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MIEN A. RIFAI
SOEDARSONO RISWAN
ELIZABETH A. WIDJAJA

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THE ORCHID GENUS *LUISIA* IN INDONESIA

DIAH SULISTIARINI

"Herbarium Bogoriense", Puslitbang Biologi — LIPI, Bogor

ABSTRACT

Nine species and one new variety of the genus *Luisia* are recognized in Indonesia. The newly proposed variety is *L. zollingeri* Rchb. f. var. *latipetala* (J. J. S.) Sulistiarini. Complete descriptions, key to all species based on morphological characters as well as lists of specimens examined are presented.

ABSTRAK

Marga *Luisia* di Indonesia diketahui diwakili oleh sembilan jenis dan satu varietas yang baru diusulkan yaitu *L. zollingeri* Rchb. f. var. *latipetala* (J. J. S.) Sulistiarini. Pertelaan lengkap, kunci identifikasi jenis berdasarkan ciri-ciri morfologinya serta daftar spesimen herbarium yang diperiksa juga disertakan.

INTRODUCTION

In his comprehensive study of *Luisia* Gaud., Seidenfaden (in Dansk Bot. Ark. 27 (4): 1 — 101. 1971) enumerated the 36 species he recognized in this genus. Although he presented a useful key for the identification of the species treated, together with complete lists of their synonyms as well as some salient notes on the existing taxonomic problems, he omitted the description of each species. Moreover he did not study the rather numerous Indonesian specimens kept in Herbarium Bogoriense so that data on the species distribution for this area are sometimes incomplete. In view of these, and because members of *Luisia* are interesting horticulturally due to their ability to cross with many species of other genera, a revision of Indonesian species was undertaken based on herbarium collections preserved in Herbarium Bogoriense (BO), the Rijksherbarium Leiden (L) as well as the living specimens in the Bogor Botanic Gardens. Except for *L. celebica* and *L. unguiculata* all species have been studied also in living state.

I should like to thank the Director of Rijksherbarium Leiden, the Keeper of Herbarium Bogoriense and Curator of Bogor Botanic Gardens for making available their specimens for this study. I am very grateful to Dr. Mien. A. Rifai of Herbarium Bogoriense for suggesting the problem. I am under deep obligation to Dr. E. F. de Vogel of Rijksherbarium Leiden for

his guidance and assistance throughout the course of this study and for critically reviewing and improving the manuscript.

L U I S I A Gaud.

Luisia Gaud, in Freycinet, Voy. Aut. du Monde : 426. 1826; Lindley in Fol. Orch. 1 : 1. 1853; Rchb. f. in Waip. Ann. 6 : 619. 1861; Hook, f. Fl. Br. Ind. 6 : 22. 1894; J. J. Smith in Orch. Java 6 : 544. 1905; Duthie in Ann. Roy. Bot. Gard, Calcutta 9 (2) : 139. 1906; Ridley, Fl. Mai. Pen. 1 : 147. 1907; Holttum, Orch. Malaya : 695. 1964; Backer & Bakh. v. d. Brink f. Fl. Java. 3 : 422. 1968.

Mesoclastes Lindl., Gen. Sp. Orch. : 44. 1840.

TYPE SPECIES : *Luxia teretifolia* Gaud.

Plants epiphytic. Stems simple or branched, terete, woody, covered with leaf sheath, with well-spaced leaves, dull green. Leafsheaths tubular, leafblade elongate, terete, slender, fleshy, obtuse, dull green but often violet-blotched. Inflorescence racemose, breaking through the base of the leaf-sheath, short, dense, many-flowered. Sterile bracts broadly clasping the peduncle, in natural position seen from the side shaped like a swallow's nest, persistent, brown. Floral bract more or less shaped like the sterile bracts, persistent, brown. Pedicel in section triangular, greenish yellow or yellowish green. Flowers small or medium sized, resupinate, greenish yellow or yellowish green with a purple brown fleshy lip. Median sepal ovate to oblong or sometimes boat-shaped. Lateral sepals boat-shaped, subequal and keeled. Petals linear-ovate, strap-shaped, obovate, elliptic, oblong or slightly falcate. Lip immobile, sessile on the base of the column, divided into two parts, the hypochilium concave or flat, two-lobed, the epichilium convex or concave, broad, ridged or smooth, entire or undulate, more or less blunt. Column short, fleshy, lacking a foot snout, greenish. Stigma usually large. Anther two celled. Pollinia 2, ovoid, orbicular or ellipsoid, cleft, on a short broad stipe. Fruit a capsule, in section triangular, with 3 keels the perianth and column long persistent.

DISTRIBUTION : Japan, Western Himalaya, Burma, Siam, Malay Peninsula, Sumatra, Java, Borneo, Celebes, Moluccas, Lesser Sunda Islands, northern part of Australia, Northern Polynesia.

KEY TO THE SPECIES OF LUISIA IN INDONESIA

1. a. Median sepals and petals joined forming a hood.....
 - x. Epichilium not or hardly wider than the hypochilium.....
.....*L. zollingeri* var. *zollingeri*
 - y. Epichilium distinctly wider than the hypochilium.....
.....*L. zollingeri* var. *latipetata*
- b. Median sepal and petals free, not joined..... 2
2. a. Lips more than 11 mm long..... 3
- b. Lips less than 7 mm long..... 4
3. a. Petals linear-ovate, 14 — 15 by ca 2 mm; surface of the epichilium with longitudinal grooves..... *L. tristis*

- b. Petals slightly falcate, 17 — 18 by 3 — 3.5 mm, surface of the epichilium irregular ...
..... *L. taurina*
4. a. Petals 2 times as long as the median sepal..... *L. antennifera*
- b. Petals at most 1.5 times as long as the median sepal..... 5
5. a. Hypochilium heart-shaped, petals obovate to narrowly obovate..... *L. confusa*
- b. Hypochilium quadrangular or rectangular, petals strap-shaped..... 6
6. a. Epichilium reniform, top broadly rounded..... *L. teretifolia*
- b. Epichilium heart-shaped, top acute to obtuse..... 7
7. a. Column with obliquely truncate top..... *L. unguiculata*
- b. Column with acuminate top..... 8
8. a. Nerves on the petals 3; lateral lobes of the hypochilium attached at about the basal two-third of it..... *L. javanica*
- b. Nerves on the petals 1; lateral lobes of the hypochilium attached along the entire length of it..... *L. celebica*

LUISIA ANTENNIFERA B1.

Luisia antennifera Blume, Rumphia 4: 50. 1840 (nom. nud.); Mus. Bot. Lugd. Bat. 5: 64. 1849; Lindley, Fol. Orch. 1: 1. 1853; Rchb. f. in Walp. Ann. 6: 619. 1861; Hook, f., Pl. Br. Ind. 6: 25. 1894; Ridley, Fl. Mai. Pen. 1: 148. 1907; J. J. S. in Bull. Jard. Bot. Btzg. II, 26: 100. 1918; Enum. Orch. Sumatra: 368. 1933; Holttum, Orch. Mai. 1: 696. 1964; Backer & Bakh. v. d. Brink, f., Fl. Java 3: 423. 1968; Seidenfaden in Dansk Bot. Ark. 27 (4): 70, fig. 37. 1971. - TYPE: *Korthah s. n.* (L - Holotype).

Plants-17 — 80 cm long, with single or branched stems, rooting at the base. Roots 2 — 3 mm diam. Stems with internodes 3 — 4 cm long. Leaf-blades 8 — 16 cm long, 1 — 2 mm diam., top obtuse to acute. Racemes arke from a node, with 6 — 27 spirally arranged or three rowed flowers, 10 — 30 mm long. Peduncle 2 — 7 by ca 3 mm. Sterile bracts 2, when flattened measure 6.2 — 4 by 2 — 4 mm. Rachis 7 — 25 by 2.5 — 4 mm; internodes 2 — 3 mm long. Floral bracts 1 — 2 by 1 — 2 mm in natural position. Pedicel 4 — 10 by ca 1 mm. Ovary 2 — 3 by ca 1.5 mm. Flowers green with petals distinctly exserted and not overlapping with median sepal. Median sepal ovate to oblong, 5.5 — 6.5 by 2.5 — 4 mm; top obtuse; nerves 3 — 5, midrib prominent. Lateral sepals 5.5 — 8 by 2 — 2.5 mm in natural position, top acute, nerves 4; keel pronounced, 0.5 — 1 mm wide, its tip overtopping the top of the sepal. Petals linear-ovate, 9 — 14 by 0.5 — 1 mm, top rounded, nerves 2 — 3. Lip violet 5.5 — 6 by 2.5 — 3.5 mm, hypochilium separated from the epichilium by a groove. Hypochilium in outline more or less triangular, rather deeply concave, two-lobed, ca 2 by 1 — 2 mm; lateral lobes directed forwards and upwards, somewhat falcate, ca 1 by 0.5 mm, with rounded top, in front at the base each continued into a swollen ridge on the junction with the epichilium; ridge confluent in front. Epichilium in outline more or less obovate, somewhat concave at the base and somewhat convex in the top half, 3 — 4 by 2.3 — 3.2 mm, top truncate, the central part more or less quadrangular, with truncate tip, centrally with a vague low ridge continuing on the blade of the epichilium; surface and margin somewhat irregular.

Column oblong, 2.5 — 4' by 1.5—2 mm; top acute. Stigma large, rectangular, ca 1 by 0.5 mm. Rostellum band-like, thin. Anther heart-shaped, ca 1.5 by 2 mm, thin, top retuse. Pollinia ovoid, ca 1 by 0.5 mm, stipes obovoid, ca 0.8 by 0.6 mm, thin, viscidium quadrangular, ca 0.5 by 0.5 mm, thin. Fruit narrowly elliptic ovoid, 3 — 3.5 by 1 cm.

DISTRIBUTION IN INDONESIA : Sumatra, Java, Borneo, 0 - 750 m alt.

SPECIMENS EXAMINED. Sumatra : Lampung, G. Sugih, *van Andei s. n.* (BO, L); Payakumbuh, *Jacobson 19* (BO); Tandikat, alt. 250 m, April, *Latif 97* (L). Java : Preanger, Cisokan, alt. 750 m, Oct. *Bakhuizen v.d. Brink 977* (BO); Cisokan, Nov., *Winckel 245* (BO). Borneo : Samarinda, Lempake, alt. 1 m, June, *Wiriadinata 539* (BO, L); S. Serttawai, Oct., *Polak 2200* (BO); Martapura, *Korthals s. n.* (L—Holotype); Kapuas, *Teysmann 8448* (BO, L).

LUISIA CELEBICA Schlechter

Luisia celebica Schlechter in Fedde Repert. 10: 191. 1911; J. J. S. in Bull. Jard. Bot. Buitz. III, 10: 18. 1928; Seidenfaden in Dansk Bot. Ark. 27(4): 70, fig. 36. 1971. — TYPE: *Schlechter 20404* (n. v.).

Plants ca 40 cm long, with simple or branched stems. Stems with internodes 2.6 — 3 cm long. Leaf blades IS — 26.5 cm long by 1.5 — 2 mm diam., top obtuse. Racemes, peduncle, sterile bracts, rachis and floral bracts not seen. Flowers with petals exerted and not overlapping with median sepal. Median sepal ovate; top acute; nerves 3, midrib prominent. Lateral sepals broad-shaped, top acute, nerves 3; keel pronounced, its tip overtopping the top of the sepal. Petals strap-shaped, top rounded, nerves 1. Hypochilium in outline rectangular, concave, two-lofeed; lateral lobes erect, attached along the entire length of the hypochilium margin, more or less obliquely triangular, surface in the middle with a longitudinal groove. Epichilium in outline heart-shaped, top acute, surface in the middle with a longitudinal groove. Column more or less rectangular, top acuminate. Stigma more or less rectangular. Rostellum indistinct. Anthers heart-shaped, top truncate. Pollinia ovoid, stipes more or less rectangular, viscidium more or less orbicular. Fruit elliptic, 3.5 — 4 cm long, 5 — 6 mm diam.

DISTRIBUTION IN INDONESIA. Celebes.

The description of the flower is based on a drawing in Schlechter, Fedde Rep. 74: T. 73. Fig. 292. 1933 which is also copied by Seidenfaden in Dansk Bot. Ark. 27 (4): 70, fig. 36. 1971. No further collection of this species has been available for study. Its distinguishing feature is the very long leaves.

SPECIMEN EXAMINED : Celebes : Minahasa, *Koorders 29582* (BO).

LUIZIA CONPUSA Rchb. f.

Luwà confua Rchb. f. in Walp. Ann. 6: 621. 1861; Merrill, Interp. Rumph. Herb. Amb. : 178. 1917; J. J. S. in Phil. Journ. Sci. 12 (5): 261. 1917; Seidenfaden in Dansk Bot. Ark. 27 (4): 47, fig. 24.1971..

Plants 30 — 70 cm long, with simple or branched stems, rooting from the base and higher up the stem. Roots 2—4 mm diam. Stems with internodes (1—) 2.5 — 3 cm long. Leafblades 11 — 15 cm long, 1—3 mm diam., top obtuse to acute. Racemes arise from a node or from a point up to 2 — 4 mm above the node, with 3 — 8 spirally arranged flowers, 5 — 18 mm long. Peduncle 2 — 4 by ca 3 mm. Sterile bracts 1 — 3, measuring about 2 by 4 mm when flattened. Rachis 3 — 4 by 2 — 3 mm, internodes ca 2 mm long. Floral bracts 1 — 2 by 2 — 3 mm in natural position. Pedicel 5 — 11 by 0.5 — 1 mm. Ovary 2 — 3 by 1 — 1.5 mm. Flowers with petals exerted and not overlapping with median sepal. Median sepal ovate, 5 — 7 by 3 — 4 mm, top obtuse to acute, margins somewhat incurved, nerves 5, midrib prominent. Lateral sepals yellowish green, outside with violet spots, 6 — 8 by 2.5 — 3.5 mm in natural position, top acuminate, nerves 4; keel pronounced, 0.5 — 1 mm wide, its tip overtopping the top of the sepal or reaching to the same height, rounded or acute. Petals obovate to narrowly obovate, 9 — 12.5 by 2 — 3 mm, yellow, top rounded, nerves 3—4. Lips 6 — 7 by 5.5 — 7 mm when flattened, hypochilium and epichilium distinctly divided by a groove. Hypochilium more or less heart-shaped, outside yellowish, inside violet with yellow spot, concave, 3 — 4 by 3 — 4 mm, two-lobed; lateral lobes erect and somewhat incurved, attached over the entire length of the hypochilium margins, more or less rectangular with rounded corner, ca 2 by 0.5 mm. Epichilium reniform to heart-shaped, outside yellowish, inside two-third to the base violet and one-third to the top yellow, concave, 3 — 4 by 5.5 — 7 mm when flattened, top somewhat acute to rounded, surface smooth, margin entire. Column rectangular, yellowish green, 3 — 4 by 2 — 3 mm, top acute to obliquely truncate. Stigma rectangular, 1 — 2 by 1 — 2 mm. Rostellum band-like, thin. Anther heart-shaped, yellowish, 1.5 — 2.5 by ca 2 mm. Pollinia more or less orbicular, yellow, 1 — 1.5 by 1 — 1.5 mm, stipes more or less triangular, transparent, whitish, 0.5 — 1 by 0.8 — 1 mm, thin, viscidium rectangular, also transparent, whitish ca 1 by 1 mm. Fruit narrowly elliptic ovoid. 3—4 cm long, 5 — 7 mm wide.

DISTRIBUTION IN INDONESIA: Sumatra, Timor, Moluccas, 0 — 1200 m alt.

In the past this species had been considered very close to *L. javanica* and *L. celebica*. From examinations of numerous living specimens I can substantiate Seidenfaden's conclusion that they can be easily recognized as distinct species. The broad heart-shaped lip which is yellow below the epichilium is the distinguishing character of this species.

SPECIMENS EXAMINED. Sumatra: Taloe, alt. 500 m, April, *Bunnemeiyer 10* (BO). Timor: Oi Poela, alt. 680 — 1200 m, *Bloembergen 3412* (BO); Nasimetan, alt 900 m, March, *Bloembergen 3472* (BO). Moluccas: Bacan, Kampung Inggoi, alt.

2 m, Sep., *Nedi 108* (BO); Ceram, *Ruinen 15* (BO); Waru, alt. 0 m, *Rutten 980* (BO, L); Wai Boifarf, alt 100 - 200 m, *Rutten 2141* (BO, L); Amboina, *Robinson 1626* (L); Obi, *Saanam 115* (BO); Buru, alt 800 m, Feb., *Toxopeus 24* (BO); Halmahera, *Lohman s. n.* (BO), Halmahera, G. Panjang, alt. 45 m, *Vogel 3178* (L).

LUISIA JAVANICA J.J.S.

Luisia javanica J. J. S. in Bull. Jard. Bbt. Btztg. II, 14: 56, 1914; in Bull. Jard. Bot. Btztj; II, 26: 102. 1918; in Bull. Jard. Bot. Btztg. III, 10 : 18. 1928; Backer & Bakh. v, d. Brink f, Pl. Java 3: 423. 1968; Seidenfaden in Dansk Bot. Ark. 27 (4): 54, fig. 27. 1971. — TYPE: *Medini s. n.* (L - Isotype).

Plants 9 — 84 cm long, with simple or branched stems, rooting from the base and higher up the stem. Roots 2 — 5 mm diam. Stems with internodes 1 — 3 cm long. Leafblades 8 — 18 cm long, 1—2 mm diam. with an obtuse to acute top. Racemes arise from a node or from a point up to 4 — 5 mm above the node, with 2 — 13 spirally arranged flowers, 4 — 19 mm long. Peduncle 2 — 5 by ca 2 mm. Sterile bracts 2 (— 4), when flattened measure 1 — 2 by 4 — 5 mm. Rachis 2 — 16 by 1 — 3 mm, internodes 1 — 3 mm long. Floral bracts 1 — 2 by ca 2 mm in natural position. Pedicel 5 — 8 by ca 1 mm. Ovary 3 — 5 by 1 — 2 mm. Flowers with petals exerted and not overlapping with median sepal. Median sepal rather shallowly concave, ovate, yellowish green 4 — 5 by 2 — 4 mm, top obtuse, margin rolled inward, nerves 3. Lateral sepals yellowish green, 4 — 6 by 2 — 3 mm in natural position, margin rolled inwards, top acuminate, nerves 3; keel pronounced, 6.5 — 0.7 mm wide, its tip about square or extending beyond the top of the sepal. Petals strap-shaped, yellow, 5 — 9 by 1.5 — 2 mm, top rounded and somewhat widened, nerves 3, vague to prominent. Lip dark violet 4.5 — 6.5 by 3 — 5 mm when flattened, hypochilium separated from the epichilium by a shallow vague groove. Hypochilium in outline more or less quadrangular, at the base swollen, two-lobed, 2 — 2.5 by 2 — 2.5 mm, either or not with longitudinal groove; lateral lobes erect and somewhat incurved, attached at about the basal two-third of the hypochilium, leaving about one-third of its margin free, ca 1 by 1.5 mm, with rounded top, nerves 0 — 3. Epichilium heart-shaped, somewhat concave, 2 — 3 by 3 — 5 mm when flattened top acute, margin entire. Column oblong, yellowish green, 2 — 3.5 by 1 — 2 mm, top acuminate. Stigma large, more or less obovate, ca 1.5 by 1 mm. Rostellum more or less rectangular, ca 1 by 0.5 mm. Anther heart-shaped, yellowish, ca 2 by 2 — 2.5 mm, thin, top margin retuse to obtuse. Pollinia ovoid, 1 — 1.5 by 0.5 — 1.5 mm, stipes more or less obovate, 1 — 1.5 by 0.5 — 1 mm, thin, viscidium orbicular, ca 1 by 1 mm, thin. Fruit narrowly elliptic ovoid, ca 3.3 cm long, ca 6 mm diam.

DISTRIBUTION IN INDONESIA: Java, Celebes, Moluccas.

This Javanese species also occurs in Celebes and the Moluccas. There is no reason actually to confuse it with *L. confusa* originally described from the Moluccas, or with *L. celebica* from Celebes. The latter has very long

leaves which from the result of a preliminary anatomical **observation appear** to differ in stomatal structure and density.

SPECIMENS EXAMINED. Java : Bogor, March, *Hallier* 501 (BO); Bogor, alt. 250 m, Feb., *Bakhuizen v. d. Brink* 756 (BO); Bubulak, alt. 250 m, March, *Bakhuizen v.d. Brink* 6687 (BO); Cikurai, *Backer s.n.* (BO); Preanger, January, *Koorders* 40280 (BO); Preanger, *Medini s.n.* (L — Isotype); Bandung, Pasir Wangi, alt. 800 m, *Docters van Leeuwen* 424 (BO); Garut, alt. 850 m, Nov., *Backer* 5297 (BO); Salatiga, April, *Docten van Leeuwen* 369 (BO); Besuki. Mountain lien, alt. 700 m, Oct., *Loggers* 60 (BO). Celebes, Parigi, Panette, alt. 450 m, June, *Bu'nneimeiyer* 12561 (BO). Moluccas, Ambon, Naai, alt. 5 m, Juli, *van der Pijl* 706 (BO).*

LUISIA TAURINA J. J. s.

Luisia taurina J. J. S. in Bull. Dept. Agr. Ind. Ne'erl. 43: 64, T. 17. 1910; Backer & Bakh. v. d. Brink f., Fl. Java 3: 423. 1968; Seidenfaden in Dansk Bot. Ark. 27 (4): 23, fig. 6. 1971. - TYPE: *Quarfls s. n.* (BO - Holotype)

Plants over 60 cm long, with simple stems, rooting from the base and higher up the stem. Roots ca 3 mm diam. Stems with internodes 2 — 2.5 cm long. Leafblades 14 — 15 cm long, 3 — 4 mm diam., top acute. Racemes arise 3 — 5 mm from a node, with 10 — 13 spirally arranged flowers, ca 15 mm long. Peduncle ca 2 by 3 — 4 mm. Sterile bracts 2, when flattened measure ca 2 by 6 mm. Rachis ca 13 by 2.5 mm, internode ca 2 mm long. Flora! bracts 1.2 — 2.2 by 1 — 1.6 mm in natural position. Pedicel 5 — 10 by 2 — 2.5 mm. Ovary ca 5 by 2 — 2.5 mm. Flowers with petals distinctly exserted and not overlapping with median sepal. Median sepal boat-shaped, narrowly ovate, yellow purplish, 8.5 — 12 by 3 — 4 mm, base broad and somewhat swollen, top acute and in lateral view abruptly cut off, nerves 5 prominent with the midrib ending before the top. Lateral sepals purplish yellow, 9 — 12 by 3 — 4 mm in natural position, top acute, nerves 5: keel pronounced, 0.6 — 1 mm wide, its tip level with the top of the sepal. Petals slightly falcate, swordshaped, widest near the top, pale yellow, 17 — 18 by 3 — 3.5 mm, top obtuse somewhat swollen, nerves 7 at the base prominent. Lip violet, 11 — 12.5 by 6 — 10 mm, hypochilium separated from the epichilium by a vague groove. Hypochilium in outline about triangular when flattened, concave, two-lobed, 4.5 — 5.5 by 4 — 4.5 mm, lateral lobes somewhat upright, more or less rectangular, with rounded corners, 3 — 3.5 by 2.5 — 3 mm, nerves vague. Epichilium in outline about triangular, somewhat flat, 6.6 — 7 by 6 — 10 mm, top emarginate, surface distinctly irregular, margin irregular. Column more or less rectangular in natural position, 3 — 4.5 by 2 — 2.5 mm, top obtuse to shortly acute. Stigma large, more or less rectangular, ca 2 by 1 mm. Rostellum a narrow band, notched after removal of the pollinarium. Anther not seen. Pollinia 2, ellipsoid to ovoid.

DISTRIBUTION IN INDONESIA: Sumatra, Java, 300 — 650 m alt,

In Java this is one of the rare species of *Luisia*, and in recent years very few specimens have been seen in the field.

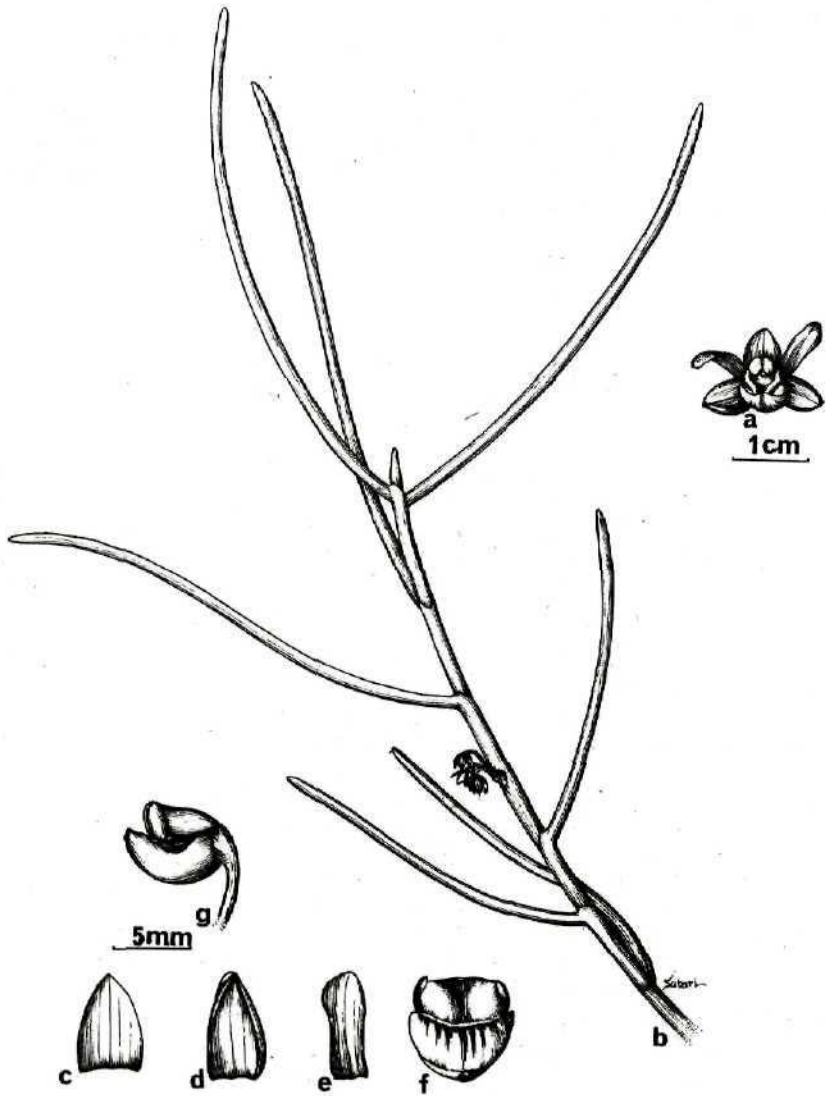


Fig. 1. *Luisia teretifolia* Gaud.: a. flower; b. habitus; c. median sepal; d. lateral sepal; e. petal; f. lip; g. column and lip. From *Gjellerub 595*,

SPECIMENS EXAMINED. Sumatra: Tandikat, alt. 300 m, February, *Latif 78* (L). Java: West Java, Kiaradua, *Comber s. n.* (BO-slides); East Java, Trenggalek, *Quarles s. n.* (BO).

LUISIA TERETIFOLIA Gaud. — Fig. 1

Luisia teretifolia Gaud, in Freycinet, Voy, Aut. du Monde : 427, T. 37. 1826; Kume, Rumph. 4: 50. 1840; Lindley, Fol. Orch. 1: 3. 1853; Rchb. f. in Walp. Ann. 6: 621. 1861; Hook, f, Fl. Br. Ind. 6: 22. 1894; Trimen, Fl. Ceylon 4: 190. 1898; Duthie in Ann. Roy. Bot. Gard. 9: 15. 1914; Seidenfaden in Dansk Bot. Ark. 27 (4): 56, fig. 30. 1970. - TYPE: *Gaudichaud 37* (P, n. v.).

Plants 1 — 65 cm long, with simple or branched stems, rooting from the base and higher up the stem. Roots 2 — 3 mm diam. Stems with internodes 2 — 3 cm long. Leaf blades 13 — 20 cm long, 1 — 3 mm diam., top obtuse to acute. Racemes arise 2 — 5 mm from a node, with 4 — 10 spirally arranged flowers, 6 — 15 mm long. Peduncle ca 2 by 3 mm. Sterile bracts 1 — 2, when flattened measure 1.5 — 3 by ca 4 mm. Rachis 4 — 13 by ca 2 mm, internodes 1 — 1.5 mm long. Floral bracts ca 1 by 2 — 3 mm in natural position. Pedicel 4 — 6 by 0.5 — 1 mm. Ovary 2 — 3 by ca 2 mm. Flowers greenish yellow, petals somewhat exserted and not overlapping with median sepal. Median sepal somewhat concave, elliptic to oblong, 5 — 5.5 by 3 — 3.5 mm, top rounded and somewhat incurved, nerves 5. Lateral sepals 4 — 5.6 by 2 — 4 mm in natural position, top broadly rounded to almost truncate, nerves 5, keel prominent rounded. Petals strap-shaped, 6 — 8 by 1.6 — 2.5 mm, top rounded, nerves 3. Lip 3.2 — 4 by 3 — 5.5 mm when flattened, hypochilium and epichilium distinctly divided by a deep groove. Hypochilium wider than long, in outline transversely rectangular, at the base concave and convex in the top half, distinctly swollen, two-lobe, ca 2 by 3 mm, lateral lobes erect and somewhat incurved, occupying the entire length of the hypochilium margin, 1.5 — 2 by 0.5 — 1 mm, with rounded top. Epichilium in outline more or less reniform, concave, when flattened 2 — 2.5 by 3 — 5.5 mm, top shortly acute; surface with some vague longitudinal grooves, margin entire and incurved. Column rectangular, 3 — 3.4 by 2 — 2.5 mm, top obliquely truncate. Stigma large, more or less rectangular, 1 — 1.5 by 1.5 — 2 mm. Rostellum ca 0.4 by 0.4 mm, top irregular. Anther about semi-orbicular in outline, at the back slightly retuse, ca 2 by 2 mm, top truncate. Pollinia orbicular, ca 1 by 1 mm, stipes rectangular, ca 1 by 0.6 mm, thin, viscidium transversal rectangular, thin. Fruit elliptic, ca 4.5 by 0.5 cm.

DISTRIBUTION IN INDONESIA: Flores, Moluccas, West Irian, 100 - 650 m alt.

SPECIMENS EXAMINED. Flores: alt. 100 m, *Verheijen 3515* (L); Manggarai, alt. 650 m, *Schmutz 4698* (L). Moluccas: Halmahera, *Lohman s. n.* (BO); P. Jamdena March, *Buwalda 4330* (BO). West Irian: Mamberamo, Sept., *Janowsky 456* (BO); Humbolat Bai, August., *Gjellerup 595* (BO, L), New Guinea: Monson District, alt. 150 m, Oct., *Schlechter 18362* (BO, L); Koitaki, April, *Carr. 10020* (L); Tari District, alt. 1700 m, Dec., *Reeve 1021* (L).

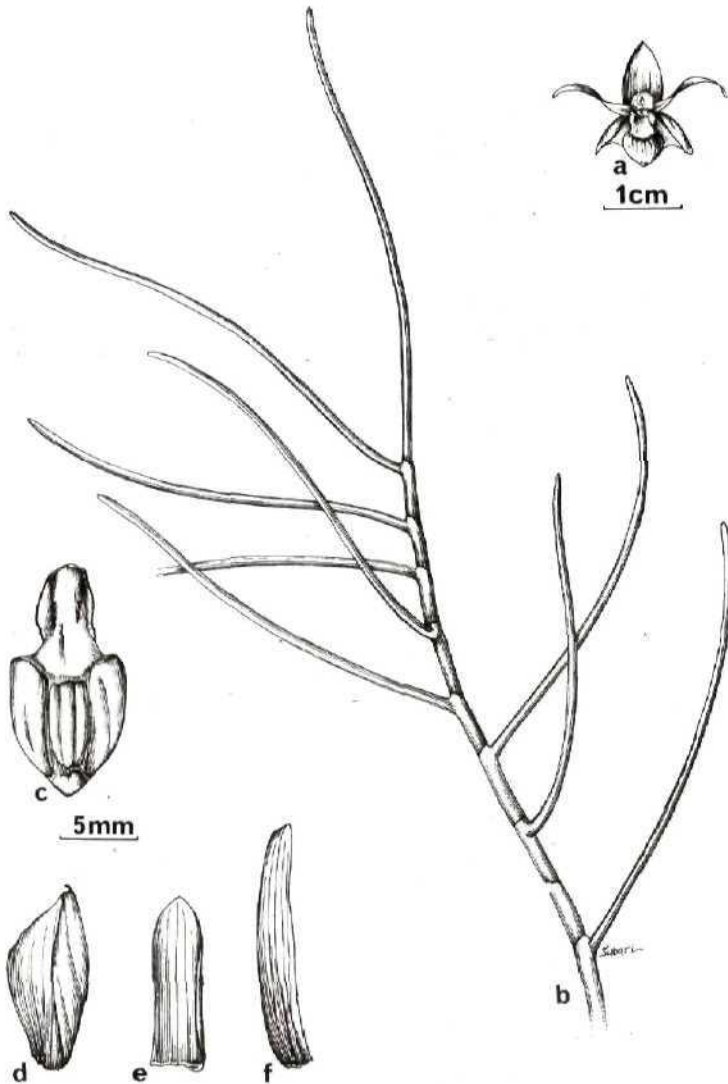


Fig. 2. *Luisia tristis* Hook, f: a. flower; b. habitus; c. lip; d. lateral sepal; e. median sepal; f. petal. From cult. Bogor Botanical Garden.

LUSIA TRKTIS Hook. f. — Fig. 2

Luisia tristis Hook, f, Pl. Br. Ind. 6: 25. 1894; Ridley, Pl. Mai. Pen. 1: 148. 1907; Seidenfaden in Dansk Bot. Ark. 27 (4): 50, fig 25. 1971.

Plants over 60 cm long, with simple stems, rooting from the base and higher up the stem. Roots ca 2 mm diam. Stems with internodes 2.5 — 3 cm long. Leafblades 12 — 20 cm long, ca 3 mm diam., top obtuse. Racemes arise from a node or 2 — 3 mm from a node, with more or less 6 spirally arranged flowers, ca 10 mm long. Peduncle ca 2 by 2 mm. Sterile bracts 2, when flattened measure ca 2 by 4 mm. Rachis ca 8 by 2 mm; internodes ca 2 mm long. Floral bracts ca 1 by 2 mm in natural position. Pedicel 6 — 8 by 1 — 1.5 mm. Ovary ca 3 by 2 mm. Flowers with petals distinctly exerted and not overlapping with median sepal. Median sepal ovate to oblong, greenish, 6 — 8 by 3 — 4 mm, top obtuse, somewhat incurved, concave, nerves 5. Lateral sepals greenish, 8 — 10 by 3 — 4 mm in natural position, top obtuse, nerves 5; keel pronounced, swollen, 1 — 1.5 mm wide, its tip overtopping the top of the sepal. Petals linear-ovate, greenish, about one-third towards apex yellowish 14 — 15 by ca 2 mm, upper two-third somewhat swollen, top obtuse, nerves 3. Lip dark purple, 11 — 12.5 by 7 — 8.5 mm, hypochilium and epichilium distinctly divided by a groove. Hypochilium in outline more or less quadrangular to rectangular, concave, at the base thick, two-lobed, 5 — 6 by 4 — 5 mm; lateral lobes turned upward, more or less rectangular, 2 — 2.5 by ca 1 mm, with rounded corners. Epichilium in outline heart-shaped, convex, 5.5 — 6.5 by 7 — 8.5 mm, top obtuse, the central part with longitudinal grooves, in the middle by grooves with two superposed, clavated ridges which are more or less distinctly set off; margin entire. Column rectangular in outline, 3.5 — 5 by ca 2 mm; top obtuse. Stigma large, more or less rectangular, 2 — 3 by 2 — 2.5 mm. Rostellum band-like, thin, after removal of the pollinarium notched. Anther heart-shaped, ca 1.8 by 2 mm. Pollinia ellipsoid, 1.4 — 2 by 0.8 — 1.5 mm, stipes triangular, 1.5 — 2.2 by 1.2 — 1.6 mm, thin, viscidium rectangular, 1 — 1.5 by 1.5 — 2 mm, thin. Fruit not seen.

DISTRIBUTION IN INDONESIA : Sumatra.

SPECIMEN EXAMINED. Sumatra. North Sumatra, Aek Banir, and cultivated in Bogor Botanical Gardens.

LUSIA UNGUICULATA J. J. S.

Luisia unguiculata J. J. S. in Bull. Jard. Bot. Btzg. III, 8: 65. 1926; Seidenfaden in Dansk Bot. Ark. 27 (4): 46, fig. 23. 1971. -TYPE; *Groeneveldt 21* (BO — Holotype).

Plants 60 — 70 cm long. Stems with internodes 1.5 — 2 cm long. Leafblades 9 — 10 cm long, ca 2 mm diam., top obtuse to rounded. Racemes arise from a node, with more or less 8 spirally arranged flowers, 10 — 15 mm long. Peduncle ca 2 by 3 mm. Sterile bracts 3, when flattened measure 3 — 6

by 4 ~ 10 mm. Rachis 8 — 13 by ca 2 mm, internodes 2—3 mm long. Floral bracts 1 — 2 by ca 1 mm in natural position. Pedicel ca 6.5 by 1 mm. Ovary ca 2.5 by 2 mm. Flowers with petals exerted and not overlapping with median sepal. Median sepal ovate, shallowly boat-shaped, 5 — 5.5 by ca 3 mm, thin, top obtuse, nerves 5 and prominent. Lateral sepals 5.2 — 6 by 2 — 2.5 mm in natural position, top acute, margin rolled inwards, nerves 6 and prominent, keel pronounced, ca 0.5 mm wide, its tip overtopping the top of the sepal. Petals strap-shaped, 6 — 8.5 by 2 — 2.8 mm, top rounded, nerves 5. Lip ca 6.5 by 5 mm, hypochilium in outline about rectangular, somewhat concave, two-lobed, ca 3.5 by 3 mm; lateral lobes erect and incurved, attached at the basal two-third of the hypochilium, 1 — 1.8 by 0.5 — 1 mm, with broadly rounded top. Epichilium in outline heart-shaped, somewhat convex, when flattened 3 — 3.5 by ca 5 mm, top obtuse, margin entire. Column oblong in outline, ca 3 by 2 mm, top obliquely truncate. Stigma large, more or less obovate, ca 2 by 1 mm. Rostellum a narrow rim. Anther about semi-orbicular in outline, at the back slightly retuse, ca 2 by 2 mm; top truncate, the tip shortly acuminate; thin. Pollinia ovoid, ca 1.5 by 1 mm, stipes more or less rectangular, ca 1 by 0.8 mm, thin, top obtuse, viscidium more or less transversal, rectangular, ca 1.8 by 1.5 mm, thin. Fruit not seen.

DISTRIBUTION IN INDONESIA: Timor.

COLLECTOR'S NOTES : sepals greenish yellow, middle part green; petals light green, top yellow; lip dark violet; pollinia yellow.

Seidenfaden (1971) suggested that this species probably could not be separated from *L. javanica*. Actually *L. unguiculata* can be easily distinguished from *L. javanica* by its 5 nerved petals as opposed to 3 in the latter species. Moreover the petal of *L. javanica* is narrower than in the present species. The epichilium is convex, whereas those of *L. javanica* and the other species they are concave.

SPECIMEN EXAMINED. Timor : Patria, September, *Groeneveldt 21* (BO-Holotype).

LUISIA ZOLLINGERI Rchb. f.

Luisia zollingeri Rchb. f. in Walp. Ann. 6: 622. 1861. —TYPE : *Zollinger 1265* (P.n.v.).

Plants 7 — 65 cm long, with simple or branched stems, rooting from the base and higher up the stem. Roots 2—3 mm diam. Stems with internodes 1 — 2.5 cm long. Leafblades 12 — 17 cm long, 2 — 4 mm diam., top obtuse. Racemes arise from a node or from a point up to 2 — 7 mm above the node, with 3—9 spirally arranged flowers, 9 — 15 mm long. Peduncle 2 — 3 by ca 2 mm. Sterile bracts 2, measuring 1 — 2 by 1.5 — 2 mm; internodes 1 — 2 mm long. Floral bracts 1 — 2 by 0.5 — 1.5 mm in

natural position. Pedicel 2 — 4 by 0.5 — 1 mm. Ovary 1.8 — 2 by 1 - 2 mm. Flowers with petals about as long as the median sepal, with which they are joined together forming a hood. Median sepal ovate, yellow, 4 — 6 by 3 — 4 mm, top obtuse to rounded, nerves 3 — 5 greenish. Lateral sepals thin, greenish yellow, 4.8 — 7 by 1 — 2 mm, top acute, nerves 3—4; keel prominent up to 0.2 mm wide, its tip about squarely cut off. Petals ovate, somewhat oblique, greenish yellow, 4.8 — 6 by 3 — 4 mm, top obtuse to rounded, nerves 4 — 5. Lip violet, 5 — 6 by 3 — 5 mm, hypochilium separated from the epichilium by a shallow vague or a distinctly groove, with 5 — 15 nerves. Hypochilium in outline more or less rectangular to quadrangular, concave, two-lobed, 2.0 — 3.0 by 2 — 4 mm, surface in the middle with a longitudinal groove; lateral lobes erect and incurved, attached the entire or over the entire length of the hypochilium margin, more or less obliquely triangular, 1.5 — 2 by 0.5 — 1.5 mm, with rounded top; surface in the middle with a longitudinal groove. Epichilium heart-shaped to transversal rectangular, concave, 2.5 ~ 3 by 3.5 — 5 mm, not or hardly or distinctly wider than the hypochilium, lip at junction of these parts not or hardly or distinctly constricted, top rounded to obtuse or acute to more or less obtuse, margin entire. Column rectangular, ca 3 by 1 — 2 mm, top obliquely truncate. Stigma large, more or less orbicular, ca 1.5 by 1.5 mm. Rostellum band-like, thin. Anther about semiorbicular in outline, ca 2 by 1.5 — 2 mm; top obtuse. Pollinia orbicular, ca 1 by 0.8 — 1 mm, stipes obovate, 1—1.5 by 0.5 — 0.8 mm, thin, viscidium ca orbicular, 1 — 1.2 by 1 — 1.5 mm, thin. Fruit ovoid, 2.5 — 3 cm long, 5 — 6 mm wide.

LUISIA ZOLLINGEHI Rchb. f. var. ZOLLINGERI — Fig. 3

Luisia zollingeri Rchb. f. in Walp. Ann. 6: 622. 1861; J. J. S. in Orch. Java 6: 546, 1905; Enum. Orch. Sumatra: 369. 1933 (p. p.); Holtum, Orch. Maiaya 1: 697. 1964; Backer & Bahk. v. d. Brink f., PL Java 3: 423. 1968; Seidenfaden in Dansk Bot. Ark. 27 (4): 72. 1971.

Lousia brachystachys Bl. in Rchb. f., Xenia Orch. : 204. t. 78. 1858.

Lip 5 — 6 by 3 — 4 mm, hypochilium separated from the epichilium by a shallow vague groove, with 5 — 13 nerves. Hypochilium in outline more or less rectangular, concave, two-lobes, 2.5 — 3 by 3 — 4 mm, surface in the middle with a longitudinal groove; lateral lobes erect and incurved, attached the entire length of the hypochilium margin, more or less obliquely triangular, 1.8 — 2 by 0.5 — 1.5 mm, with rounded top. Epichilium more or less heart-shaped to transversal rectangular, concave, 2.5 — 3 by 3 — 4 mm, not or hardly wider than the hypochilium, lip at the junction of these parts not or hardly constricted, top rounded to obtuse, margin entire.

DISTRIBUTION IN INDONESIA : Sumatra, Java, Borneo.

SPECIMENS EXAMINED, Sumatra : Berhala Island 90 km from Belawan, August, *Meer Mohr* 47 (BO). Java : Depok, *van Steenis* 5671 (BO); Kalibata, June, *Raap* 382 (L); Topper Hoedja', alt. 30 m, Feb., *Docters van Leeuwen — Reijnuaan* 11633 (BO); East Java, Nusabarung Island, September, *Afriastini* 1249 (BO). Borneo : Mnjarmasin, *Korthals s. n.* (L); Kutai, Belayan, March, *Kostermans* 10251 (BO).

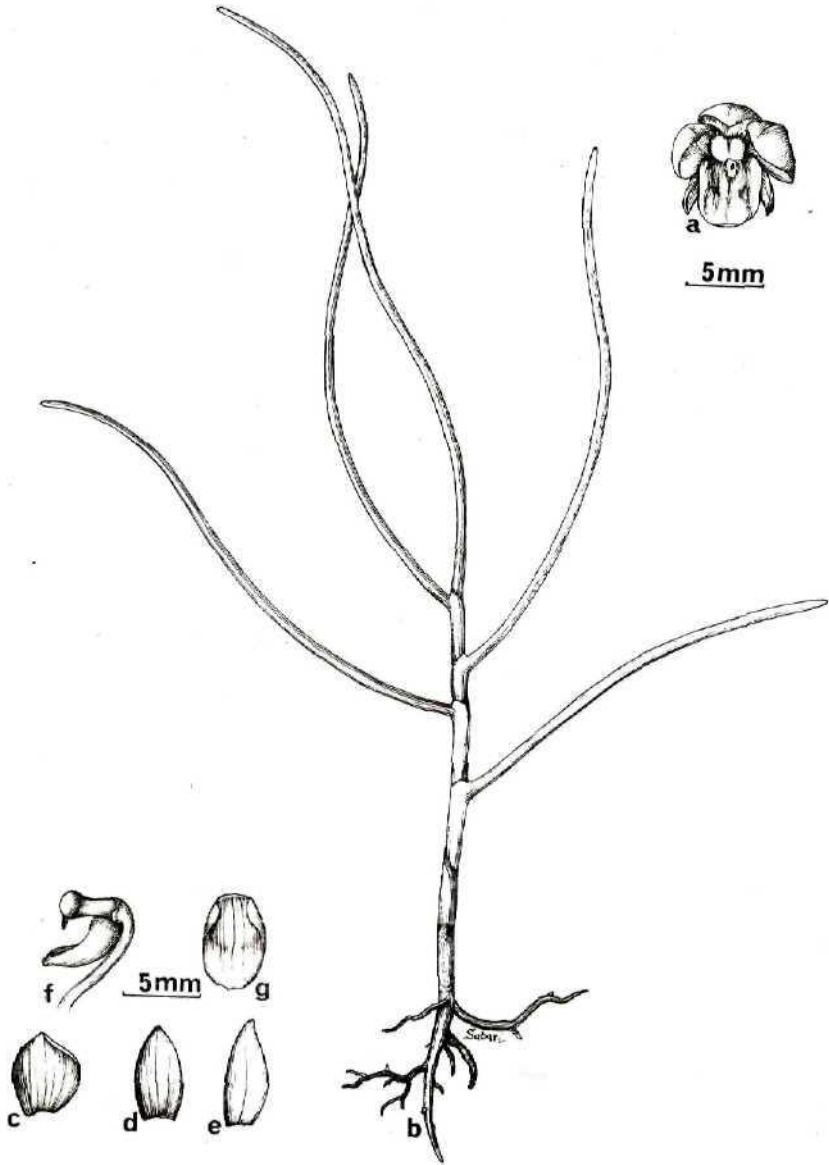


Fig. 3. *Luisia zollingeri* Rchb. f. var. *zollingeri*: a, flower; b, habitus; c, petal; d, median sepal; e, lateral sepal; f, column and lip; g, lip. From cult. Bogor Botanical Garden.

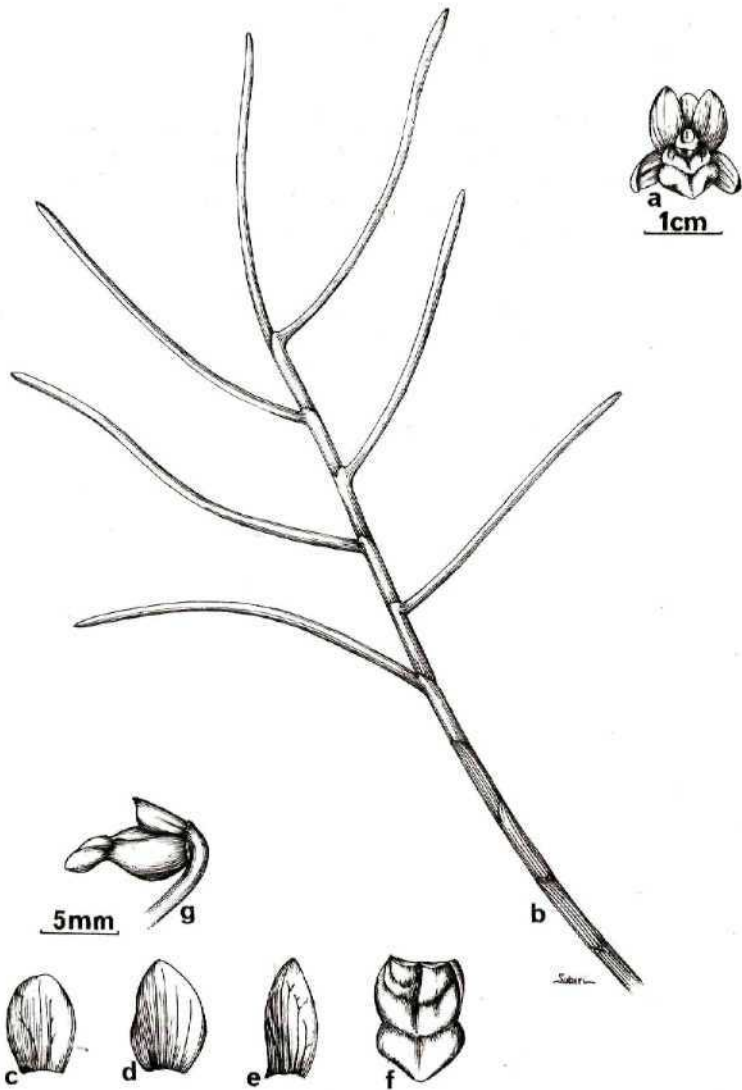


Fig. 4. *Luisia zollingeri* Rchb. f, var. *latipetata* (J. J. S.) Sulistiarini: a. flower; b. habitus; c. median sepal; d. petal; e. lateral sepal; f. lip; g. column and lip. From cult. Bogor Botanical Garden.

Luisia zollingeri Rchb. f. var. **latipetala** (J. J. S.)
Sulistiarini, *stat & comb. nov.* — Fig. 4

Luisia latipetola J. J. S. in Bull. Dep. Ind. NéerL 43: 67, fig. 2. 1910(basionym); in Bull. Jard. Bot. Btzg. II, 26: 102. 1918. - TYPE : *tiling s. n.* (BO - Holotype, L — Isotype).

Lip 5 — 6 by 3.5 — 5 mm, hypochiliuin separated from the epichilium by a distinctly groove, with nerves 7 — 9. Hypochilium in outline quadrangular, concave, two-lobed, 2 — 3 by 2 — 3 mm, surface smooth, in the middle with a longitudinal groove ; lateral lobes erect and incurved, attached, over the entire length of the hypochilium margin, more or less obliquely triangular, 1.5 — 2 by 1 — 1.5 mm, with rounded top. Epichilium heart-shaped, concave, 3 — 3.5 by 3.5 — 5 mm, distinctly wider than the hypochilium, lip at the junction of these parts distinctly constricted, base broadly rounded, top acute to more or less obtuse, surface smooth, margin entire.

DISTRIBUTION IN INDONESIA : Sumatra, Java, alt. 50 - 750 m.

This taxon had been considered as a synonym of *-L. zollingeri* (Smith 1933, Seidenfaden 1971) but besides the difference in the width of epichilium, leaf anatomical observation (Sulistiarini, Ber. Biol. 3(4): 143 — 145. 1986) seems to suggest that it can be treated as a variety of *L. zollingeri*.

SPECIMENS EXAMINED. Sumatra : 'Bün', *Groeneveldt 6* (L); Sijunjung. *Theunissen & Jacobson 1616* (BO); Kabanjahe, alt. 750 m, Feb., *Galoengi 57a* (BO). Java : Cikampek, alt. 50 m, *Now, Beumée 4579* (BO); Mount Slamet, *Illing s. n.* (BO — Holotype, L — Isotype); Mount Pancar, *Joseph s. n.* (BO); Pati, Ngarengan, Oct., *Beumée 1119* (BO); Tempuran, Sept., *Docters van Leeuwen 131* (BO); Brebes, Banjarharjo, Nov., *BeumSe 4784* (BO); Pekalongan, Subah, alt. 200 m. Oct., *Beumée 3482* (BO), all 150 m. April *Beumée 1980* (L).

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