



Research article

Two new species of *Lasianthus* Jack (Rubiaceae) from southern Vietnam

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Abstract. Two new species of shrubs in the genus *Lasianthus* Jack (Rubiaceae), *L. naikii* V.S.Dang & Vuong sp. nov. and *L. sonlangensis* V.S.Dang, Vuong & Quan sp. nov. from Kon Chu Rang Nature Reserve of Gia Lai Province in southern Vietnam, are described and illustrated. The similarities and differences of two new species with the morphologically closest allies are presented. Descriptions, illustrations, colour plates and vernacular names are provided.

Keywords. Kon Chu Rang, *Lasianthus*, new species, *Nudiflorae*, Rubiaceae, taxonomy.

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Introduction

The genus *Lasianthus* Jack is part of the family Rubiaceae Juss. and comprises more than 180 species of shrubs or small trees that grow in the shade of evergreen forests (Robbrecht 1988; Zhu & Taylor 2011;

Dang & Naiki 2019). Species of *Lasianthus* are distributed mainly in the Old World tropics with 160 species occurring in tropical Asian, 20 species in Africa and four species in tropical America and Australia (Zhu *et al.* 2012; Naiki *et al.* 2015). In Vietnam, 43 species and two subspecies have been reported to date (Ha *et al.* 2020; Dang & Naiki 2020). Among them, 13 species and one subspecies which are found in the shade of evergreen forests and are endemic to Vietnam, were recently described: *L. bidoupensis* V.S.Dang & Naiki, *L. elevatineurus* H.Zhu, *L. fansipanensis* V.S.Dang & Naiki, *L. honbaensis* V.S.Dang, Tagane & H.Toyama, *L. konchurangensis* V.S.Dang, T.B.Tran & T.D.Ha, *L. larsenii* H.Zhu, *L. longissimus* H.Zhu, *L. oblongilobus* H.Zhu, *L. sapaensis* V.S.Dang & Naiki, *L. tamdaoensis* V.S.Dang, *L. stephanocalycinus* Naiki, Tagane & Yahara, *L. thuyanae* V.S.Dang & Naiki, *L. yaharae* V.S.Dang, Tagane & H.Tran and *L. capitatus* subsp. *vietnamensis* H.Zhu (Zhu 2000; Zhu & Roos 2002; Dang *et al.* 2015, 2016, 2019; Naiki *et al.* 2015; Dang & Naiki 2019, 2020; Ha *et al.* 2020), and two species were newly recorded: *L. cambodianus* Pit., *L. giganteus* Naiki (Dang *et al.* 2017; Naiki *et al.* 2017).

We collected two unknown species of *Lasianthus* from Kon Chu Rang Nature Reserve in southern Vietnam during our field trips in April 2021. After detailed morphological examination of species of *Lasianthus* in Pitard (1924), Pham (2000), Zhu (2000), Zhu & Taylor (2011), Zhu *et al.* (2012), Naiki *et al.* (2015), Dang & Naiki (2019, 2020) and Napiroon *et al.* (2020), as well as comparison with the specimens in the herbaria HN, KYO, P, VNM and VNMN (acronyms of herbaria follow Index Herbariorum (Thiers continuously updated)), and specimen images on the website of JSTOR Global Plants (<https://plants.jstor.org/>) and BM (<https://www.nhm.ac.uk/>), we conclude that our collections are distinct from previously known taxa and describe them here as two new species. The genus *Lasianthus* includes three sections, sect. *Stipulares* Hook.f., sect. *Nudiflorae* Hook.f. and sect. *Lasianthus* Jack. Based on Zhu *et al.* (2012), the two new species are members of section *Nudiflorae* by having small stipules and bracts less than 3 mm long.

Material and methods

Species descriptions were based on observations from living and dried specimens, which were deposited at the herbaria of the Institute of Ecology and Biological Resources (HN) and the Institute of Tropical Biology (VNM). The measurements were made using a ruler accurate to 0.5 mm. The photographs were taken with a Canon 1000D camera fitted with an EF 100 mm f/2.8 Macro USM lens.

Results

Class Magnoliopsida Brongn.
Order Gentianales Juss. ex Bercht. & J.Presl
Family Rubiaceae Juss.
Genus *Lasianthus* Jack

***Lasianthus naikii* V.S.Dang & Vuong sp. nov.**

urn:lsid:ipni.org:names:77295607-1

Figs 1–2; Table 1

Diagnosis

Lasianthus naikii sp. nov. is similar to *L. formosensis* Matsumura (Fig. 3) in leaf morphology and blue fruits, but differs from the latter by having secondary veins 5–6 pairs (vs 6–7 pairs), bracts present 0.5–1 mm long (vs absent), calyx tube 2–5 mm long (vs ca 1 mm long), calyx lobes 1–1.5 mm long (vs 3–4 mm long) and corolla lobes 6 (vs 5). For a further comparison see Table 1.

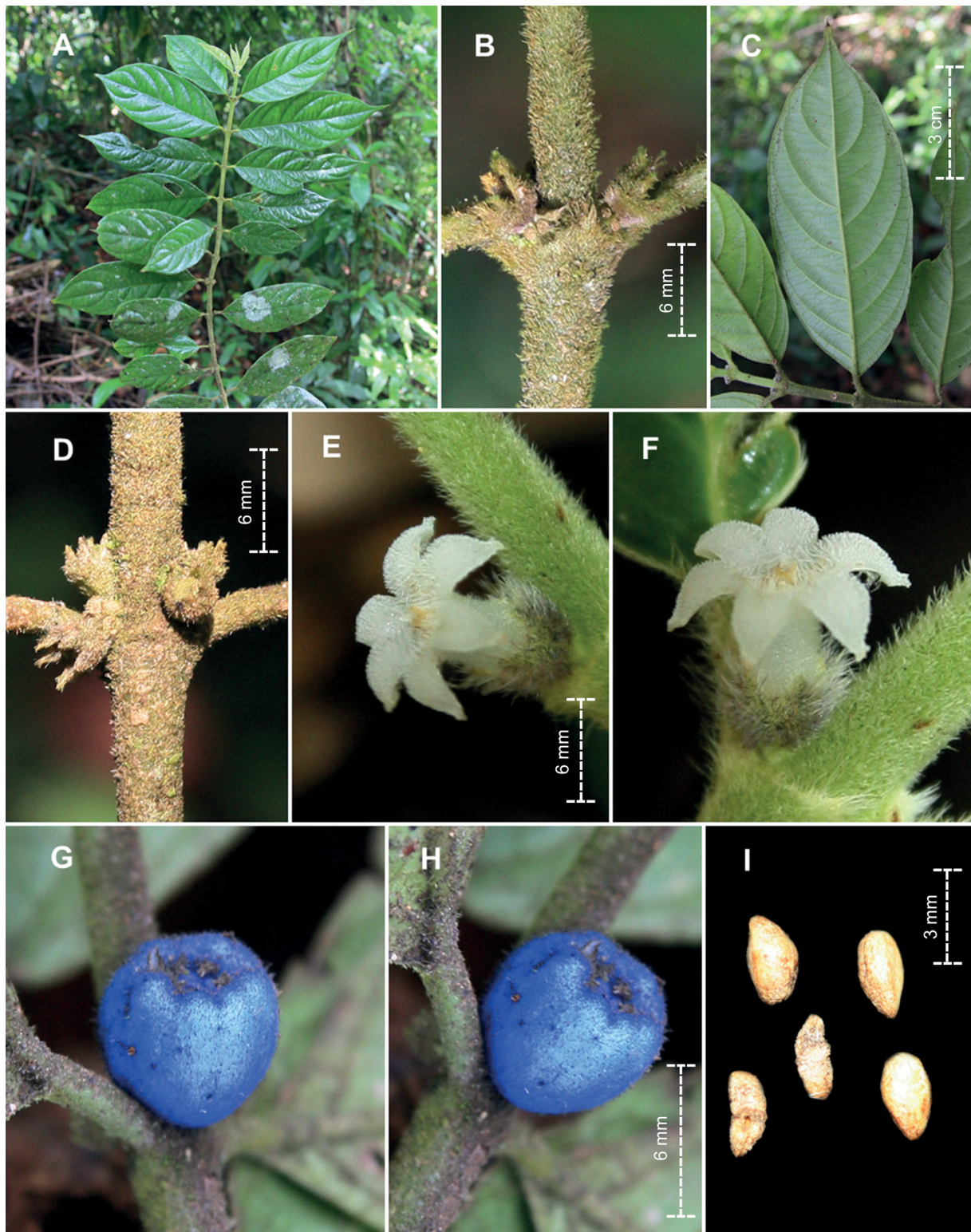


Fig. 1. *Lasianthus naikii* V.S.Dang & Vuong sp. nov. **A.** Branch. **B.** Stipule. **C.** Abaxial leaf surfaces. **D.** Calyces. **E–F.** Close-up of flowers. **G–H.** Mature fruits. **I.** Seeds. Photos by Van-Son Dang on 22 Apr. 2021.

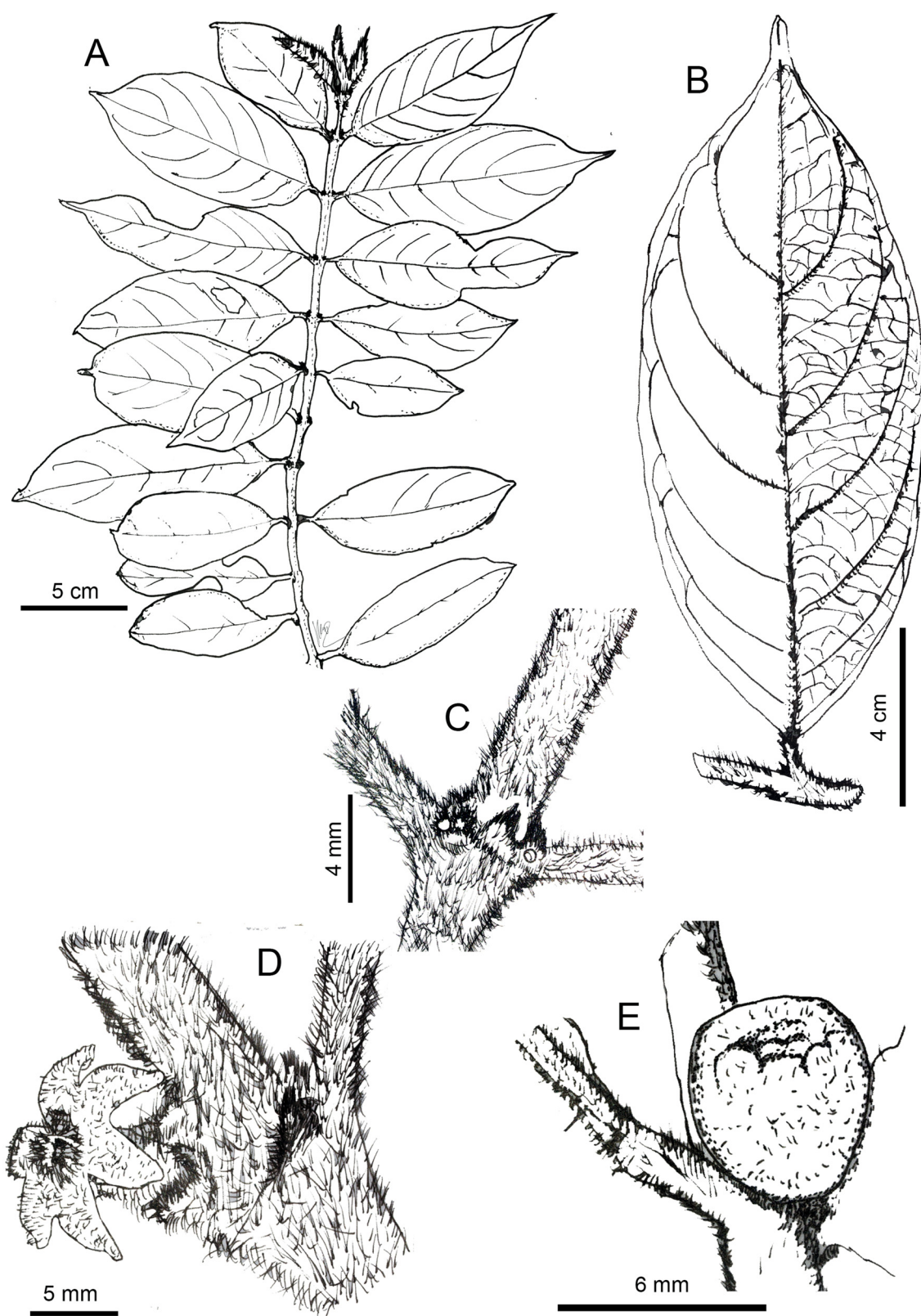


Fig. 2. *Lasianthus naikii* V.S.Dang & Vuong sp. nov. **A.** Branch. **B.** Abaxial leaf surfaces. **C.** Stipule. **D.** Close-up of flower. **E.** Fruit. Line drawings from the holotype (*Dang 453*) by Ba-Vuong Truong.

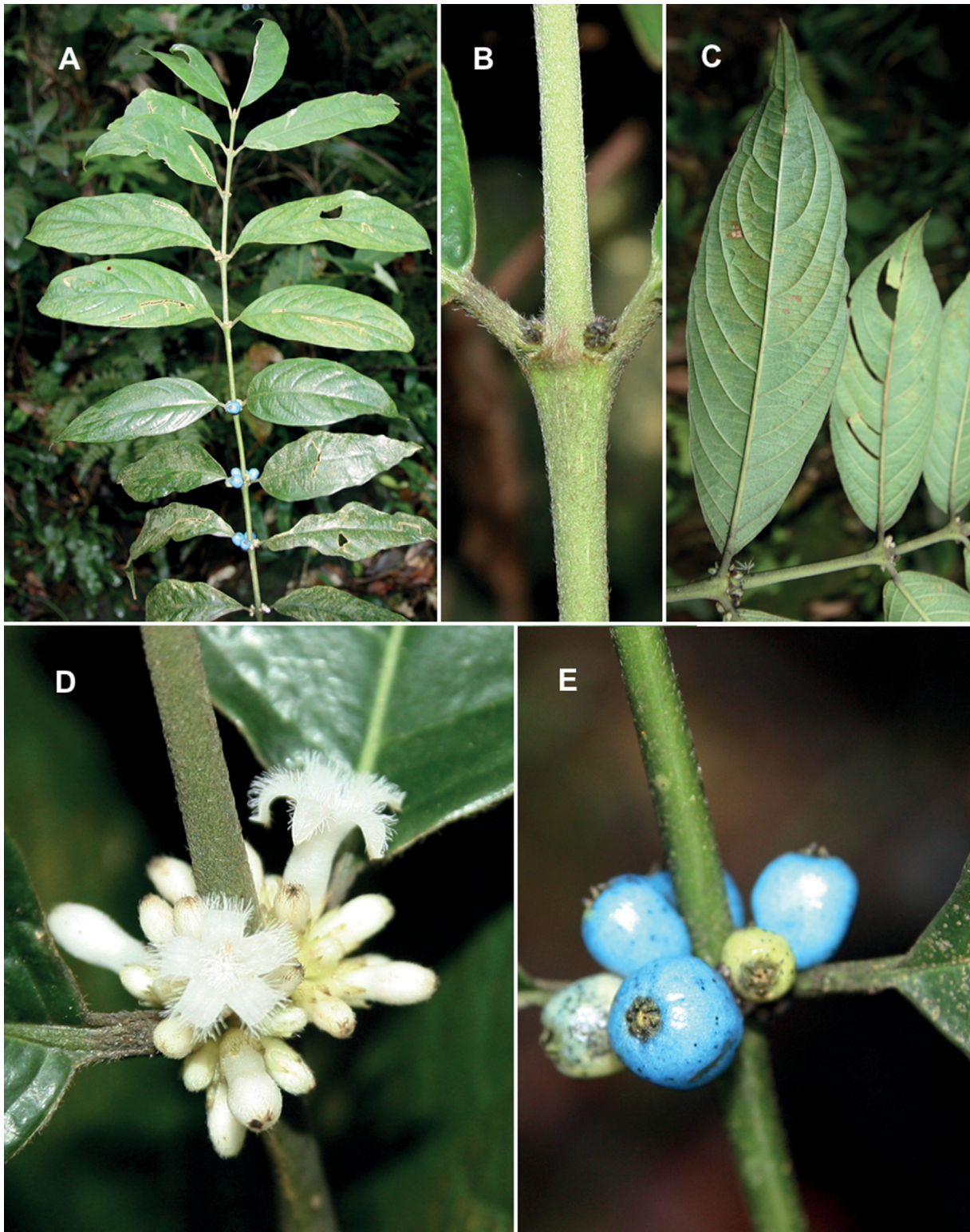


Fig. 3. *Lasianthus formosensis* Matsumura. A. Fruiting branch. B. Stipule. C. Abaxial leaf surfaces. D. Close-up of inflorescences and flowers. E. Fruits. Photos by Van-Son Dang on 17 Nov. 2018.

Table 1. Comparison of *Lasianthus naikii* V.S.Dang & Vuong sp. nov. and *L. formosensis* Matsumura. * = from Zhu & Taylor 2011.

Characters	<i>Lasianthus naikii</i> sp. nov.	<i>Lasianthus formosensis</i> *
Leaf blades	12–14 × 3–5 cm	7–12 × 2.5–5 cm
Secondary veins	5–6 pairs	6–7 pairs
Petioles	densely villous, 5–7 mm long	villous to villosulous, 5–8 mm long
Stipules	1.5–2 mm long	ca 2 mm long
Bracts	0.5–1 mm long	absent
Calyx tube	2–5 mm long	ca 1 mm long
Calyx lobes	1–1.5 mm long, 6-lobed	3–4 mm long, 5-lobed
Corolla	6-lobed	5-lobed
Fruits	strigose, 6–7 mm in diam.	subglabrous, ca 5 mm in diam.

Etymology

The new species is named in honor of Associate Professor Dr Akyo Naiki of University of the Ryukyus, Japan, for his contributions to the study of Rubiaceae in Vietnam.

Vernacular name

Xú hương ‘Naiki’.

Type material

VIETNAM • Gia Lai Province, K’Bang District, Son Lang Commune, Kon Chu Rang Nature Reserve, primary evergreen forests; 14°29’10.00” N, 108°32’19.12” E; at 1000–1100 m a.s.l.; 22 Apr. 2021; *Van-Son Dang, Ba Vuong Truong, Minh Quan Dang & Nghia Son Hoang Dang 453*; holotype: VNM!; isotypes: HN!, VNM!.

Description

Shrubs, evergreen, 1–2 m tall; branches and branchlets terete, 1.5–3 mm diam., densely villous, internodes 2–3 cm long. Leaves opposite, blades oblong or elliptic-ovate, 12–14 × 3–5 cm, coriaceous, yellowish brown when dry, adaxially glabrous, abaxially villous especially on the midrib and secondary veins, apex acuminate or cuspidate, aristate 2–4 mm long, villous, base acute or obtuse, margin entire; midrib slightly prominent adaxially, prominent abaxially; secondary veins 5–6 pairs, ascending at an angle of 40–60° from midrib, curved to the margin, flat adaxially, distinct abaxially; tertiary veins reticulate; petioles 5–7 mm long, densely villous. Stipules triangular, 1.5–2 mm long, persistent, villous. Inflorescences cymose, sessile, 1–3-flowered; bracts small, 0.5–1 mm long, villous. Flowers sessile; calyx campanulate, 3–4 mm long, yellowish brown, densely villous outside, calyx tube 2–2.5 mm long, calyx lobes 6, linear-triangular, 1–1.5 mm long, tips acute; corolla cylindrical, 6–8 mm long, white, corolla tube 4–5 mm long, pubescent outside, corolla lobes 6, triangular, 2–3 mm long, puberulous outside, floccose inside; stamens 6, filaments short, anthers oblong, 0.6–1 mm long; ovary with 5 locules, style linear, 4–5 mm long, stigma 0.6–0.8 mm long. Fruit drupaceous, ovoid-globose, 7–9 mm long, 6–7 mm in diam., strigose, crowned by calyx lobes, blue when ripe; pyrenes 5. Seeds ovoid, 2–3 mm long, smooth to subwarty on the abaxial face, brown when dry.

Distribution, habitat and phenology

Lasianthus naikii sp. nov. is only known from its type locality at 1000–1100 m elevation. It grows under the shade of primary evergreen forest on clay, which is dominated by *Garcinia cowa* Roxb. (Clusiaceae Lindl.), *Oroxylum indicum* (L.) Kurz (Bignoniaceae Juss.), *Tabernaemontana peduncularis* Wall. (Apocynaceae Juss.), *Dialium cochinchinense* Pierre (Fabaceae Lindl.), *Elaeocarpus kontumensis* Gagnep. (Elaeocarpaceae Juss.), *Litsea elongata* (Nees) Hook.f. (Lauraceae Juss.), *Lasianthus fordii*

Hance (Rubiaceae Juss.), *Magnolia praecalva* (Dandy) Figlar & Noot. (Magnoliaceae Juss.), *Symplocos cochinchinensis* (Lour.) S.Moore (Symplocaceae Desf.) and *Syzygium chanlos* (Gagnep.) Merr. & L.M.Perry (Myrtaceae Juss.). Flowering and fruiting specimens were collected in April.

Population and threats

The new species is so far only known from Kon Chu Rang Nature Reserve, Gia Lai Province, southern Vietnam. It was collected in a single population containing less than 50 individuals, occupying an area of less than 15 km².

Lasianthus sonlangensis V.S.Dang, Vuong & Quan sp. nov.

urn:lsid:ipni.org:names:77295608-1

Figs 4–5; Table 2

Diagnosis

Lasianthus sonlangensis sp. nov. is morphologically similar to *L. caeruleus* Pitard (Fig. 6) which is endemic to Vietnam in the shape of leaves and inflorescences, but differs from the latter by having secondary veins 5–7 pairs (vs 4–5 pairs), petioles 2–3 mm long (vs 4–5 mm long), bracts present 0.6–1 mm long (vs absent), calyx tube 1.5–2 mm long (vs ca 1 mm long), calyx lobes 0.7–1 mm long (vs ca 0.5 mm long) and corolla lobes 4 (vs 5). For a further comparison see Table 2.

Etymology

The specific epithet is derived from commune ‘Son Lang’ where the new species was discovered.

Vernacular name

Xú hương ‘Son Lang’.

Type material

VIETNAM • Gia Lai Province, K’Bang District, Son Lang Commune, Kon Chu Rang Nature Reserve, primary evergreen forests; 14°29’15.08” N, 108°32’11.10” E; at 900–1100 m a.s.l.; 24 Apr. 2021; *Van-Son Dang, Ba Vuong Truong, Minh Quan Dang & Nghia Son Hoang Dang 465*; holotype: VNM!; isotypes: HN!, VNM!.

Description

Shrubs, evergreen, up to 1 m tall; branches and branchlets slender, 1–1.5 mm diam., glabrous, internodes 1.5–2.5 cm long. Leaves opposite, blades oblong to oblong-lanceolate, 5–7 × 1–1.5 cm, coriaceous, yellowish brown when dry, glabrous on both sides, apex acute to acuminate, aristate 0.7–1 mm long, glabrous, base acute, margin entire; midrib slightly prominent adaxially, prominent abaxially; secondary veins 5–7 pairs, ascending at an angle of 60–75° from midrib, curved to the margin, flat adaxially, slightly prominent abaxially; tertiary veins subparallel to subreticulate; petioles 2–3 mm long, glabrous. Stipules triangular, 0.8–1 mm long, persistent, glabrous except barbate margin. Inflorescences cymose, sessile, 1–9-flowered; bracts small, 0.6–1 mm long, glabrous except barbate margin. Flowers sessile; calyx campanulate, 2–3 mm long, white to whitish purple, calyx tube 1.5–2 mm long, glabrous, calyx lobes 4, linear-triangular, 0.5–1 mm long, glabrous except barbate margin; corolla tube cylindrical, 8–9 mm long, white, corolla tube 6–7 mm long, puberulous outside in upper part, corolla lobes 4, triangular, 1.5–2 mm long, puberulous outside, floccose inside in the throat; stamens 4, filaments short, anthers oblong, 1–1.2 mm long; ovary with 4–5 locules, style linear, 7–8 mm long, stigma lobes 4, 0.4–0.7 mm long. Fruits not seen.

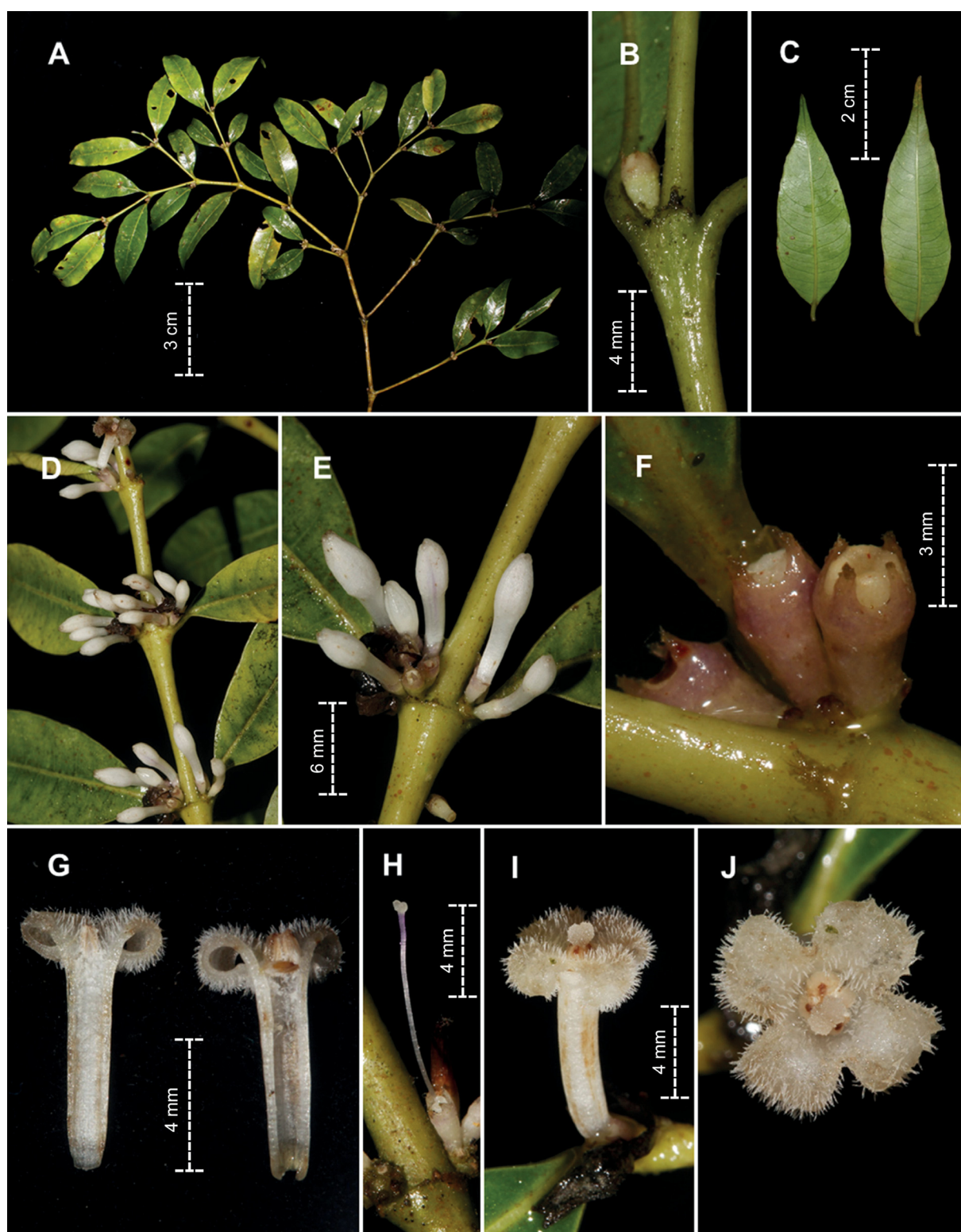


Fig. 4. *Lasianthus sonlangensis* V.S.Dang, Vuong & Quan sp. nov. **A.** Branch. **B.** Stipule and flower bud. **C.** Abaxial leaf surfaces. **D–F.** Close-up of infructescence. **G–J.** Close-up of flowers. Photos by Ba-Vuong Truong on 24 Apr. 2021.

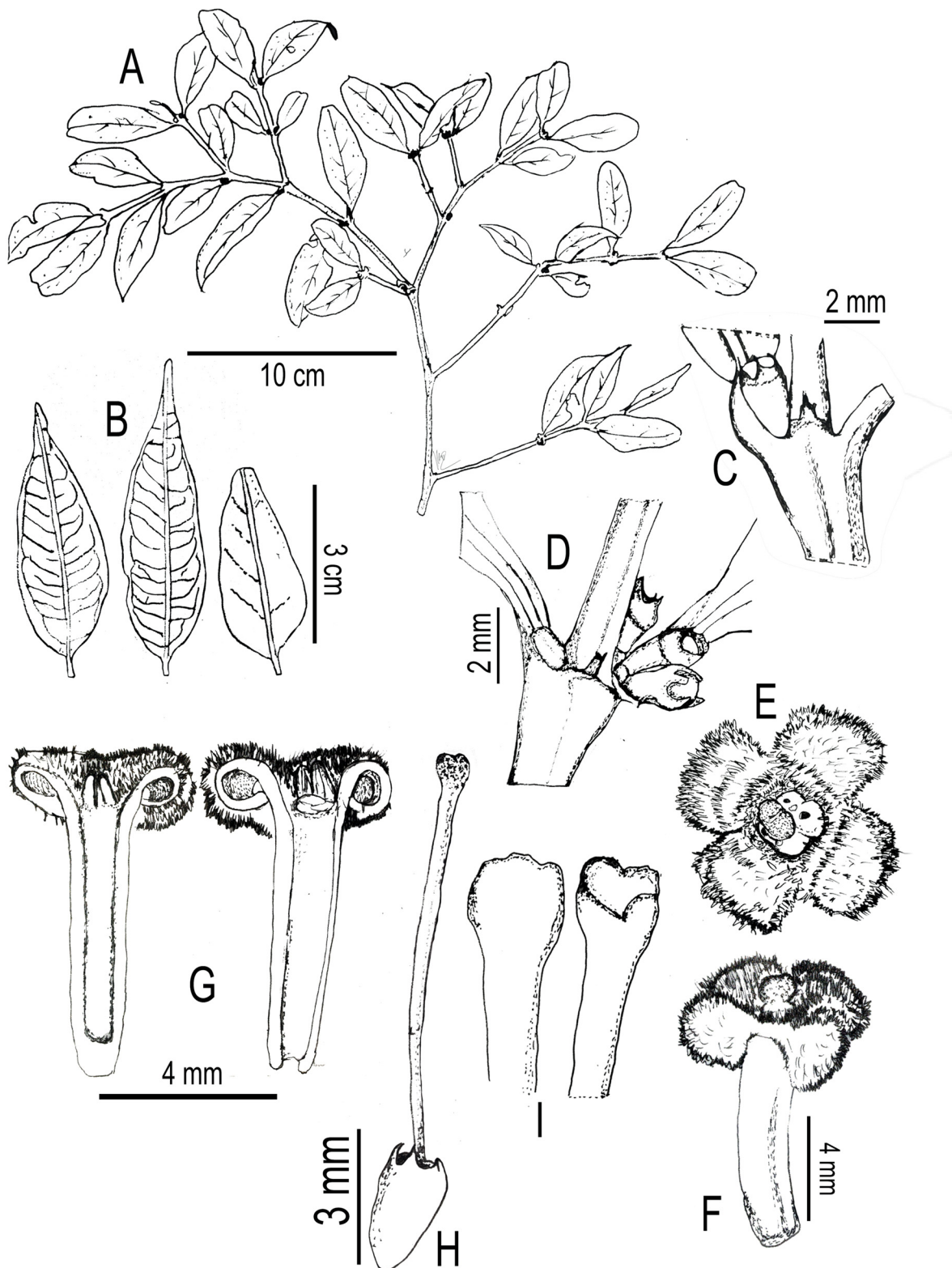


Fig. 5. *Lasianthus sonlangensis* V.S.Dang, Vuong & Quan sp. nov. **A.** Branch. **B.** Abaxial and adaxial leaf surfaces. **C.** Stipule and flower bud. **D.** Inflorescence. **E.** Flower view from above. **F.** Flower in side view. **G.** Flower in vertical section. **H.** Stigma. **I.** Stigma apical portion. Line drawings from the holotype (Dang 465) by Ba-Vuong Truong.

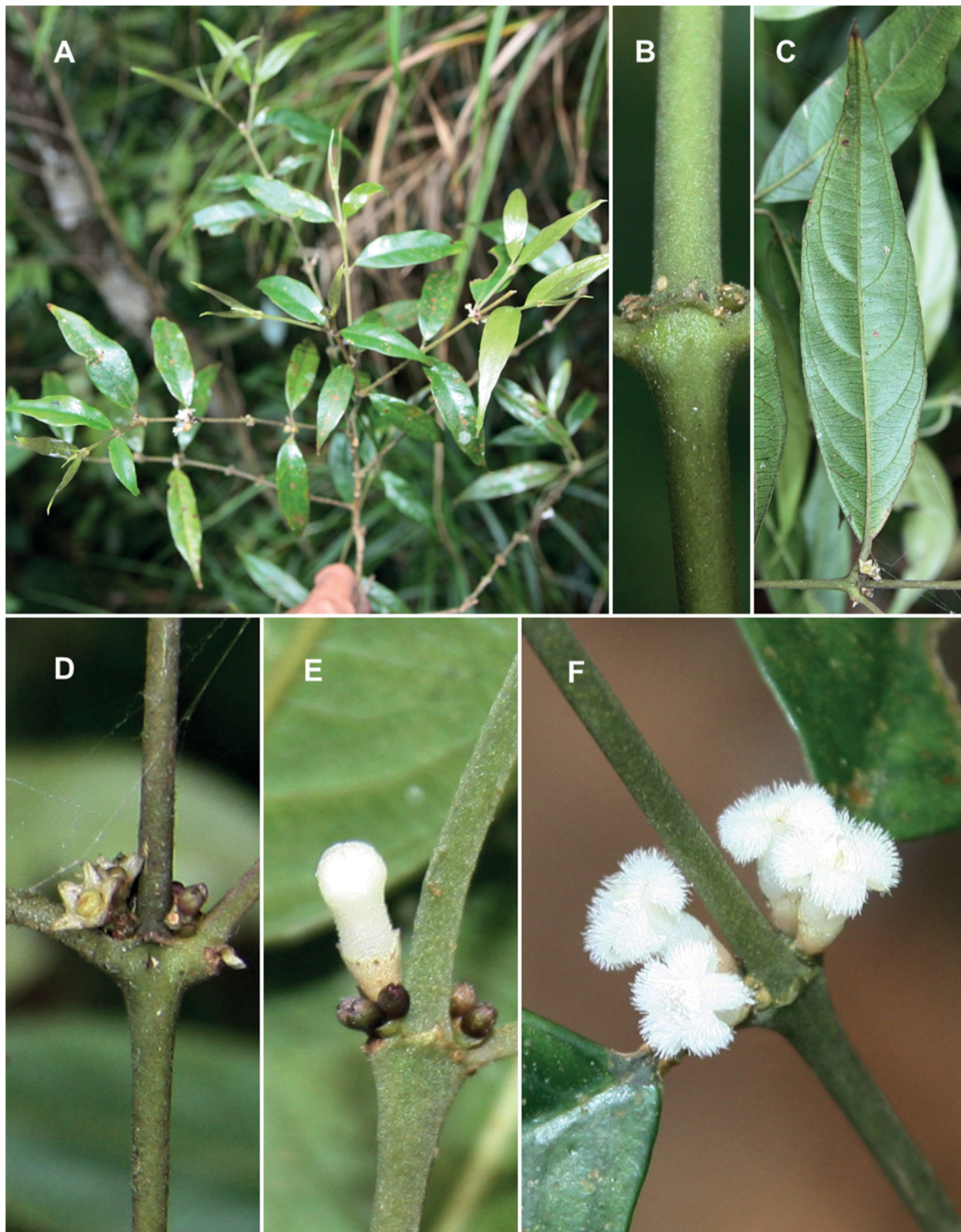


Fig. 6. *Lasianthus caeruleus* Pitard. **A.** Flowering branches. **B.** Stipule. **C.** Abaxial leaf surfaces. **D–E.** Close-up of calyces, flower buds and young fruits. **F.** Close-up of inflorescences and flowers. Photos by Van-Son Dang on 26 Jul. 2019.

Table 2. Comparison of *Lasianthus sonlangensis* V.S.Dang, Vuong & Quan sp. nov. and *L. caeruleus* Pitard. * = from Pitard 1924; ** = from Dang 411, VNM.

Characters	<i>Lasianthus sonlangensis</i> sp. nov.	<i>Lasianthus caeruleus</i>
Leaf blades	5–7 × 1–1.5 cm	4.5–7 × 0.8–1.5 cm *
Secondary veins	5–7 pairs	4–5 pairs *
Petioles	2–3 mm long	4–5 mm long *
Stipules	persistent, 0.8–1 mm long	often deciduous *
Bracts	0.6–1 mm long	absent *
Calyx tube	1.5–2 mm long	ca 1 mm long *
Calyx lobes	0.7–1 mm long, 4-lobed	ca 0.5 mm long, 5-lobed *
Corolla tube	6–7 mm long	4–5 mm long **
Corolla lobes	1.5–2 mm long, 4-lobed	1.5–2 mm long, 5-lobed **

Distribution, habitat and phenology

Lasianthus sonlangensis sp. nov. was discovered in Kon Chu Rang Nature Reserve, Gia Lai Province, southern Vietnam. It occurs in the understory of primary evergreen forest together with *Lasianthus hirsutus* (Roxb.) Merr. (Rubiaceae Juss.), *Ardisia perpendicularis* E.Walker (Primulaceae Batsch ex Borkh.), *Mischocarpus sundaicus* Blume (Sapindaceae Juss.), *Pterospermum mucronatum* Tardieu (Malvaceae Juss.) and *Trivalvaria costata* (Hook.f. & Thomson) I.M.Turner (Annonaceae Juss.), at 900–1100 m elevation. Flowering specimens were collected in April.

Population and threats

Lasianthus sonlangensis sp. nov. is currently known from only one locality with a small population of less than 10 individuals. The forest habitat where we found this species is frequently disturbed by anthropogenic factors, such as spontaneous tourism activities and collection of non-timber forest products (NTFPs).

Discussion

Lasianthus Jack differs from other genera of Rubiaceae by having branches solitary at stem nodes, inflorescences axillary and opposite, inside of corolla tube and inner surface of corolla lobes typically hairy and ovary with 3–9 locules (Zhu *et al.* 2012; Wong *et al.* 2019). This genus is especially close to *Saprosma* Blume, but differs from it by having inflorescences borne on peduncles directly from main stems, these with no more than one reduced basal node (vs inflorescence borne on regular paired axillary short shoots, each short shoot with several stipulate nodes). It is also close to *Paralasianthus* H.Zhu, but differs from it by having a 4–5-locular ovary (vs 2-locular). Two new species are presented as members of *Lasianthus* because they are characterized by these features. *Lasianthus naikii* V.S.Dang & Vuong sp. nov. is closely related to *L. formosensis* Matsumura which distributed in China, Japan, Thailand and northern Vietnam, but differs from it by having fewer secondary veins, bracts present, calyx size and number of corolla lobes; meanwhile, *Lasianthus sonlangensis* V.S.Dang, Vuong & Quan sp. nov. is similar to *L. caeruleus* Pitard which is endemic to Vietnam, but differs from it in having fewer secondary veins, shorter petioles, bracts present, larger calyx and number of corolla lobes.

Recently, eight new species have been discovered from Kon Chu Rang Nature Reserve including *Anadendrum chlorospathum* V.D.Nguyen, Dinh & P.C.Boyce (Araceae Juss.), *Boeica konchurangensis* B.H.Quang, D.V.Hai & Mich.Möller (Gesneriaceae Rich. & Juss.), *Capparis gialaiensis* Sy and C. *kbangensis* Sy & D.V.Hai (Capparaceae Juss.), *Lasianthus konchurangensis* V.S.Dang, T.B.Tran & T.D.Ha (Rubiaceae Juss.), *Premna vietnamensis* Bo Li (Lamiaceae Martinov), *Psydrax gialaiensis* B.H.Quang, T.B.Tran & V.S.Dang (Rubiaceae Juss.) and *Rungia gialaiensis* D.V.Hai, Z.L.Lin & Joogku Lee (Acanthaceae Juss.) (Sy *et al.* 2015, 2020; Do *et al.* 2018, 2021; Bui *et al.* 2019, 2020; Nguyen *et al.*

2019). We expect that further floristic surveys in Kon Chu Rang Nature Reserve should be conducted and more new species will be added to the flora of Vietnam.

Acknowledgments

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