

Two new species and one new addition of *Lasianthus* (Rubiaceae) for the flora of Vietnam

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
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
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Abstract

Two new species of *Lasianthus* (Rubiaceae), *L. trongii* and *L. hoabinhensis*, are described from Vietnam. *Lasianthus trongii* (sect. *Nudiflorae*) is closely related to *L. tamdaoensis* but distinguished by its glabrous branches, shorter petioles, 4 calyx lobes, smaller corolla, and drupes reddish-orange, larger, and with 4 pyrenes. *Lasianthus hoabinhensis* (sect. *Lasianthus*) is similar to *L. attenuatus* but differs in having larger leaf blades, more secondary veins of 9–11 pairs, 6 or 7 calyx lobes, smaller corolla, and drupes with 6 or 7 pyrenes. In addition, *Lasianthus laoticus*, previously known only from southern Laos, is recorded in Vietnam for the first time.

Key words: Gentianales, Hoa Binh Province, Indochina, Lasiantheae, Quang Tri Province, Rubioideae, taxonomy

Introduction

Lasianthus Jack (1823: 125) includes about 292 species in the tropical and sub-tropical regions of the world (POWO 2024), making it a large genus in the family Rubiaceae. Most *Lasianthus* species are distributed in tropical Asia (Zhu *et al.* 2012, Dang & Naiki 2023). In Vietnam, 74 species and four subspecies were so far known (Dang *et al.* 2022, Dang & Naiki 2023).

From 2021 to 2024, we conducted field surveys to assess plant diversity in several protected forests and nature reserves in Vietnam, and some unknown *Lasianthus* specimens were collected. Through careful morphological examination of newly collected material, literature review in Vietnam and surrounding countries (Pitard 1924, Pham 2000, Zhu 2001, 2002, Zhu *et al.* 2011, 2012, Naiki *et al.* 2015, Napiroon *et al.* 2018, 2020, Dang *et al.* 2019, Dang

& Naiki 2019, 2023, Tagane *et al.* 2023), and comparison with potentially similar species at the herbaria HN, HNU, K, KAG, KUN, MO, P, and VNM, and the virtual herbaria on website (such as JSTOR Global Plants, A, and BM), we confirmed that two new species, *Lasianthus trongii* V.S.Dang, T.A.Le & Tagane and *L. hoabinhensis* V.S.Dang, T.S.Hoang & Naiki, are to be described among them. In addition, *L. laoticus* Tagane, Soulad. & Nob.Tanaka (2023: 148) is reported as a new record for Vietnam.

Taxonomy

Lasianthus trongii V.S.Dang, T.A.Le & Tagane, *sp. nov.* Figures 1 & 2.

TYPE:—VIETNAM. Quang Tri Province: Vinh Linh District, Hien Thanh Commune, in secondary forests, 17°03'35.03"N, 107°04'23.02"E, 50 m elevation, 19 November 2022, *Le Tuan Anh & Van-Son Dang LTA001* (holotype VNM [VNM00070334!]; isotypes VNMN!, VNM [VNM00070775!]).

Diagnosis:—*Lasianthus trongii* is closely related to *L. tamdaoensis* V.S.Dang in Dang & Naiki (2019: 51) in the shape of the leaves and inflorescence with long peduncle, but it can be distinguished from latter by its branches glabrous (vs. densely appressed pubescent to strigose), petioles 2–3 mm long (vs. 3–5 mm long), calyx 4-lobed (vs. 5-lobed), corolla tube 4–4.5 mm long (vs. 5–6 mm long), lobes 1–1.2 mm long (vs. 2–4 mm long), fruits reddish-orange (vs. blue), and pyrenes 4 (vs. 5).

Shrubs 1–3 m tall; branches ca. 2 mm in diam., glabrous; internodes 2–4 cm long. Leaves opposite; blades lanceolate-elliptic or lanceolate, 8–12 × 2–3 cm, subcoriaceous, glabrous on both surfaces, apex caudate-acuminate, 1–1.5 mm long, base subrotund, margin entire, midrib flat adaxially, prominent abaxially, secondary veins 6–8 pairs, ascending at the angle of 40–50° from the midrib, curved to the margin, prominent abaxially, tertiary veins parallel, faint adaxially, prominent abaxially; petioles 2–3 mm long, glabrous. Stipules small, narrowly triangular, 0.8–1 mm long, sparsely strigose at the base only. Inflorescences cymose, up to 7-flowered; peduncles 2–3.5 cm long, sparsely strigose. Bracts persistent, linear to lanceolate, 1–2 mm long, pubescent. Flowers subsessile. Calyx campanulate to obconical, glabrous, tube 1.7–2.5 mm long, pale-green *in vivo*, lobes 4, triangular, 0.5–1 mm long, sparsely strigose toward apex, apex acute. Corolla cylindrical, tube 4–4.5 mm long, white, puberulent outside on the upper part, lobes 4, oblong-triangular, 1–1.2 mm long, pubescent outside, villous inside. Stamens 4, inserted at corolla tube; filaments 0.7–0.9 mm long, basally connate to corolla; anthers oblong, 0.3–0.5 mm long. Ovary 4-locular; style 1.5–2 mm long, pubescent; stigma 0.3–0.5 mm long, 3-lobed. Drupes ovoid to subglobose, 1.0–1.2 cm long, ca. 1.0 cm in diam., glabrous, reddish-orange when ripe; pyrenes 4. Seeds ovoid, 6–7 mm long, ridged on the abaxial face, blackish brown when dry.

Distribution, habitat and phenology:—*Lasianthus trongii* is currently only known from Vietnam, occurring in provinces of Quang Binh and Quang Tri. It was found in secondary forests at elevation of 50–100 m. Flowering and fruiting specimens were collected in November and December.

Etymology:—The new species is named in honor of Mr. Nguyen Dinh Trong who has made great contributions to local forest protection of the type locality in Quang Tri Province.

Vernacular name:—Xú hương trọng (Vietnamese).

Preliminary conservation assessment:—*Lasianthus trongii* is currently known from two localities in Quang Binh and Quang Tri Provinces, Central Vietnam. The Extent of Occurrence (EOO) is estimated less than 1,000 km² and the known Area of Occupancy (AOO) is 8 km². Two populations in Quang Tri and one population in Quang Binh were found in the understory of the broad-leaved evergreen forests, and each with 50 individuals were observed. In the population of Quang Tri, threats such as deforestation for charcoal and agricultural purposes have been observed, while the population in Quang Tri is inside the protected area of the national park and well-preserved. According to IUCN criteria B1a,b(iii), B2a,b(iii) and D, the species was assessed as Endangered (EN) (IUCN 2024).

Additional specimens examined (paratypes):—VIETNAM. Quang Binh Province: Phong Nha-Ke Bang National Park, Phong Nhar Botanic Garden, in broad-leaved evergreen forest, 17.55657°N, 106.29983°E, 89 m elevation, 5 December 2024, *S. Tagane, V.S. Dang, P. Souladeth, Q.T. Pham, T. Yamamoto, T. Fujiwara, R. Masuda, K. Souvannakhommane, K. Phengmala N934* (FOF, KAG [KAG189037], VNM).

Notes:—It resembles *L. tamdaoensis* V.S.Dang in Dang & Naiki (2019: 51) which is known from Tam Dao National Park and Ba Vi National Park of northern Vietnam, but differs from that species in the several characters. This new species is also similar to *L. kailarsenii* Poopath, Vajrodaya & Napiroon in Napiroon *et al.* (2018: 208), a Thai species, but distinguished by its leaves 8–12 cm long (vs. 5–7 cm long), petioles 2–3 mm long (vs. 1 mm long), corolla

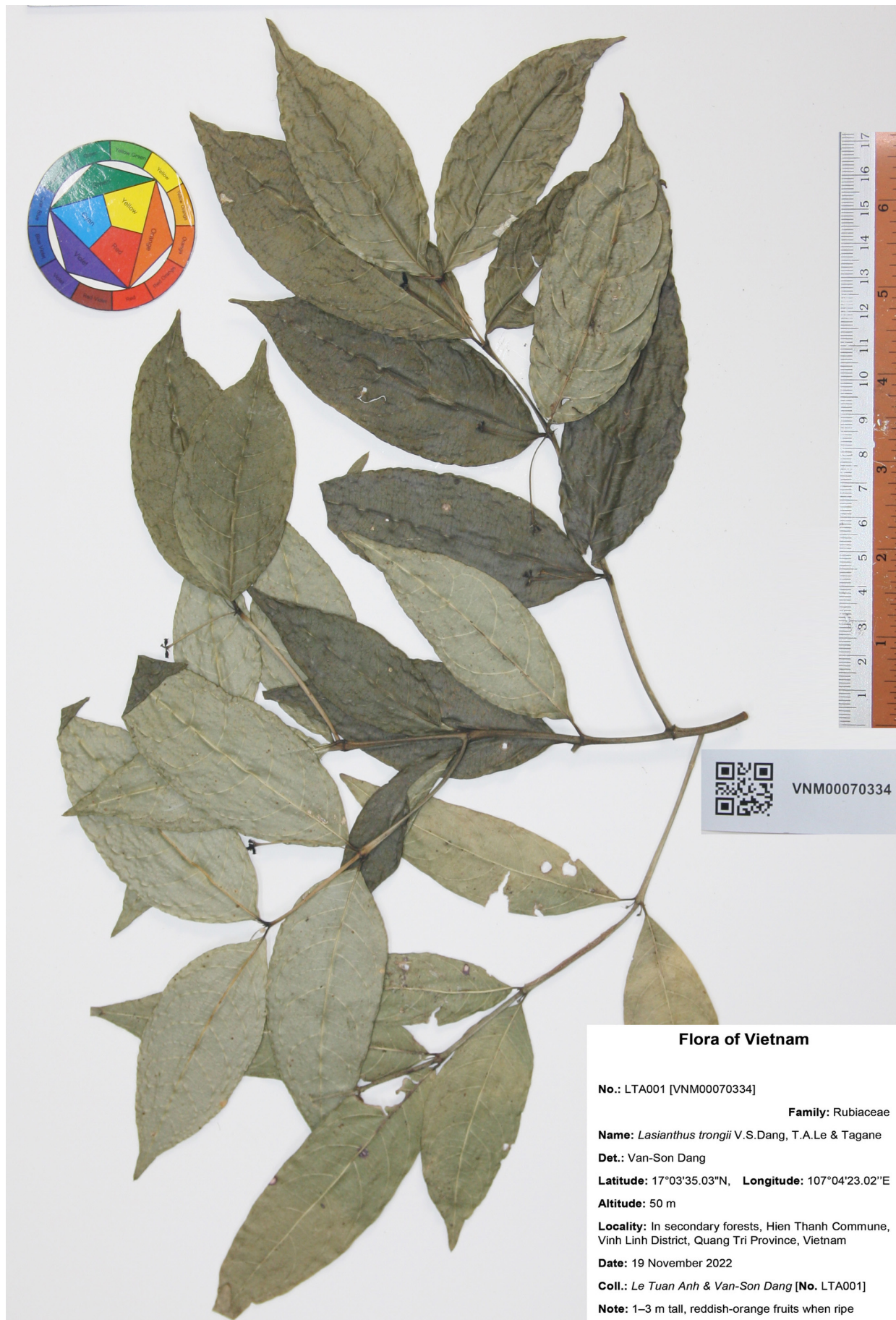


FIGURE 1. Holotype of *Lasianthus trongii* V.S.Dang, T.A.Le & Tagane (LTA001, VNM). Photoed by Van-Son Dang.

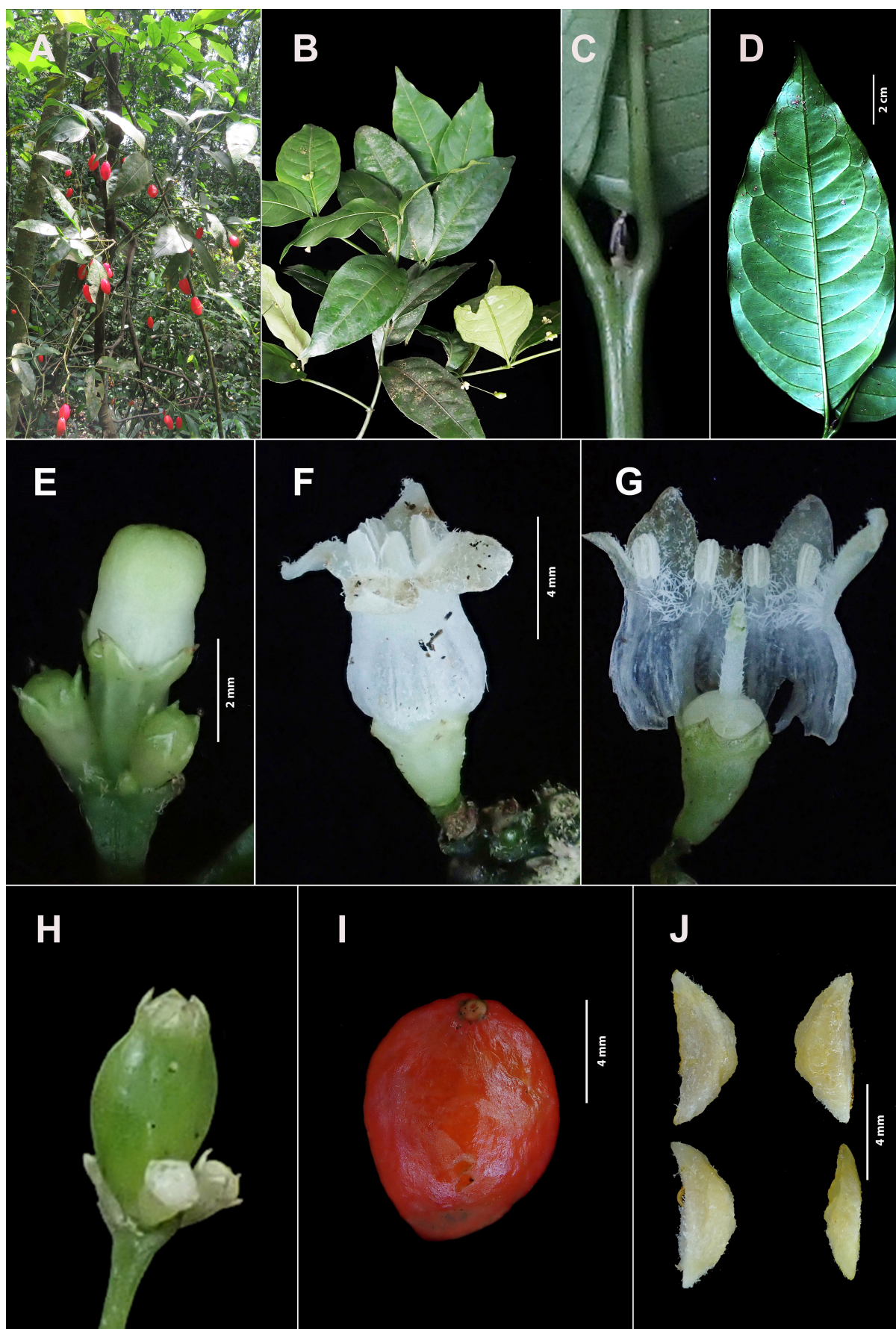


FIGURE 2. *Lasianthus trongii* V.S.Dang, T.A.Le & Tagane, **A.** Habitat and habit, **B.** Flowering branch, **C.** Shoot apex, **D.** Abaxial leaf surface, **E–G.** Flower buds and flowers, **H.** Young fruit, **I.** Mature fruit, **J.** Pyrenes. Photoed by Le Tuan Anh.

tube 4–4.5 mm long (vs. tube 8–10 mm long), and fruits reddish-orange, ca. 10 mm in diam. (vs. blue, 3.5–5 mm in diam.). The comparison among *Lasianthus trongii*, *L. tamdaoensis* and *L. kailarsenii* is shown in Table 1.

TABLE 1. Comparison of *Lasianthus trongii* with its morphologically closest allies (Napiroon *et al.* 2018, Dang & Naiki 2020).

Characters	<i>L. trongii</i>	<i>L. tamdaoensis</i>	<i>L. kailarsenii</i>
Branche hairiness	glabrous	densely appressed pubescent to strigose	glabrous
Leaf size (cm)	8–12 × 2–3	6–9 × 2.5–4	5–7 × 2.5–3
Number of secondary veins on each side	6–8	5–6	6–8
Petiole hairiness	glabrous	appressed-pubescent	sparsely hirsute
Petiole length (mm)	2–3	3–5	1
Stipule length (mm)	0.8–1	1–1.5	3–4
Peduncle length (cm)	2–3.5	1–3.5	2.5–4
Bract length (mm)	1–2	2–3	2–3
Calyx tube length (mm)	1.7–2.5	1–2	2–2.5
Calyx lobe length (mm)	0.5–1	2–3	1–1.5
Number and shape of calyx lobe	4, triangular	5, subulate to lanceolate	4, triangular
Corolla tube length (mm)	4–4.5	5–6	8–10
Corolla lobe length (mm)	1–1.2	2–4	1.5–2
Fruit shape	ovoid or subglobose	ovoid or globose	globose
Fruit size (mm in diam.)	10	6–8	3.5–5
Fruit colour	reddish-orange	blue	blue
Number of pyrenes	4	5	unknown

Lasianthus hoabinhensis V.S.Dang, T.S.Hoang & Naiki, *sp. nov.* Figures 3 & 4.

TYPE:—VIETNAM. Hoa Binh Province: Da Bac District, Phu Canh Nature Reserve, in evergreen broadleaf forests, 20°55'08.00"N, 105°01'40.00"E., 1114 m elevation, 26 October 2021, *T.S. Hoang, H.T. Nguyen, T.L. Ho & V.S. Dang HTS4215* (holotype VNM [VNM00070335!]; isotypes VAFS!, VNM [VNM00070776!]).

Diagnosis:—*Lasianthus hoabinhensis* is closely related to *L. attenuatus* Jack (2012: 13) in having densely tomentose or setose on branches and axillary inflorescences, but it can be distinguished from latter by its leaf blades 15–25 × 5–8 cm (vs. 5–12 × 2.5–5 cm), secondary veins 9–11 pairs (vs. 6–8 pairs), calyx tube 3–4 mm long (vs. ca. 1 mm long) and lobes 7 (vs. 5), corolla lobes 6 or 7 (vs. 5), 3–4 mm long (vs. 4–5 mm long), and pyrenes 6 or 7 (vs. 5).

Shrubs up to 3 m tall; branches ca. 5 mm in diam., densely tomentose or sometimes setose, blackish when dry; internodes 5–10 cm. Leaves opposite; blades oblong, oblong-ovate or elliptic-lanceolate, 15–25 × 5–8 cm, coriaceous, adaxially glabrous, abaxially tomentose, apex acute to cuspidate-acuminate, 10–15 mm long, base more or less oblique, slightly cordate, margin entire, midrib flat adaxially, prominent abaxially, secondary veins 9–11 pairs, ascending at the angle of 45–60° from midrib, curved to the margin, flat adaxially, prominent abaxially, tertiary veins subparallel, prominent abaxially; petioles 1–2 mm long, tomentose. Stipules narrowly triangular, 2–3 mm long, densely tomentose on both surfaces. Inflorescences axillary, cymose, up to 4-flowered, covered by persistent bracts. Bracts numerous, filiform, 8–12 mm long, tomentose, forming a dense head. Flowers sessile, 16–20 mm long. Calyx obconical to campanulate, 4–6 mm long, hirsute, tube 3–4 mm long, pale-purple *in vivo*, lobes 7, linear, 2 mm long, hirsute on both surfaces. Corolla tube cylindrical, 12–14 mm long, tube 9–10 mm long, white, sparsely hirsute outside, lobes 6 or 7, ovate-triangular, 3–4 mm long, sparsely hirsute outside, villous inside. Stamens 6 or 7, inserted at corolla tube, filaments short, anthers oblong, 1.5–2 mm long. Ovary with 6 or 7 locules, style 15–17 mm long, glabrous, stigma 6- or 7-lobed, 0.5–0.8 mm long. Drupes subglobose to ovoid, 8–12 mm long, ca. 7 mm in diam., minutely hirsute, blue when ripe; pyrenes 6 or 7. Seeds ovoid, 2–3.5 mm long, smooth on the abaxial face, brown when dry.

Distribution, habitat and phenology:—The new species is only known from Phu Canh Nature Reserve, Da Bac District, Hoa Binh Province, Northern Vietnam. This species grows under the shade of the evergreen broadleaf forests, at an elevation of 1000–1200 m. Flowering and fruiting specimens were collected in October.



FIGURE 3. Holotype of *Lasianthus hoabinhensis* V.S.Dang, T.S.Hoang & Naiki (HTS4215, VNM). Photoed by Van-Son Dang.

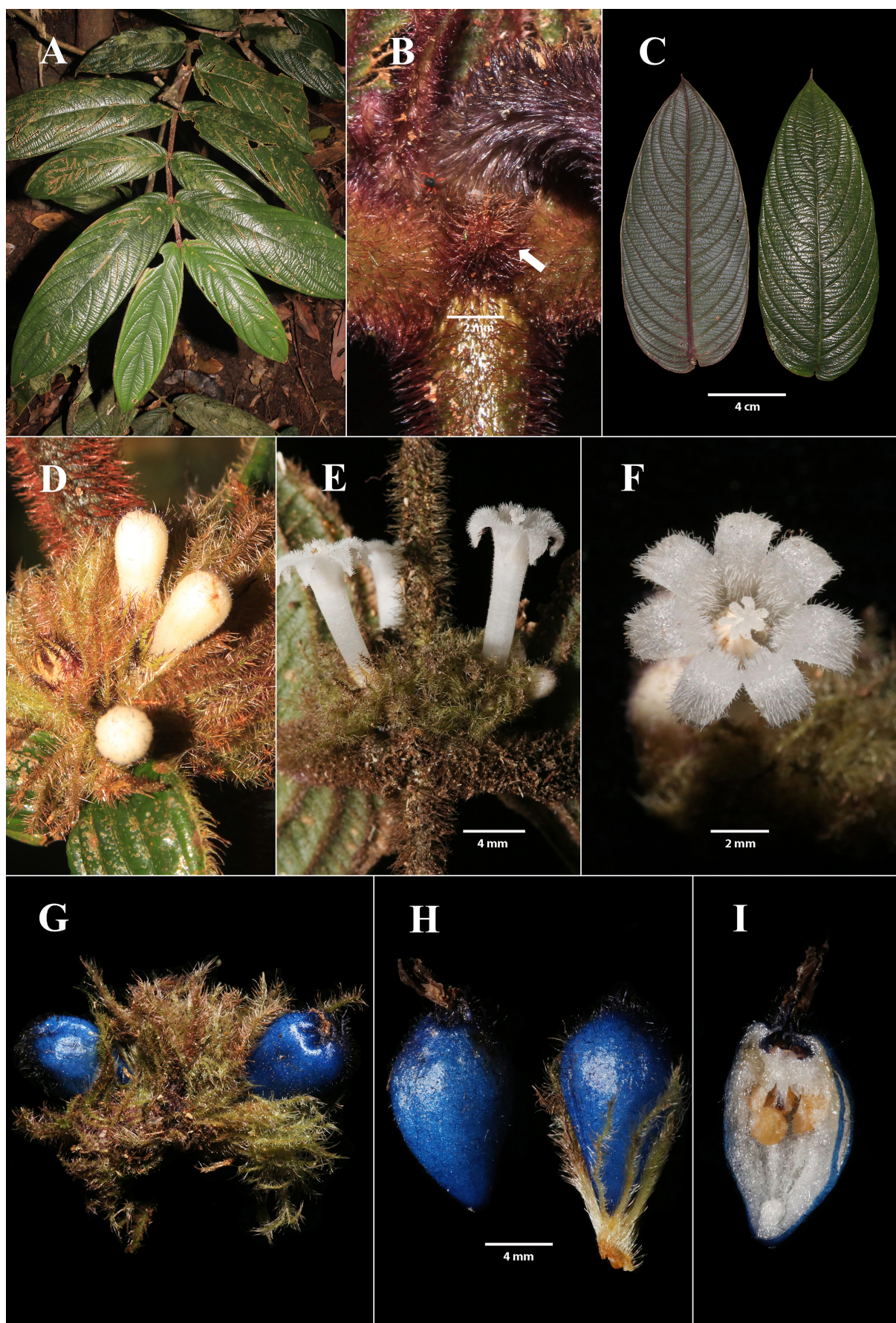


FIGURE 4. *Lasianthus hoabinhensis* V.S.Dang, T.S.Hoang & Naiki, **A.** Leafy branch, **B.** Stipule, **C.** Abaxial and adaxially leaf surfaces, **D–F.** Inflorescences and flowers, **G–H.** Mature fruits, **I.** Longitudinal section of fruit showing pyrenes. Photoed by Hoang Thanh Son.

Etymology:—The new species is named after its type locality, Hoa Binh Province.

Vernacular name:—Xú hương hòa bình (Vietnamese).

Preliminary conservation assessment:—*Lasianthus hoabinhensis* is known only from a single population with about 100 individuals in Phu Canh Nature Reserve of Hoa Binh Province. A comprehensive survey of remaining forest near the type locality and neighboring provinces is needed to accurately investigate the distribution range and number of populations of the species. Due to lack of current data and according to IUCN criteria (IUCN 2024), the species is assessed as “Data Deficient” (DD).

Notes:—The new species resembles *L. attenuatus* Jack (2012: 13) which is widespread in tropical and subtropical regions in Asia, but differs from that species in the several characters. *Lasianthus hoabinhensis* is also similar to *L. pilosus* Wight (2012: 75), which is distributed in Malaysia and Thailand, but distinguished by its shorter petioles (1–2 mm long vs. 3–5 mm long), larger bracts (8–12 mm long vs. 4–5 mm long), smaller calyx (tube 3–4 mm long, lobes ca. 2 mm long vs. tube ca. 8 mm long, lobes ca. 5 mm long), and smaller corolla tube (9–10 mm long vs. ca. 15 mm long), and reddish-orange fruits (vs. blue). The comparison among *L. hoabinhensis*, *L. attenuatus* and *L. pilosus* is shown in Table 2.

TABLE 2. Comparison of *Lasianthus hoabinhensis* with its morphologically closest allies (Pitard 1924, Pham 2000, Zhu *et al.* 2012).

Characters	<i>L. hoabinhensis</i>	<i>L. attenuatus</i>	<i>L. pilosus</i>
Plant height (m)	up to 3	1–2	up to 3
Leaf size (cm)	15–25 × 5–8	5–12 × 2.5–5	8–17 × 3.5–6
Number of secondary veins on each side	9–11	6–8	9–15
Petiole length (mm)	1–2	1–2	3–5
Bract length (mm)	8–12	6–15	4–5
Calyx tube length (mm)	3–4	ca. 1	ca. 8
Calyx lobe length (mm)	ca. 2	1–2	ca. 5
Number of calyx lobe	7	5	5–7
Corolla tube length (mm)	9–10	8–10	ca. 15
Corolla lobe length (mm)	3–4	4–5	ca. 3
Number of corolla lobe	6 or 7	5	5–7
Fruit shape	subglobose or ovoid	globose or ovoid	subglobose
Fruit size (mm in diam.)	7	5–10	unknown
Number of pyrenes	6 or 7	5	5–7

Lasianthus laoticus Tagane, Soulad. & Nob.Tanaka (2023: 148). Figures 5 & 6.

TYPE:—LAOS. Attapeu Province: Sanamxai District, roadside, at the edge of evergreen forests, 14°47'18.18"N, 106°25'24.90"E, 183 m elevation, 6 July 2019, *P. Souladeth, S. Tagane, N. Tanaka, K. Souttakone, Y. Suyama, K. Phengmala, N. Ishii* L3024 (holotype FOF!, isotypes KAG [KAG129297], TNS!).

Distribution, habitat and phenology:—Laos (Attapeu and Champasak Provinces) and Vietnam (Binh Chau-Phuoc Buu Nature Reserve, Ba Ria-Vung Tau Province). It grows in lowland evergreen forests, 20–190 m elev. Flowering and fruiting specimens were collected in July to August.

Vernacular name:—Xú hương lão (Vietnamese).

Notes:—*Lasianthus laoticus* was described from Laos by Tagane *et al.* (2023) based on two collections, *Souladeth et al.* L3024 and L2222. This species is easily recognizable in the field in having brownish hairy branches, cordate leaf base, secondary veins 8–11 pairs, long peduncles 1.5–3 cm long, flowers white with a faint tinge of yellow, and fruits subglobose or ovoid, black when ripe.

Specimen examined:—VIETNAM. Ba Ria-Vung Tau Province: Binh Chau-Phuoc Buu Nature Reserve, in evergreen forests, 10°35'12.04"N, 107°33'25.00"E, 28 m elev., 16 August 2022, *V.-S. Dang & L.V. Son Dang*-664 (VNM [VNM00070336]).



FIGURE 5. Specimen of *Lasianthus laoticus* Tagane, Soulad. & Nob.Tanaka (Dang 664, VNM). Photoed by Van-Son Dang.

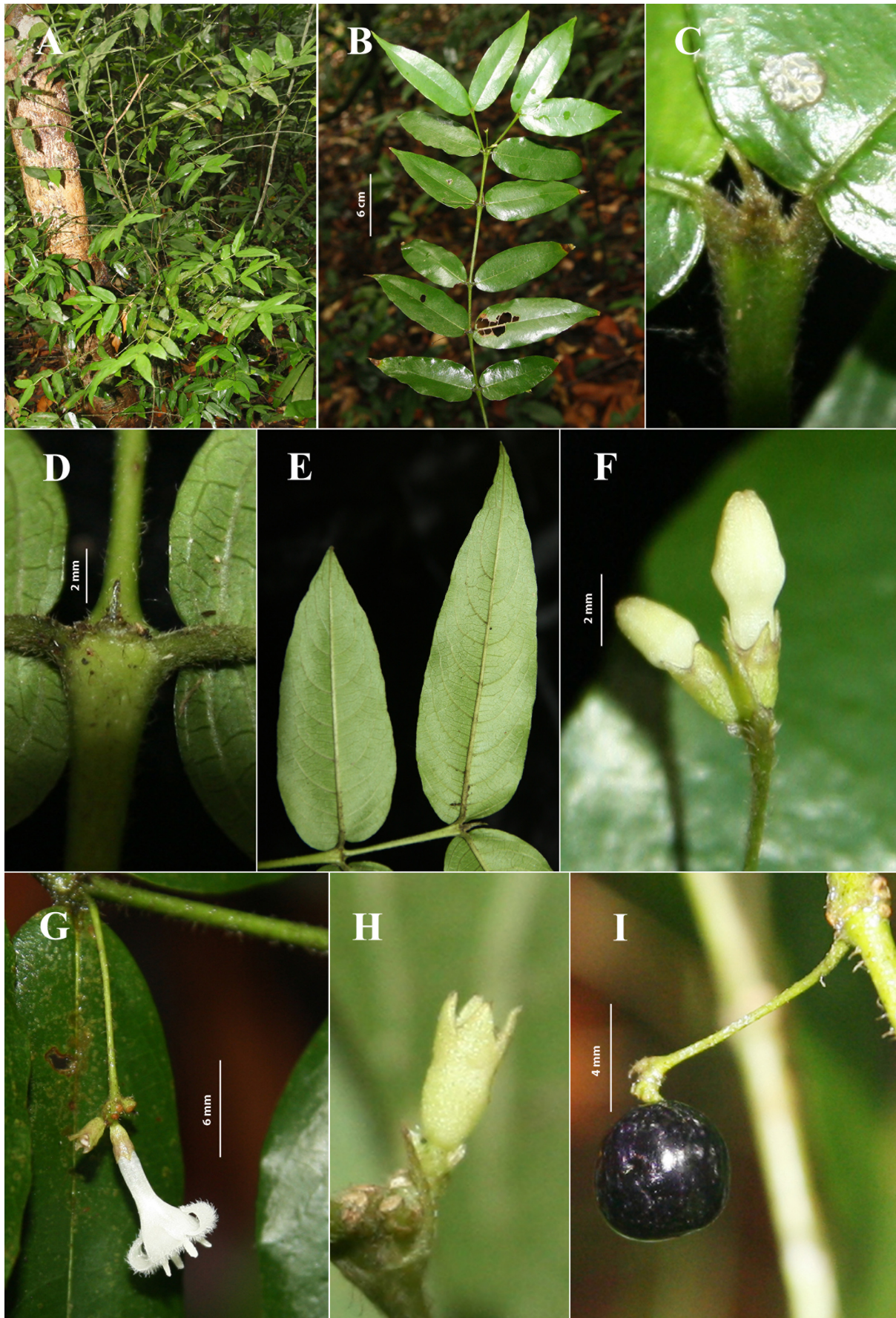


FIGURE 6. *Lasianthus laoticus* Tagane, Soulad. & Nob.Tanaka, **A.** Habit, **B.** Branch, **C.** Shoot apex showing expanding young leaves, **D.** Stipule, **E.** Abaxial leaf surface, **F–G.** Inflorescences and flowers, **H.** Young fruit, **I.** Mature fruit. Photoed by Van-Son Dang.

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