

## Two new records of *Lasianthus* (Rubiaceae) for the Flora of Laos

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**Abstract:** Two species of *Lasianthus* Jack (Rubiaceae), viz. *L. biflorus* (Blume) M.Gangop. & Chakrab. and *L. hispidulus* (Drake) Pit., from Nam Kading National Protected Area in central Laos, are reported as new records for the Flora of Laos. Taxonomic description, habitat, distribution, voucher specimens, and color photographs are provided for each species.

**Keywords:** Bolikhamxai Province, Indochina, Nam Kading National Protected Area, plant diversity, taxonomy

### Introduction

*Lasianthus* Jack is known to be one of the large genera in the family Rubiaceae comprising 291 species, distributed mainly in tropical and subtropical forests (Zhu *et al.*, 2011, 2012; Naiki *et al.*, 2015; Dang & Naiki, 2023; POWO, 2024). The genus is characterized by having axillary inflorescences, apically acute to rounded flower buds, typically villous hairy adaxial surface of corolla tube and lobes, 3–9 locular ovary, and pyrenes with a thick wall (Zhu *et al.*, 2012; Wong *et al.*, 2019; Dang & Naiki, 2023). In Laos, 14 species and 1 subspecies have been recorded up to now, namely *Lasianthus attenuatus* Jack, *L. bolavenensis* Tagane & Soulad., *L. chevalieri*

Pit., *L. chinensis* Benth., *L. chrysonurus* (Korth.) Miq., *L. harmandianus* Pierre ex Pit., *L. hirsutus* (Roxb.) Merr., *L. hookeri* C.B. Clarke ex Hook.f., *L. japonicus* Miq., *L. japonicus* subsp. *longicaudus* (Hook.f.) C.Y. Wu & H. Zhu, *L. laoticus* Tagane, Soulad. & Nob. Tanaka, *L. repoeuensis* Pierre ex Pit., *L. sarmentosus* Craib, *L. sikkimensis* Hook.f., and *L. verticillatus* (Lour.) Merr. (Newman *et al.*, 2017 onwards; Napiroon *et al.*, 2020; Tagane *et al.*, 2021, 2023; Dang & Naiki, 2023).

In 2023 and 2024, we carried out four field surveys to assess the flora of the Nam Kading National Protected Area in Bolikhamxai Province and its vicinities in Khammouane Province, central Laos. During these surveys, we collected several *Lasianthus* specimens from evergreen forests, two of which were later identified as *L. biflorus* (Blume) M.Gangop. & Chakrab. and *L. hispidulus* (Drake) Pit. Since the two species have not been documented in the Flora of Laos, we here report them as new to the country.

### Materials and Methods

The specimens of the newly recorded species were collected from Nam Kading National Protected Area, Bolikhamxai Province, central Laos and its vicinities in Khammouane Province, and deposited in the Herbarium of the Faculty

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of Forest Science, National University of Laos (FOF), Kagoshima University Museum (KAG), and Institute of Tropical Biology (VNM). Morphological characters were examined based on living plants and dried herbarium specimens. Detailed photographs were taken of fresh materials in the field using Olympus E-5 and Canon 1000D digital cameras.

### Taxonomic Treatment

***Lasianthus biflorus*** (Blume) M.Gangop. & Chakrab., J. Econ. Taxon. Bot. 16: 338. 1992; Zhu & Taylor, Fl. China 19: 189. 2011; Zhu *et al.*, Blumea 57: 19. 2012; Naiki *et al.*, Acta Phytotax. Geobot. 66: 156. 2015; Napiroon *et al.*, Phytotaxa 439: 10. 2020; Dang & Naiki, Phytotaxa 581: 27. 2023. *Litosanthes biflora* Blume, Cat. Gew. Buitenzorg (Blume): 22. 1823. *Type*: INDONESIA, Java, Blume *s.n.* (lectotype L! [L.0000722], designated by Zhu, 2002).

*Lasianthus gracilis* King & Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73: 132. 1904. *Type*: MALAYSIA, Perak, Tea Gardens, Ridley 2904 (lectotype SING! [SING0059255], designated by Wong, 1988).

*Lasianthus gainii* M.Gangop. & Chakrab., J. Econ. Taxon. Bot. 16: 338. 1992. *Syntype*: Kusukusu, *s.d.*, Hayata & Sasaki *s.n.* (n.v.).

*Litosanthes gracilis* Hayata, Icon. Pl. Formosan. 2: 113. 1912. *Syntype*: Botanrosha, G.Nakahara *s.n.* (n.v.).

#### Fig. 1

Shrubs, evergreen, up to 2 m high. Twigs terete, densely hirsute; internodes 1–1.5(–4) cm long. *Leaves* opposite; blades elliptic or subovate, 1–2.5 × 0.5–1.5 cm, chartaceous, greenish-brown when dry, adaxially glabrous, abaxially puberulent, apex acute, aristate with arista 1–2 mm long, base cuneate, margin entire, midrib slightly prominent adaxially, prominent abaxially, secondary veins 6–10 pairs, ascending at an angle of 60–80° from midrib, curved to the margin, flat adaxially, tertiary veins subparallel; petioles 1–2 mm long, puberulent. Stipules lanceolate, 1–1.5 mm long,

puberulent. *Inflorescences* solitary or cymose, peduncles 0.5–1.5 cm long, puberulent; bracts small, inconspicuous. *Flowers* pedicellate, pedicels 0.5–1 mm long; calyx campanulate, 1–2 mm long, glabrous, lobes 4; corolla white, 2–4.5 mm long, glabrous outside, triangular-lanceolate, lobes ovate. *Fruits* drupaceous, obovoid, 3.5–5 mm in diam., glabrous, smooth, black when ripe; pyrenes 4.

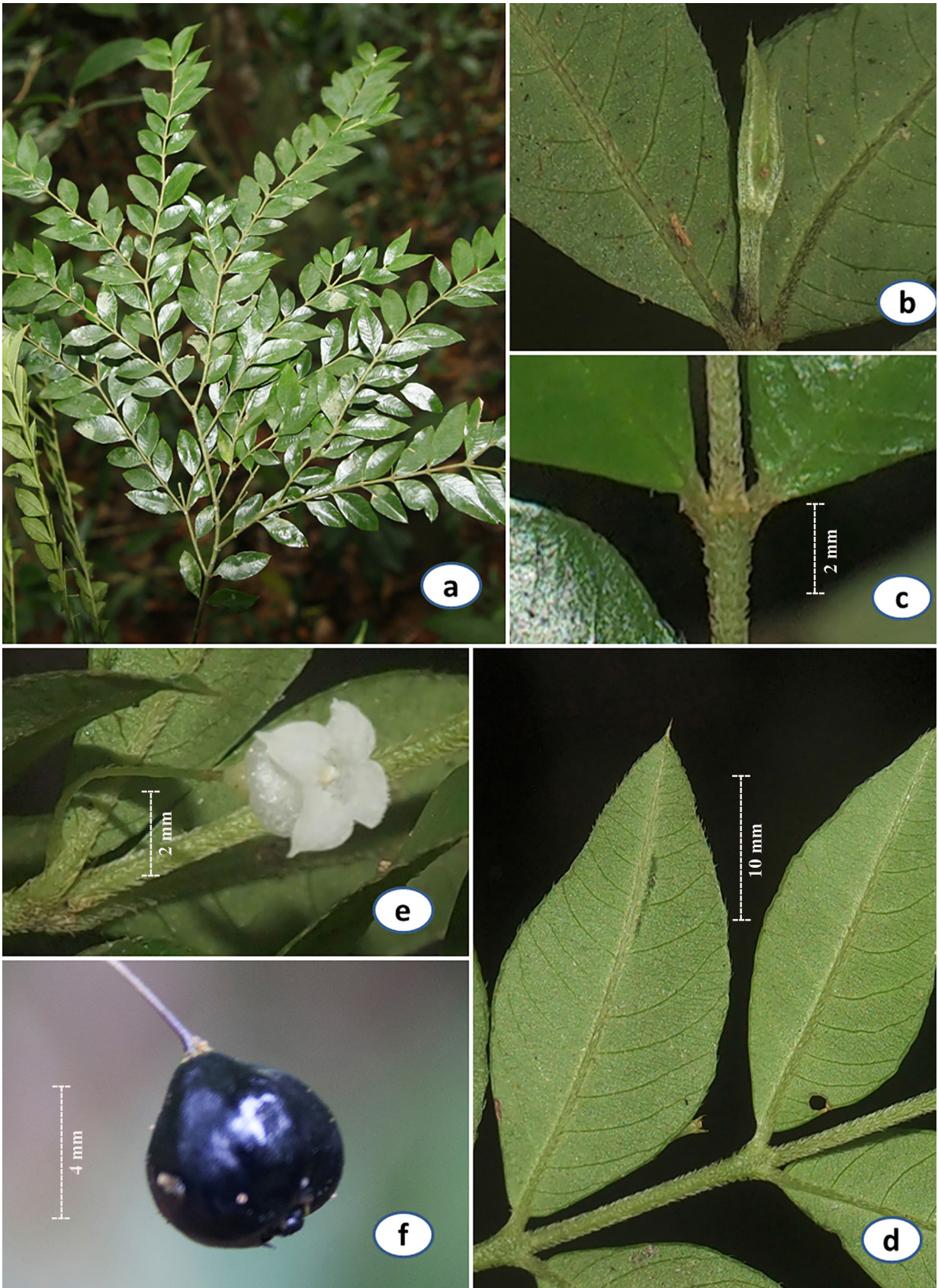
*Flowering & fruiting*: Flowers and fruits were collected in September.

*Habitat*: *Lasianthus biflorus* was collected in the semi-shaded understory of semi-evergreen forests at 510–540 m elev., where the species of Lauraceae, Rubiaceae, Myrtaceae, Fagaceae and Fabaceae are dominant.

*Distribution*: Cambodia, China, Indonesia, Malaysia, Philippines, Thailand, Taiwan and Vietnam. In Laos, this species occurs in the Nam Kading National Protected Area of Bolikhamxai Province in central Laos.

*Specimens examined*: LAOS, Bolikhamxai Province, Viengthong District, Ban Nadi, Nam Kading National Protected Area, at 515 m, N 18° 19' 49.401" E 104° 31' 27.655", 04.09.2023, Tagane *et al.* Z367 FOF [FOF005521], KAG [KAG186811], VMM); same locality, 05.09.2023, Tagane *et al.* Z416 FOF [FOF005571], KAG [KAG186853], VNM [VNM00072084]); Khamkeuth District, near Ban Kaengbid, at 537 m elev., N 18° 13' 9.859" E 104° 30' 21.09", 15.03.2024, Tagane *et al.* Z839 FOF [FOF005966], KAG [KAG187254], VNM [VNM00070633].

*Notes*: *Lasianthus biflorus* is a new record for the Flora of Laos. This species is closely related to *Lasianthus bifloroideus* H.Zhu endemic to Borneo but differs in having twigs densely hirsute (*vs.* thinly puberulous), cymes with 0.5–1.5 cm long peduncles (*vs.* sessile or subsessile), and smooth fruit (*vs.* warty). Among the species of *Lasianthus* in Laos, *L. biflorus* is easily recognized by its small size of lamina, which is up to 2.5 cm long and the smallest among the *Lasianthus* species in Laos, long



**Fig. 1.** *Lasianthus biflorus* (Blume) M.Gangop. & Chakrab.: **a.** Leafy branches; **b.** Close-up of young branch and leaves (abaxial surface); **c.** Stipules; **d.** Abaxial leaf surfaces; **e.** Flower; **f.** Mature fruit (photos a & f Van-Son Dang; b–e Shuichiro Tagane).

peduncles up to 1.5 cm long, and ripening black fruits.

***Lasianthus hispidulus*** (Drake) Pit. In P.H. Lecomte, Fl. Indo-Chine 3: 393. 1924; Pham, Fl. Vietnam 3: 205, f. 8523. 2000; Zhu, Acta Phytotax. Sin. 39: 130. 2001; Zhu & Taylor, Fl. China 19: 192. 2011; Zhu *et al.*, Blumea 57: 48. 2012; Naiki *et al.*, Acta Phytotax. Geobot. 66: 168. 2015; Napiroon *et al.*, Phytotaxa 439: 17. 2020; Dang & Naiki, Phytotaxa 581: 73. 2023. *Mephitidia hispidula* Drake, J. Bot. (Morot) 9: 239. 1895. *Lectotype* (designated by Zhu, 2001): VIETNAM, Thai Nguyen Province, *Eberhardt* 3852 (P).

*Lasianthus brevidens* Craib, Kew Bull. 1933: 19. 1933. *Type*: THAILAND, Ratchburi, Prachuap, Khao Luang, 700 m, *Kerr* 10833 (holo K [K000777026!], isotypes BK [BK257382 image!], BM [BM000945605 image!]).

*Lasianthus bunzanensis* Simizu, Trans. Nat. Hist. Soc. Taiwan 34: 301. 1944. *Type*: CHINA, Taiwan, Taipei, *Suzuki* 16385 (holotype TII!). **Fig. 2.**

Shrubs, evergreen, up to 1.5 m high. Twigs terete, densely villous with yellowish brown hairs; internodes 2–4 cm long. *Leaves* opposite; blades elliptic to ovate-oblong, 6.5–10 × 2.5–5 cm, thinly coriaceous, yellowish brown when dry, adaxially glabrous, abaxially densely villous, yellowish brown, apex cuspidate-acuminate or acuminate, aristate with arista 1.5–2 mm long, base acute or obtuse, margins entire, midrib prominent adaxially, prominent abaxially, secondary veins 4–6 pairs, ascending at an angle of 45–70° from midrib, curved to the margins, slightly prominent adaxially, tertiary veins parallel; petioles 4–7.5 mm long, densely villous with yellowish brown hairs. Stipules subulate, 0.5–1 mm long, hirsute on both surfaces. *Inflorescences* solitary, subsessile; bracts absent. *Flowers* subsessile; calyx campanulate, 1–1.5 mm long, densely villous with yellowish brown hairs, tube c. 1 mm long, lobes 5, c. 0.5 mm long; corolla not seen. *Fruits* drupaceous, globose, 3.5–5 mm in diam., hirsute, blue when ripe; pyrenes 5.

*Flowering & fruiting*: Fruits were collected in September and March, flowers not seen.

*Habitat*: *Lasianthus hispidulus* grows in secondary evergreen forests, at 450–520 m elevation.

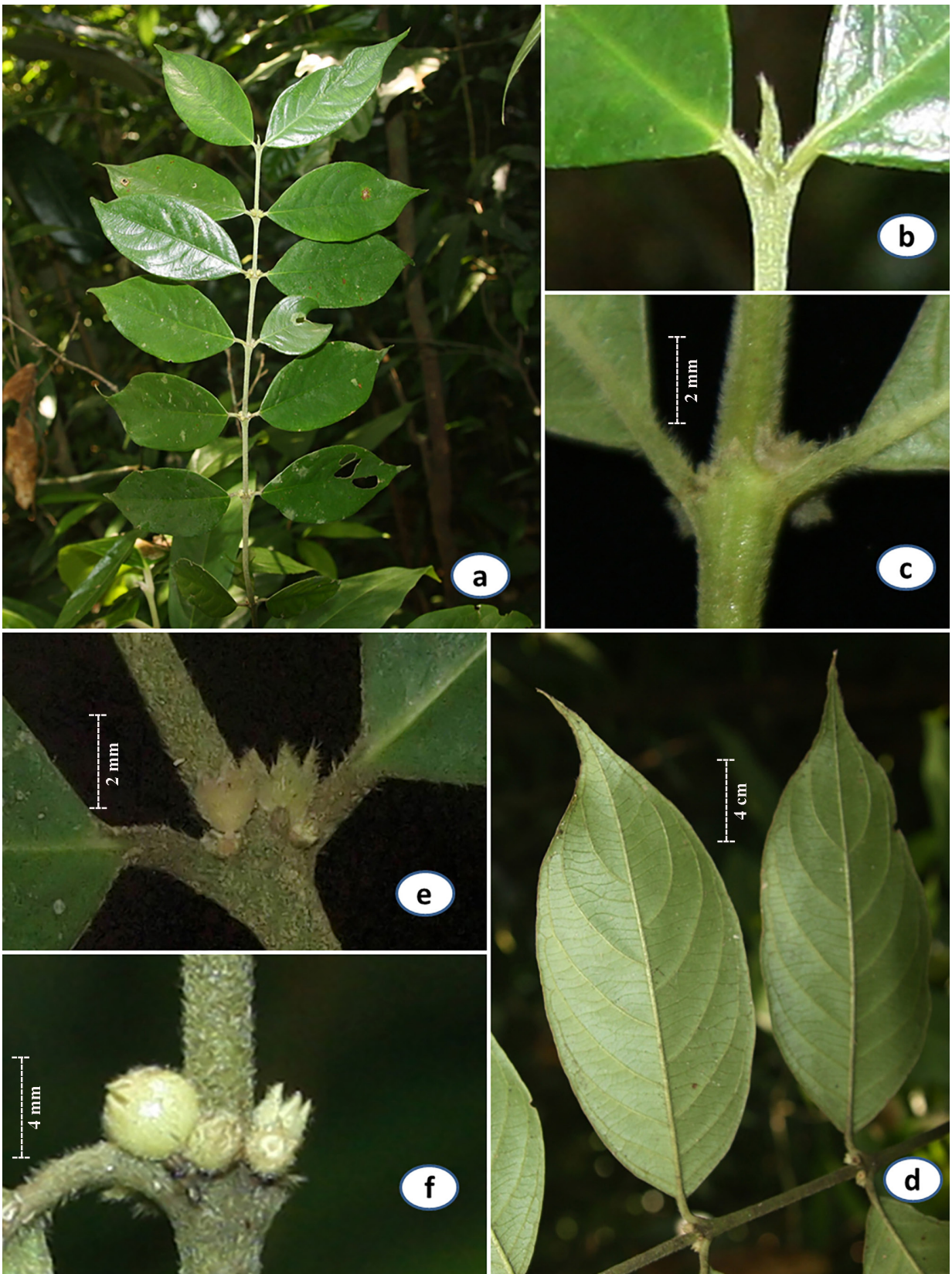
*Distribution*: Cambodia, China, Indonesia, Japan, Malaysia, Myanmar, Papua New Guinea, Thailand, Taiwan and Vietnam. Our finding in Laos fills the gap of the distribution of this species.

*Specimens examined*: LAOS, Bolikhamxai Province, Viengthong District, Ban Nadi, Nam Kading National Protected Area, at 515 m, N 18° 13' 9.859", E 104° 30' 21.09", 05.09.2023, *Tagane et al.* Z417 (FOF, KAG [KAG186854], VNM). Khammouane Province, Khounkham District, Tad Nam Sanam, at 458 m, N 18° 13' 10.6674", E 104° 30' 11.016", 15.03.2024, *Tagane et al.* Z828 (FOF, KAG [KAG187243], VNM [VNM00072869]).

*Notes*: *Lasianthus hispidulus* is newly recorded in the Flora of Laos. This species is closely related to *L. fordii* Hance which is also distributed widely in tropical and subtropical regions in Southeast and East Asia, but distinguished by its branches, petioles, lower leaf surface and calyx densely covered with yellowish brown hairs (*vs.* subglabrous to thinly appressed hairy). It is also similar to *L. curtisii* King & Gamble distributed widely in Southeast to East Asia but differs in having calyx lobes shorter than calyx tubes (*vs.* longer than calyx tubes).

### Key to the species of *Lasianthus* in Laos

1. Flowers in pedunculate cymes ..... 2
1. Flowers in sessile fascicles or solitary ..... 4
2. Corolla 13–14 mm long; peduncles 1–2 mm long; fruits globose, blue ..... *L. japonicus*
2. Corolla up to 12 mm long; peduncles more than 5 mm long; fruits obovoid, black ..... 3
3. Leaves blade elliptic or subovate, 1–2.5 × 0.5–1.5 cm; peduncles 0.5–1.5 cm long; bracts inconspicuous ..... *L. biflorus*



**Fig. 2.** *Lasianthus hispidulus* (Drake) Pit.: **a.** Branch with young fruits; **b.** Close-up of apical part of twig; **c.** Stipules; **d.** Abaxial leaf surfaces; **e.** Inflorescence; **f.** Young fruits (photos a–d Van-Son Dang; e & f Shuichiro Tagane).

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- 3. Leaves blade ovate-oblong, 3.5–13 × 1.4–4.1 cm; peduncles 1.3–3 cm long; bract linear, ca. 2.2 mm long ..... *L. laoticus*
- 4. Bracts more than 3 mm long ..... 5
- 4. Bracts less than 3 mm long ..... 9
- 5. Bracts leaf-like ..... *L. hirsutus*
- 5. Bracts lanceolate, subulate, linear, ovate, filiform ..... 6
- 6. Leaf base cordate or rarely rounded ..... *L. attenuatus*
- 6. Leaf base acute, obtuse or cuneate ..... 7
- 7. Secondary veins 15–17 pairs; stipules more than 15 mm long ..... *L. harmandianus*
- 7. Secondary veins 7–10 pairs; stipules up to 8 mm long ..... 8
- 8. Stipules 3–8 mm long; bracts up to 5 mm long; corolla 5–6 mm long ..... *L. chrysoneurus*
- 8. Stipules 2–3 mm long; bracts up to 20 mm long; corolla 10 mm long ..... *L. sikkimensis*
- 9. Calyx tube shorter than lobes or as long as lobes ..... 10
- 9. Calyx tube longer than lobes ..... 11
- 10. Petioles 10–15 mm long; secondary veins 11 pairs; calyx lobes linear ..... *L. chevalieri*
- 10. Petioles 1–2 mm long; secondary veins 3–5 pairs; calyx lobes triangular ..... *L. sarmentosus*
- 11. Leaf blades with reticulate nervules; secondary veins more than 10 pairs ..... 12
- 11. Leaf blades with parallel or subparallel nervules; secondary veins less than 10 pairs ..... 13
- 12. Stipules 4–5 mm long; calyx truncate ..... *L. repoeuensis*
- 12. Stipules 1.5–3 mm long; calyx not truncate ... ..... *L. chinensis*
- 13. Branches glabrous ..... *L. bolavenensis*
- 13. Branches hairy ..... 14

- 14. Corolla 10–12 mm long; fruits ellipsoid, up to 10 mm in diam. .... *L. verticillatus*
- 14. Corolla 6–7 mm long; fruits globose or subglobose, up to 6 mm in diam. .... 15
- 15. Branches densely appressed pubescent; leaf blades 12–24 cm long; fruits glabrous or puberulent ..... *L. hookeri*
- 15. Branches densely villous; leaf blades 7–10 cm long; fruits hirsute ..... *L. hispidulus*

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