 m, 18 January 1988, C. Luer, J. Luer, E. Besse & R. Vasquez 8535 (SEL); NE of Cochabamba, toward Villa Tunari, 2500 m, 26–30 November 1978, C. Luer, J. Luer, J. Kuhn & F. Fuchs 3554 *p.p.* (SEL); toward Villa Tunari, 2500 m, 4 February 1983, C. Luer, J. Luer, E. Besse & R. Vasquez 8685 (SEL).

Etymology: named after the Rio Unduavi, and its eponymous town and district, the type locality.

As noted above in the diagnosis, this species is close to the Peruvian *Fernandezia gracillima* but has a narrower lip claw with an oblong to elliptic (vs. suborbicular blade). Another close relative is the Peruvian *F. nunezii*, which has a more rectangular lip with distinctly right-angled corners (vs. rounded) at the base of the blade; furthermore, the calli seem a little more widely separated.

Fernandezia vaginata (Schltr.) M.W. Chase, *Phytotaxa* 20: 31. 2011.

Basionym: *Pachyphyllum vaginatum* Schltr., *Rep. Sp. Nov. Regni Veg.*, Beih. 27: 182. 1924. TYPE: COLOMBIA. Cundinamarca: In the country around Bogota, 2500 m, 1921, H. Hopf *s.n.* (Holotype: B, destroyed). Neotype (here designated): COLOMBIA. Cundinamarca: Monserrate, above Bogota, 3200m, 26 March 1944, M. Schneider 272 (Holoneotype: AMES; Isoneotype: COL, not seen). Fig. 63.

Homotypic synonym: *Orchidotypus vaginatus* (Schltr.) Senghas, in Schltr., *Die Orchideen* ed. 3, I/B (31): 1923. 1995.

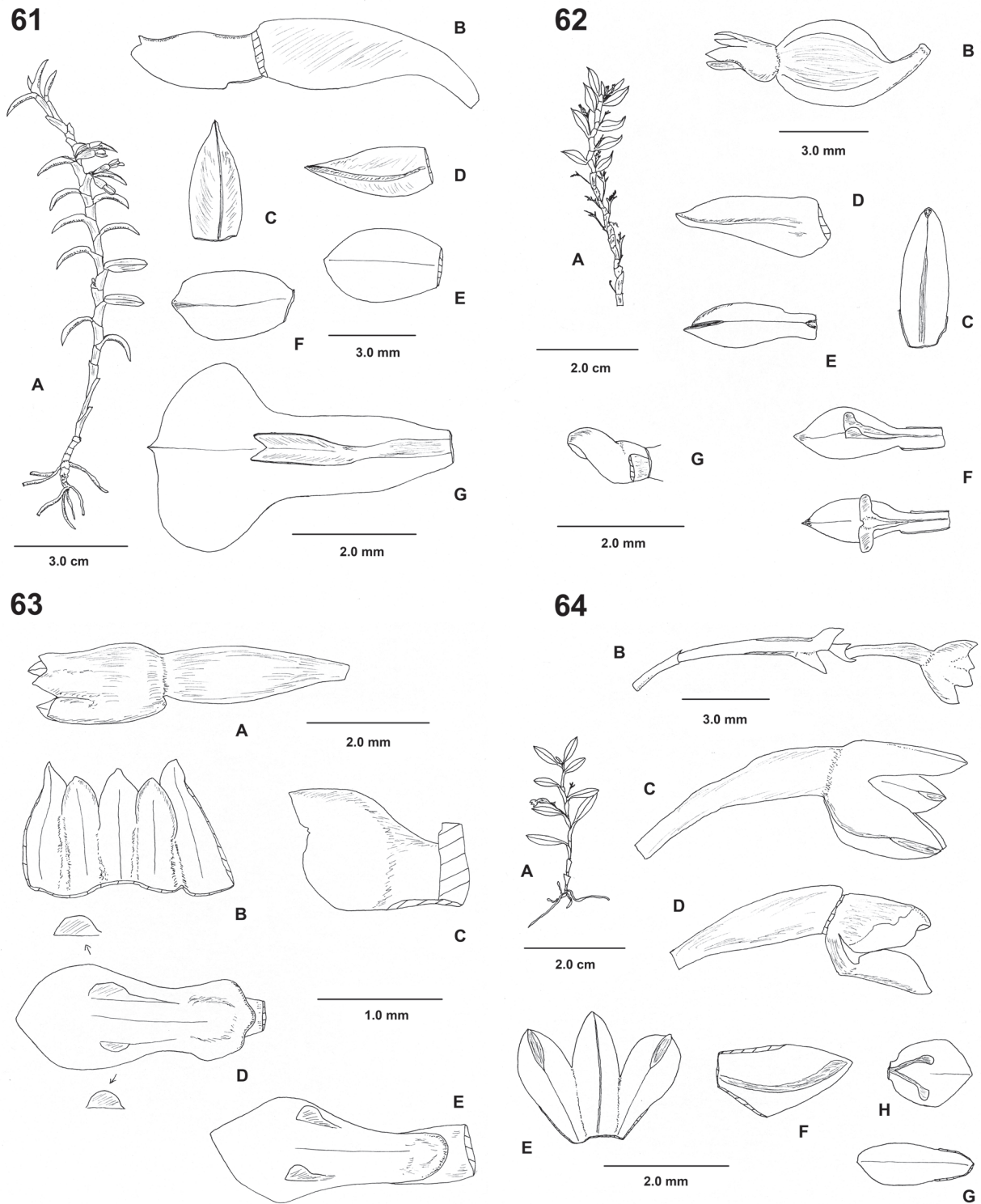


FIGURE 61–64. **61**, *Fernandezia transversalis* Ormerod. **A**, stem; **B**, column; **C**, dorsal sepal; **D**, lateral sepal; **E–F**, petals; **G**, labellum. Drawn from holotype. **62**, *Fernandezia unduaviae* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum (with calli unspread and spread); **G**, column. Drawn from holotype. **63**, *Fernandezia vaginata* (Schltr.) M.W. Chase. **A**, flower; **B**, tepals (lateral sepal, petal, dorsal sepal, petal, lateral sepal); **C**, column; **D–E**, labellums. **A–D** from neotype; **E** from *Garcia-Barriga & Jaramillo Mejia 19784* (AMES). **64**, *Fernandezia vanderwerffii* Ormerod. **A**, stem; **B**, inflorescence; **C**, flower; **D**, labellum and column; **E**, tepals (petal, dorsal sepal, petal); **F**, lateral sepal; **G**, petal (inside); **H**, labellum blade. Drawn from holotype.

Usage synonym: *Orchidotypus schultesii* auct. non (L.O. Williams) Senghas, Szlach., Kolan. & Mystk., Polish Bot. J. 59, 2: 170, f.6. 2014 *p.p.*

Epiphytic herb. Roots terete, 0.3–0.5 mm thick. Stems simple, secondly to distichously leafy, 1–5 cm long. Leaves ligulate-lanceolate, acute, margins minutely denticulate near the apex, 4.0–7.0 × 1.2–2.1 mm; leaf sheaths with a lobe each side at apex, margins minutely papillose-denticulate. Inflorescence 2.9 mm long; peduncle 2.7 mm long; rachis 1–2 flowered, 0.2 mm long; floral bracts deltate, acute, ca. 1 mm long. Flowers white, or light greenish with a white lip. Pedicellate ovary clavate, 2–3 mm long. Dorsal sepal oblong, subacute, united to petals and lateral sepals for ca. 0.8 mm, free part ca. 1 mm long, in total 1.75–1.80 × 0.70–0.80 mm. Lateral sepals obliquely oblong, acute, united to each other and petals for ca. 0.8 mm, 1.85–1.90 × 0.75–0.80 mm. Petals from an oblong part united to sepals, dilated into an ovate-elliptic lobe, acute to subacute, free part 0.70–0.90 × 0.70–0.75 mm, in total 1.70–1.75 × 0.70–0.75 mm. Labellum broadly clawed, obovate-oblong, subacute, thinly carinate below tip, claw 0.8 × 0.6 mm, upper part 0.80–0.95 × 0.70–0.80 mm, in total 1.65–1.75 × 0.80 mm; calli 2, remote, semicircular. Column shortly and broadly stalked, each side with a low broad wing, 0.95–1.00 mm long, 0.8 mm wide laterally.

Distribution: Colombia.

Additional specimens examined: COLOMBIA. Santander del Norte: below Paramo de Jurisdicciones, 3150 m, 10 May 1984, C. Luer, J. Luer, R. Escobar & E. Valencia 10237 (MO). Santander del Norte/Cesar: 20 km to the S of Abrego, Las Jurisdicciones (Cerro de Oroque), 3700–3960 m, 19/21 May 1969, H. Garcia-Barriga & R. Jaramillo 19784 (AMES); same area, 3000–3900 m, 22–27 July 1974, H. Garcia-Barriga & R. Jaramillo 20683 (GH).

This species is closely related to *Fernandezia schultesii* but generally it has slightly smaller (sepals 1.75–1.90 vs. 2.2–2.9 mm long) flowers with an elliptic (vs. triangular in upper half) dorsal sepal, and ovate (vs. ovate-lanceolate) petals. It is possible that the plant (*G.C.K. Dunsterville 1029*) from Venezuela illustrated as *Pachyphyllum schultesii* in Dunsterville and Garay (1979) actually represents *Fernandezia vaginata*, because it agrees in all the characters of the species cited above.

Fernandezia vanderwerffii Ormerod, *sp. nov.*

TYPE: PERU. Amazonas: Chachapoyas to Mendoza road, a little past Molinopampa, 2400 m, 15 March 1998, H. van der Werff, B. Gray, R. Vasquez & R. Rojas 15056 (Holotype: MO). Fig. 64.

Similar to *Fernandezia tenuis* (Schltr.) M.W. Chase but with broader (1.5–3.0 vs. 1.0 mm) leaves, and the labellum with smaller lamellae that do not overlap the edges of the blade.

Epiphytic herb. Roots terete, slender, 0.2–0.6 mm thick. Stems simple to 5 branched (branches 3.2–5.0 cm long), densely leafy, weakly to moderately flexuous, 2.1–9.0 cm long, 0.01–0.10 cm thick. Leaves oblong-ob lanceolate to oblanceolate, acute, thin, 6.0–9.0 × 1.5–3.0 mm; leaf sheaths semitubular, smooth, striate, 2.5–3.0 mm long. Inflorescence

5.01–8.00 mm long; peduncle narrowly winged toward apex, 5 mm long; rachis 1–5 flowered, 0.1–3.0 mm long; floral bracts ovate-deltate, acute, ca. 1 × 1 mm. Flowers white. Pedicellate ovary clavate, 3 mm long. Dorsal sepal oblong, cymbiform, subacute, midvein low carinate, joined to lateral sepals and petals for 0.5–1.0 mm, 1.80 × 0.75–0.80 mm. Lateral sepals obliquely rhombic, subacute, midvein carinate, united to claw of labellum, 1.9 × 1.0 mm. Petals oblong-ob lanceolate, subacute, midvein thickly carinate in apical third, ca. 1.75 × 0.75 mm. Labellum clawed, pentagonal, subacute, claw ca. 0.7–0.8 mm long, blade 1.2 × 1.0 mm, in total ca. 2 × 1 mm; lower half of lip with 2 widely divergent lamellae, each raised apically ovate-elliptic lobe. Column each side with low wing, broadest in the lower half, 1.2 mm long, 0.9–1.0 wide laterally.

Distribution: Peru.

Habitat: scrub and degraded forest (type), 2400 m.

Eponymy: named after Henk van der Werff (1946–), one of the collectors of the type and well-known specialist in Lauraceae.

Fernandezia vanderwerffii appears to be related to *F. gracillima* and its two closest allies (*F. nunezii* and *F. unduaviae*), which however differ in having elliptic leaves tapered at each end. Another similar Peruvian species is *F. tenuis* (Schltr.) M.W. Chase, but it has much narrower leaves (1 mm wide) and the lip has much larger calli that far overlap the sides of the lip when spread out.

Fernandezia vargasii Ormerod, *sp. nov.*

TYPE: PERU. Cusco: Prov. La Convencion, Tanamanche to Quellomayo, 3750 m, 25 July 1944, C. Vargas C. 4445 (Holotype: AMES). Fig. 65.

Usage synonym: *Pachyphyllum distichum* auct. non Kunth, C. Schweinf., Fieldiana, Bot. 30, 4: 975, 1961 *p.p.*

Related to *Fernandezia distichoides* M.W. Chase but the leaves oblong to oblong-elliptic (vs. narrowly oblong), not so fleshy, and flat (vs. V-shaped in section).

Epiphytic (?) herb. Roots terete, 0.8–2.0 mm thick. Stems stout, simple to branched (branches to 3.5 cm long), densely leafy, 17.0–21.5 cm long, up to 1 cm wide across leaf sheaths, 0.3–0.5 cm thick. Leaves oblong-elliptic to oblong, obtuse, coriaceous, margins minutely laxly denticulate, denser apically, 12.0–31.0 × 7.0–9.5 mm; leaf sheaths (exposed part) triangular, smooth, striate, margins minutely laxly denticulate, exposed dorsal edge to 8 mm long. Inflorescence to 19.5 mm long; peduncle 6.5–7.0 mm long; sheathing bract midway along peduncle, 3 mm long; rachis densely flowered, to 11 mm long; floral bracts suborbicular, acuminate, margins minutely denticulate, 3 × 4 mm. Flower color not known. Pedicellate ovary clavate, triquetrous, 4 mm long. Dorsal sepal oblong, acute, rigid, fleshy, 3.1 × 1.2 mm. Lateral sepals obliquely oblong-lanceolate, subacute, rigid, fleshy, 3.2 × 1.2 mm. Petals oblong, subacute, 2.9 × 1.1 mm. Labellum ovate-oblong, subacute, carinate below tip, lower part 2.2 × 2.0–2.1 mm, upper part shallowly concave, 1.75 × 1.50 mm, in total 3.95 × 2.0–2.1 mm; lower part divided by a thick ridge that ends in 2 oblong, parallel calli. Column clavate, at apex each side with a rounded, forward-pointing wing, 2.3 mm long, 1.5 mm wide laterally.

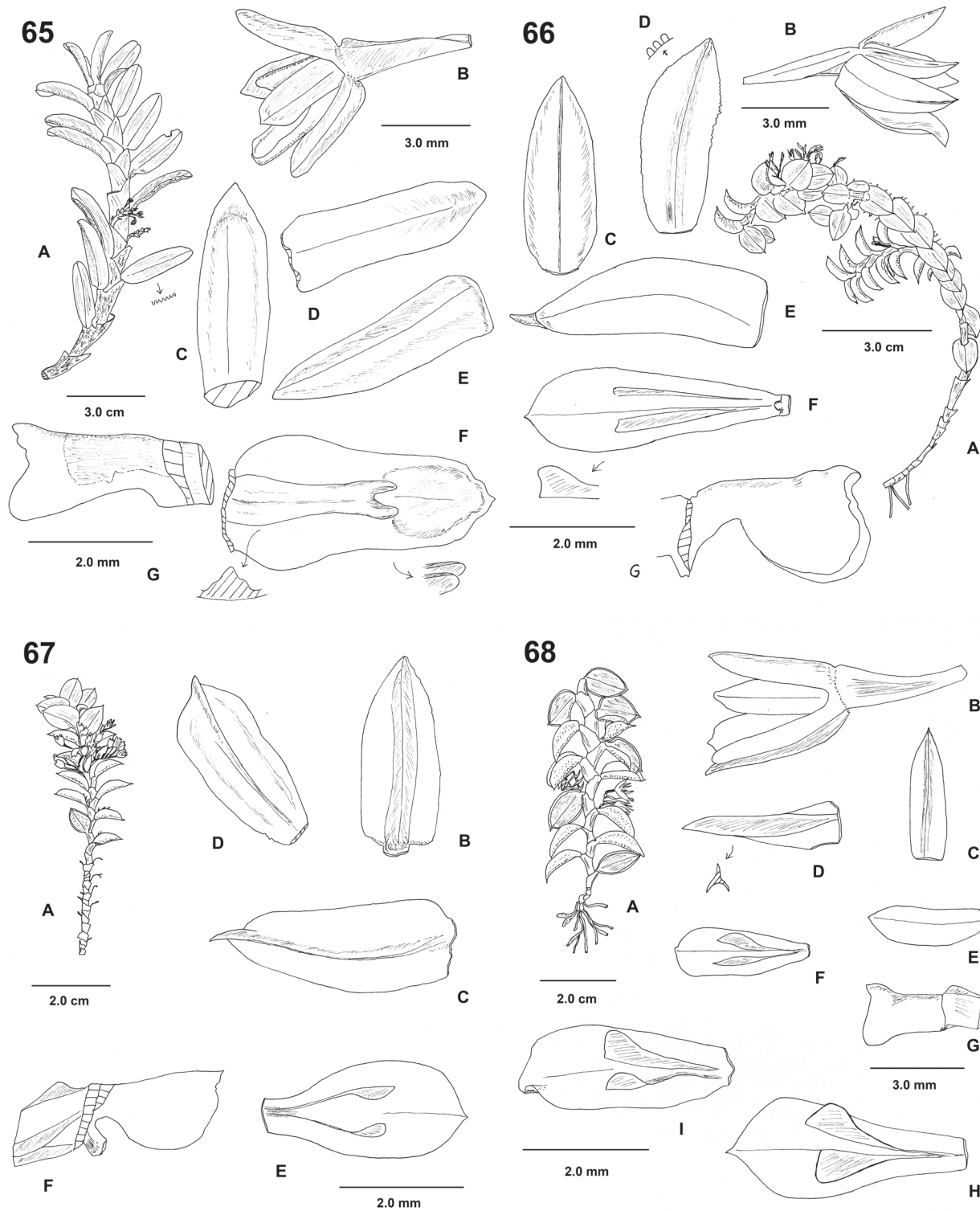


FIGURE 65–68. **65**, *Fernandezia vargasii* Ormerod. **A**, stem (upper part); **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column. Drawn from holotype. **66**, *Fernandezia weberbaueri* Ormerod var. *weberbaueri*. **A**, stem; **B**, flower; **C**, dorsal sepal; **D**, petal; **E**, lateral sepal; **F**, labellum; **G**, column. Drawn from holotype. **67**, *Fernandezia weberbaueri* Ormerod var. *platychila* Ormerod. **A**, stem (upper part); **B**, dorsal sepal; **C**, lateral sepal; **D**, petal; **E**, labellum; **F**, column. Drawn from holotype. **68**, *Fernandezia weberbaueri* Ormerod var. *tricurcensis* Ormerod. **A**, stem; **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, labellum; **G**, column; **H–I**, labellums. **A–G** from holotype; **H** from *Cano 3997* (MO); **I** from *Huamantupa et al. 6971* (MO).

Distribution: Peru.

Eponymy: named after C. Vargas Calderon (1903–2002), Peruvian botanist and collector of the type.

This species is a member of the florally conservative *Fernandezia distichoides* complex. It may be distinguished from *F. distichoides* by its flatter, less fleshy, oblong-elliptic to oblong leaves. In *F. distichoides* the leaves are fleshier with upcurved sides and narrowly oblong.

It should be noted that the plant illustrated as *Pachyphyllum distichum* Kunth (= *Fernandezia distichoides* M.W. Chase) by Bennett and Christenson (1998) is not related to that species but is rather an undescribed member of section *Lamellata* (i.e., related to *F. pectinata*). The depiction of a thick V-shaped callus on the lip is erroneous and is correctly interpreted as 2 lamellae arising from the thickened midline of the lip.

Fernandezia weberbaueri Ormerod, *sp. nov.*

TYPE: PERU. Cusco: Prov. Quispicanchi, Marcapata, 3000–3100 m, 17 February 1929, A. Weberbauer 7813 (Holotype: F). Fig. 66.

Related to *Fernandezia ichneumonea* Ormerod but the leaves flat (vs. conduplicate) with a shorter (1 vs. 2 mm long) apiculus, the inflorescences generally with more (up to 5 vs. up to 3) flowers, the dorsal sepal acute (vs. subacuminate), and the column with broader (1.5–1.6 vs. 1.3 mm wide) wings.

Epiphytic herb. *Roots* terete, 0.5–0.7 mm thick. *Stems* simple to branched (branches 1–3 cm long), laxly to densely leafy, 6–16 cm long, ca. 1–2 mm thick. *Leaves* ovate-elliptic to ovate-suborbicular, acute or with an apiculus to 1 mm long, margins minutely denticulate near the apex, coriaceous, 5.5–8.0 × 4.5–7.5 mm; leaf sheaths tubular, margins minutely denticulate. *Inflorescence* to 7 mm long; peduncle 3–4 mm long; rachis up to 5 flowered, ca. 3–4 mm long; floral bracts ovate-lanceolate, acute, margins minutely denticulate, to 2.8 × 1.6 mm. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, 3.0–3.5 mm long. *Dorsal sepal* oblong to oblong-lanceolate, acute, 2.9–4.2 × 1.1–1.2 mm. *Lateral sepals* obliquely oblong, apiculate, midvein carinate, 3.75–4.00 × 1.20–1.60 mm. *Petals* obliquely oblong, acute, margins subentire to papillose-denticulate, midvein carinate near apex, 3.1–3.2 × 1.1 mm. *Labellum* oblanceolate, acute, 3.3–3.8 × 1.3–1.5 mm; lamellae 2, weakly divergent, running 2/3 length of lip. *Column* each side with an obliquely semicircular, rounded wing, 2.1 mm long, 1.5–1.6 mm wide.

Distribution: Peru.

Additional specimen examined: PERU. Cusco: Prov. Paucartambo, Pillahuata to Ajanaco, 3000 m, 1994, D. Moscoso Z. 1019E (MO).

Habitat: bushwood consisting of high shrubs and small trees, with many hard-leaved types (type), 3000–3100 m.

Eponymy: named after the collector of the type, Augusto Weberbauer (1871–1948), German naturalist and botanist, who devoted much of his life to furthering botanical studies in Peru.

As noted above I consider this plant closely related to *Fernandezia ichneumonea*, but it seems to be more slender in appearance with narrower leaf sheaths, shorter apiculi at

the leaf tips, more floriferous inflorescences, flowers with an acute (vs. subacuminate) dorsal sepal, and broader column wings.

Fernandezia weberbaueri var. *platychila* Ormerod, *var. nov.*

TYPE: PERU. Cusco: Prov. La Concencion, Distrito Huayopata, Sector San Luis, 2995 m, 23 November 2006, L. Valenzuela, J. Farfan & E. Suclli 8087 (Holotype: MO). Fig. 67.

Differing from typical *F. weberbaueri* in having a shorter and broader labellum.

Epiphytic herb. *Roots* terete, 0.4–1.0 mm thick. *Stems* simple, densely leafy, 6.0–19.3 cm long, 0.18–0.28 cm wide across leaf sheaths, 0.05–0.10 cm thick. *Leaves* ovate to ovate-elliptic, apiculate, coriaceous, 6.5–12.0 × 4.0–6.0 mm; leaf sheaths semitubular, smooth. *Inflorescence* to 9 mm long; peduncle to 6 mm long; rachis 3–6 flowered, 0.5–3.0 mm long; floral bracts deltate-lanceolate, acute, ca. 1 mm long. *Flowers* white. *Pedicellate ovary* clavate, trialate, 5 mm long. *Dorsal sepal* oblong, acute, midvein thickly carinate, 3.0 × 1.2 mm. *Lateral sepals* obliquely oblong, acute, carinate, 3.7 × 1.4–1.5 mm. *Petals* broadly oblong-oblanceolate, subacute, midvein carinate, 2.85 × 1.15 mm. *Labellum* shortly clawed, blade elliptic, subacute, 3.0 × 1.7 mm; claw divided medially by a low thickening that divides into 2 divergent lamellae that each end in a triangular lobe. *Column* shortly and broadly stalked, each side with a broadly semicircular wing, 1.7 mm long, 1.1–1.2 mm wide laterally.

Distribution: Peru.

Habitat: disturbed primary forest, 2995 m.

Etymology: from the Classical Greek *platys*, broad, and *cheilos*, lip, in reference to the broad labellum of this variety.

As noted above, this variety differs in its shorter and broader lip.

Fernandezia weberbaueri var. *tricurucensis* Ormerod, *var. nov.*

TYPE: PERU. Cusco: Prov. Paucartambo, Distrito Challabamba, Tres Cruces, 3450 m, 27 October 2007, R. Vasquez, C. Davidson, S. Davidson, J. Farfan, E. Suclli & A. Pen 32884 (Holotype: MO). Fig. 68.

Differing from *Fernandezia weberbaueri* Ormerod var. *weberbaueri* in the flowers having a column with straight lower margins and the wings slightly apically produced and rounded.

Epiphytic herb. *Roots* terete, 0.4–1.0 mm thick. *Stems* simple to branching (branches 1.5 cm long), subslaxly to densely leafy, 6–15 cm long, 0.2–0.4 cm wide across leaf sheaths, 0.08 cm thick. *Leaves* oblong, ovate, to ovate-elliptic, shortly apiculate, margin minutely denticulate toward apex, drying pale greenish-blue with a white margin (type), 8.0–13.0 × 4.5–8.5 mm; leaf sheaths semi-rhombic in lateral view, truncate, margins recurved, entire to minutely denticulate, 5 mm long. *Inflorescence* to 9 mm long; peduncle 3.5–4.0 mm long; rachis 5–6 flowered, 5 mm long; floral bracts ovate-rhombic, acute, margins entire to minutely denticulate, to 2.8 × 2.4 mm. *Flowers* white. *Pedicellate ovary* clavate, triquetrous, ca. 4 mm long. *Dorsal sepal* ligulate to oblong-lanceolate, acute, midvein

low carinate, 3.25–4.00 × 1.20–1.30 mm. *Lateral sepals* obliquely lanceolate, acute, high carinate, 4.00–4.65 × 1.10–1.75 mm. *Petals* narrowly oblong, acute, 3.00–3.75 × 0.95–1.20 mm. *Labellum* oblong-oblancheolate to oblong-cuneate, subacute, carinate below tip, 3.65–4.10 × 1.35–1.80 mm; midline thickened in lower 1/4 of lip before dividing into 2 weakly divergent lamellae. *Column* each side with a low, suborbicular, apical wing, 1.9–2.2 mm long, 1.0–1.6 mm wide laterally.

Distribution: Peru.

Additional specimens examined: PERU. Cusco: Prov. Paucartambo, Pillahuata, Tres Cruces, about 130 km from Cusco on the road toward Pilcopta, 2000 m, 4 April 1987, *P. Nunez* 7805 p.p. (NY); Acjanaco, Cerro Macho Cruz, 3440 m, 28 July 1990, *A. Cano E.* 3997 (MO). Prov. La Convencion, Distrito Santa Teresa, Uchuyillaspay, 3885 m, 22 September 2005, *I. Huamantupa, N. Anaya, M. Callalli, J. Tito, L. Vargas & E. Paz* 6971 (MO).

Habitat: roadside remnant forest (type), frequent in forest dominated by *Weinmannia* (*Cano* 3997), in mixed “Pajonal” (*Huamantupa et al.* 6971), 2000–3885 m.

Etymology: named after the type locality, Tres Cruces.

Fernandezia weberbaueri var. *tricurucensis* may be distinguished from typical *F. weberbaueri* by its flowers having a column with straight lower margins with slightly produced and rounded wings at the apex.

Fernandezia yahuarcochae Ormerod, *sp. nov.*

TYPE: PERU. Cajamarca: Prov. Chota, Laguna Yahuarcocha (above Incahuasi), 3600 m, 14 September 1985, *A. Sagastegui A., D. Skillman, J. Mostacero L. & L. Ramirez V.* 12885 (Holotype: MO; Isotypes: F, HUT, not seen). Fig. 69.

Related to *Fernandezia hamiltonii* Ormerod but flowers with the upper half of the labellum wider (1.50–1.60 vs. 1.10–1.15 mm).

Lithophytic (?) *herb.* *Roots* terete, 0.75–1.00 mm thick. *Stems* simple, densely leafy, 6–18 cm long, 0.3–0.6 cm wide across leaf sheaths. *Leaves* ligulate, acute, thickly coriaceous, 8–10 mm long, 1.2–2.0 mm wide laterally; leaf sheaths deltate in lateral view, truncate, smooth. *Inflorescence* ca. 8 mm long; peduncle hidden in leaf sheath, ca. 4 mm long; rachis 4–5 flowered, ca. 4 mm long; floral bracts ovate-deltate, acute, 2.5 × 2.2 mm. *Flowers* whitish. *Pedicellate ovary* clavate, triquetrous, 2.5 mm long; capsule triquetrous, 5 mm long (incl. 1.2 mm long pedicel), one side 4 mm side. *Dorsal sepal* oblong-lanceolate, subacute, midvein low carinate, 2.8 × 1.2 mm. *Lateral sepals*

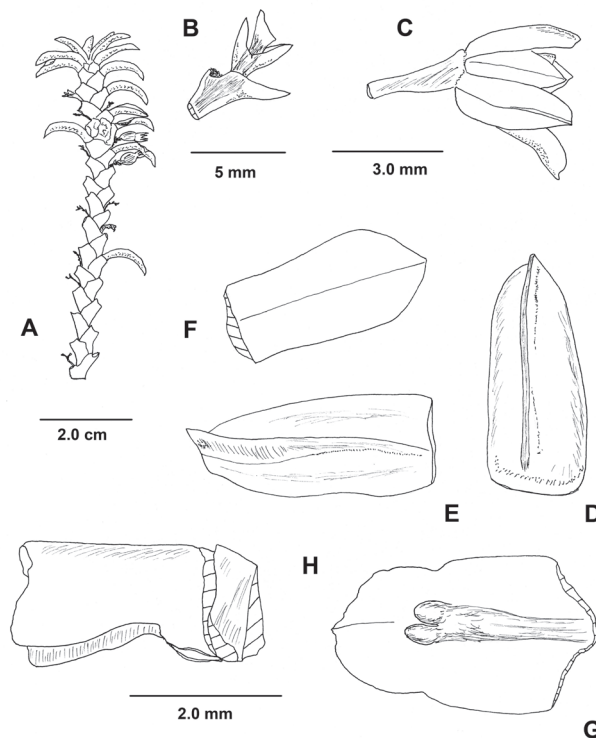


FIGURE 69. *Fernandezia yahuarcochae* Ormerod. **A**, stem (upper part); **B**, rachis; **C**, flower; **D**, dorsal sepal; **E**, lateral sepal; **F**, petal; **G**, labellum; **H**, column. Drawn from holotype.

obliquely oblong, subacute, midvein high carinate in upper half, 2.9 × 1.2 mm. *Petals* broadly oblong-oblancheolate, subacute, 2.20–2.30 × 1.15–1.20 mm. *Labellum* oblong-elliptic, shallowly subpandurate, carinate below tip, lower half 1.8 × 2.0 mm, upper half 1.2 × 1.5–1.6 mm, in total ca. 3 mm × 2 mm; lower half divided by a thick ridge ending in 2 conical-ellipsoid calli. *Column* cuneate in lateral view, 2 mm long, 1.2 mm wide laterally.

Distribution: Peru.

Habitat: rocky “Jalca,” 3600 m.

Etymology: named after the type locality, Lake Yahuarcocha.

This species appears to be related to *Fernandezia hamiltonii* but differs in having the leaves more drawn out toward the apex, and the upper half of the lip is wider (1.50–1.60 vs. 1.10–1.15 mm).

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