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Three new taxa and a new record of *Lasianthus* (Rubiaceae) in Thailand

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Lasianthus kailarsenii Poopath, Vajrodaya & Napiroon, *L. tennissarimensis* Napiroon, Balslev & Chayamarit and *L. krabiensis* Napiroon, Balslev & Chamchumroon are described as new species and illustrated. *Lasianthus kailarsenii* is morphologically close to *L. lancilobus*, but differs from it by its glabrous (not hirsute) branches and leaves, campanulate and glabrous (not obconical and hirsute) calyx, exserted (not included within the corolla tube) stigma, and 8 (not 4) pyrenes. *Lasianthus tennissarimensis* resembles *L. robinsonii* but differs from it by having lanceolate leaves that are 7.5–10 cm long (not oblong or oblong-elliptic, 12–16 cm long), its 5–6 (not 8–9) pairs of secondary veins, the calyx limbs that are narrowly lanceolate and 7–8 mm long (not linear and 2.5–4 mm long). *Lasianthus krabiensis* also resembles *L. lancilobus* but differs from it by having the abaxial leaf surface sparsely hirsute (glabrous), peduncle 1.5 mm (not 2.5–3 mm) long, and bracts shorter than calyx tube, 5–6 mm long (not longer than calyx tube, 1.5 cm long). *Lasianthus oblongus* which was previously known only from Peninsular Malaysia, has now been recorded in Yala (southern Thailand). A key that compares them to the related Thai *Lasianthus* species is also provided.

The genus *Lasianthus* (Rubiaceae) includes about 180 species of which 160 occur in primary forests in tropical Asia (Robbrecht 1988, Zhu *et al.* 2012). In Southeast Asia alone, there are more than 130 species which have been treated separately for different parts of the region. Ridley (1923) recorded 59 species for the Peninsular Malaysia region, Pitard (1924) 37 for Indo-China, and van den Bakhuizen (1965) 28

for Java. For Thailand, Zhu (2001) recognized 52 species, one subspecies and 12 varieties, and for the entire Malaysian region Zhu *et al.* (2012) recognized 131 species, five subspecies and six varieties. Currently, and based on the revision of the Malaysian species by Zhu *et al.* (2012), the genus is divided into three sections: (1) *Stipulares* with quite large stipules that partly or completely cover the sessile cymes,

(2) *Lasianthus* with conspicuous, linear-lanceolate, ovate, cordate or leaf-like bracts, and (3) *Nudiflorae* with bracts inconspicuous or absent. The inflorescences of *Lasianthus* are sessile or pedunculate cymes, with bracts and bracteoles present or absent. The diagnostic importance of peduncles and bracts was emphasized already by Hooker (1880), but variability in length of peduncles sometimes reduces their diagnostic importance. Fragile flowers of *Lasianthus* are not useful diagnostically because they are often missing from herbarium specimens and species of *Lasianthus* in Cambodia were therefore identified and described using vegetative characters, such as shape and indumentum of branches, leaf shape, stipules and calyx (Naiki et al. 2015).

Here we describe three new species from the southern and southwestern regions of Thailand. We compare the samples of the three new species with morphologically similar species such as *L. lancilobus*, *L. robinsonii* (and some others). We also present the first record of *L. oblongus* from Thailand which previously was thought to be endemic to Malaysia.

Comparisons were made with type specimens of the relevant taxa at the K and L herbaria, using photographs available on the web and relevant literature (Zhu 1994, 1998, 2001, 2002, Zhu et al. 2012). Terminology follows Zhu et al. (2012). The key to species combines our observations and information from the relevant literature (Zhu 2001, Zhu et al. 2012). Flowers, calyces, and drupes of herbarium specimens were observed under a stereo microscope. Herbarium acronyms follow *Index Herbariorum* (sweetgum.nybg.org/science/ih/).

***Lasianthus kailarsenii* Poopath, Vajrodaya & Napiroon, sp. nova (Figs. 1 and 2).**

TYPE: Thailand. Yala Province: Mae Wat, route to nature trail, permanent ecology plot, Than To District, 06°03'20.4"N, 101°16'33.8"E, 260 m a.s.l., 15 October 2017 M. Poopath 1997 (holotype BKF, isotype PSU). — PARATYPES: Thailand. Yala Province: North of Banglang reservoir, Than To District, 06°04'00"N, 101°23'00"E, 200–250 m a.s.l., 17 June 1992 K. Larsen, S.S. Larsen, S.S. Renner, C. Niyomdham, W. Ueachirakan & P. Sirirugsa 42951 (AAU, BKF); Yala Province. Ban Chulabhon Phatthana 7, Than To District, 250 m a.s.l., 10 February 2004 D.J. Middleton, M. Poopath, R. Pooma & K. Williams 2908 (BKF).

ETYMOLOGY: The specific epithet is given in honour of the late Prof. Dr. Kai Larsen, Institute for Bioscience of Aarhus University, Denmark, who made the first collection of this species in Thailand on 17 June 1992.

Shrub, 1–2 m tall; branches terete, 2 mm in diam., glabrous. Leaves opposite; petioles 1 mm long, sparsely hirsute at base only; blades lanceolate to lanceolate-elliptic, 5–7 × 2.5–3 cm, subcoriaceous, apex caudate-acuminate, long-hirsute along margin, base subrotund, margins recurved, both surfaces glabrous, midrib sunken adaxially, prominent abaxially and glabrous, secondary veins 6–8 pairs, ascending at 45° angle from midrib, curved towards margin, prominent beneath, tertiary veins parallel, adaxially faintly prominent, abaxially prominent. Stipules lanceolate, 3–4 mm long, sparsely hirsute at apex only. Inflorescence cymose; peduncles 2.5–4 cm long, glabrous; bracts two per node, lanceolate, unequal or equal, 2–3 mm long, pubescent. Flowers stalked; pedicels 2 mm long; calyx 4-lobed and campanulate, 3.5 mm long, glabrous, calyx limbs triangular and acute at apex, ca. 1–1.5 mm long; corolla 4-lobed and tubular, tube 8–10 mm long, lobes oblong-lanceolate, 1.5–2 mm long, hirsute inside; stigma 3-lobed, style 1.5–2 mm long, exerted from corolla tube, pubescent. Fruits drupaceous with persistent 4-lobed calyx at apex, globose, green when young, maturing to blue, glabrous, 3.5–5 mm in diam.

DISTRIBUTION AND HABITAT: This new species was found in tropical rainforest in Than To District, Yala Province, at 200–260 m a.s.l. around the Banglang Reservoir. It grew in canopy shade, on sandy loam at 200–260 m a.s.l. in an area where species of Arecaceae (Palmae) and Dipterocarpaceae predominate.

Morphologically *L. kailarsenii* is close to *L. lancilobus* (Table 1).

***Lasianthus tennissarimensis* Napiroon, Balslev & Chayamarit, sp. nova (Fig. 3)**

TYPE: Thailand. Petchaburi Province, Kaeng Krachan National Park, evergreen forest, 12°49'19.7"N, 99°21'57.7"E, 960 m a.s.l., 23 October 2013 S. Tagane et al. T2090 (holotype BKF).

ETYMOLOGY: The name refers to the Tennissarim region (southern Thailand) where its type specimen was collected.

Fig. 1. *Lasianthus kailarsenii* (from the holotype). — **A:** Habit. — **B:** Leaves arrangement and inflorescences. — **C:** Fruit. — **D:** Flower and calyx. — **E:** Drupe. — **F:** Veins.

Shrub, 1.5 m high. Branches terete, 4 mm diam.; branchlets 2 mm diam., tomentose. Leaves lanceolate, 7.5–10 × 3–4 cm, membranous, adaxially glabrous, abaxially tomentose; apex cuspidate-acute; base rounded and slightly

oblique; margins slightly curved; midrib adaxially sunken, abaxially prominent and tomentose; secondary veins 5–6 pairs, ascending at angles of 45°–50° from midrib, curved to margin, abaxially prominent; tertiary veins parallel, adaxially

Fig. 2. *Lasianthus kailarsenii* (from the holotype). — **A:** Habit and leaves. — **B:** Inflorescences and peduncles. — **C:** Flower with calyx. — **D:** Fruit. — **E:** Stipules. — **F:** Inflorescences with two bracts per node. — **G:** Leaf apex (hirsute at margin). Drawn by Miss Wanwisa Bhuchaisri.

faintly prominent, abaxially prominent; petioles 3–5 mm long, tomentose. Stipules narrowly triangular, 2–3 mm long, tomentose. Inflorescence cymose; peduncles 2.5–4 cm long, tomentose; bracts two per node, filiform, unequal or equal, 1–1.2 cm long, tomentose; short bracteoles numerous. Flowers sessile; calyx obconical, 7–8 mm long, tomentose; calyx tube 3–4 mm long; calyx limbs 4-lobed, narrowly lanceolate, $3.5\text{--}4 \times 1$ mm, nerved on lobes inside, outside tomentose; corolla tubular, 3–4 mm long, outside sparsely hirsute. Fruits drupaceous, young fruits ovoid, tomentose, 2×2.5 mm. Flowering and fruiting in October.

DISTRIBUTION AND HABITAT: This species was found in evergreen forest in Phetchaburi Prov-

ince near the Thai–Burmese border at 900–960 m a.s.l. in Kaeng Krachan National park.

Lasianthus tennissarimensis is here described based on specimens at BKF coming from a small population in Kaeng Krachan semi-evergreen rain forest in Tennissarim-South Thailand region (southwestern Thailand) which is connected with Burma in the Indo-Malayan ecoregion. *Lasianthus tennissarimensis* is morphologically close to *L. lancilobus* (Table 1).

***Lasianthus oblongus* King & Gamble**
(Figs. 4 and 5)

J. Asiat. Soc. Bengal 73: 127. 1904. — TYPE: Malaysia.

Table 1. Comparisons of Morphological characters of selected species of *Lasianthus* in Thailand.

	<i>L. kallarsenii</i> ¹	<i>L. lancilobus</i> ^{2,3}	<i>L. temissarinensis</i> ^{3,4}	<i>L. krabiensis</i> ⁵	<i>L. robinsonii</i> ^{3,6}	<i>L. oblongus</i> ^{3,7}	<i>L. pedicellatus</i> ^{3,8}
Branches	glabrous	sparsely hirsute	tomentose	sparsely hirsute	tomentose	glabrescent	glabrous
Leaf shape	lanceolate to lanceolate-elliptic	oblong	lanceolate	oblong to oblong-lanceolate	oblong-elliptic	narrowly oblong-lanceolate	lanceolate
Leaf size (cm)	5–7 × 2.5–3	6–13 × 2.5–3.5	7.5–10 × 3–4	6–12 × 2–3.5	10–12 × 3.5–4.3	9–12 × 2–3	19–23 × 5–8
Leaf base	subrounded	acute	rounded and slightly oblique	obtuse	rotund to cuneate	acute	acute
Leaf apex	caudate-acuminate	acuminate	cuspidate-acute	slightly oblique	acuminate to shortly caudate	caudate-acuminate	acuminate to caudate
Indumentum on leaf	glabrous	abaxial surface sparsely hirsute	abaxial surface tomentose	both surfaces sparsely hirsute	glabrous	abaxial surface puberulous	glabrous
Secondary veins	6–8 pairs	5–6 pairs	5–6 pairs	5–6 pairs	8–9 pairs	6–7 pairs	5 pairs
Stipule shape	lanceolate, 3–4	lanceolate	narrowly triangular	lanceolate	triangular	triangular	triangular
Stipule length (mm)	2 bracts per node	2–2.5	2–3	2–2.5	2	3–4	1
Bracts	2 bracts per node	2 bracts per node	2 bracts per node	2 bracts per node	2 bracts per node	inconspicuous or absent	absent
Peduncle length (mm)	2.5–4	25–30	25–40	10–15	5–10	sessile	sessile
Calyx	campanulate	no report shape	obconical	obconical	tubular	cupular	obconical
Calyx length (mm)	3.5	5	7–8	5	4	1.5–2	1
Corolla lobes	4	not seen	4	4	4	5	no report
Indumentum on drupe	glabrous	verrucose	tomentose	verrucose	tomentose	verrucose	glabrous

¹⁾ K. Larsen et al. 42951 (holotype BKF), ²⁾ Church et al. 2639 (online photograph seen holotype L, isotype K), ³⁾ Zhu et al. (2012), ⁴⁾ S. Tagane et al. T2090 (holotype BKF), ⁵⁾ K. Williams et al. 1882 (holotype BKF), ⁶⁾ Ridley 13631 (isotype K), ⁷⁾ King's collector 4128 (isolectotype K) and Voradol Chamchumroon & Manop Poopath V.C.2193 (BKF, PSU), ⁸⁾ De Vogel 5344 (online photograph seen holotype L, isotype L).

Fig. 3. *Lasianthus tennissarimensis* (from the holotype). — **A:** Habit. — **B:** Inflorescence. — **C:** Calyx. Illustrated by Miss Wanwisa Bhuchaisri.

Perak, *King's collector* 4128 (isoelectotype K!), selected by K.M. Wong 1989), Malaysia: Perak, *King's collector* 4962 (syntype K!).

Shrub, 1–2 m tall; branches terete, 2 mm in diam., glabrescent. Leaves opposite, petioles 5–6 mm long, sparsely pubescent; blades narrowly oblong-lanceolate, 9–12 × 2–3 cm, coriaceous, apex caudate-acuminate, base acute; margins slightly curved; both surfaces gla-

brous; midrib sunken adaxially, prominent and puberulous abaxially; secondary veins 6–7 pairs, ascending at angles of 45°–50° from midrib, curved to margin, prominent beneath; tertiary veins parallel, adaxially faintly prominent, abaxially prominent. *Stipules* triangular, 3–4 mm long, persistent, pubescent. *Inflorescence* cymose, sessile or subsessile; bracts inconspicuous or absent. *Flowers* stalked; pedicels 3 mm long; calyx cupular, 1.5–2 mm long, puberulous, calyx

Fig. 4. *Lasianthus oblongus*. — A: Inflorescence. — B: Flower. — C: Leaf and veins.

limb cupular, truncate or nearly entire, puberulous outside; corolla lobes 5–8, oblong, 3–5 mm long, densely long-floccose inside at base, pubescent inside at margin; stigma 3-lobed; style 3 mm long, reaching above corolla tube, sparsely hirsute. *Fruits* drupaceous, globose, purple when ripe (fruit information from note on herbarium sheets, not seen on sheets). Flowering and fruiting June–October.

DISTRIBUTION AND HABITAT: Endemic to Peninsular Malaysia (Perak and Selangor) and Thailand near the Thai–Malaysia border. In Thailand,

L. oblongus was collected in lowland tropical rain forests at 100–150 m a.s.l.

Lasianthus oblongus is known only from small populations scattered in western and north-western Malaysia, and some parts of northern Perak State connected with natural areas in Yala Province, Thailand, where we now found this species. The collections from Peninsular Malaysia cited by Zhu *et al.* (2012) are quite similar, especially in their narrowly oblong-lanceolate leaves that are 9–14 cm long and 2–3 cm wide, with 6–7 pairs of secondary veins, parallel ter-

Fig. 5. *Lasianthus oblongus* (from Voradol Chamchumroon & Manop Poopath V.C.2193, BKF). — **A:** Leaf arrangement. — **B:** Calyx (young fruiting stage). — **C:** Calyx (young flowering stage). Drawn by Miss Wanwisa Bhuchaisri.

tiary veins, stipules triangular and 2–3 mm long, 2–3 mm long pedicels, cupular calyx, 5–7 lobed corolla that is floccose inside, and globose and puberulous drupes. Superficially *L. oblongus* is close to *L. pedicellatus* (Table 1).

SPECIMENS EXAMINED. **Thailand.** Peninsular. Yala Province, Betong District, Ban Chulabhorn Pattana 10, 11 June 2005, Voradol Chamchumroon & Manop Poopath V.C. 2193 (BKF, PSU); Yala Province, Ban Nang Sata District, 75°97'80"N, 68°14'37"E, 660 m a.s.l., the route to Mt. Lee Pae, 17 October 2017, Poopath M. 2012 (BKF).

Lasianthus krabiensis Napiroon, Balslev & Chamchumroon, *sp. nova* (Fig. 6)

TYPE: Thailand. Krabi, Khao Phanom Bencha, 08°16'48"N,

98°56'20"E, 900 m a.s.l., 18 June 2006 K. Williams et al. 1822 (holotype BKF!, isotype AAH!).

ETYMOLOGY: The name refers to Krabi Province (southern Thailand) where the species was collected.

Shrub, 1 m high. Branches terete, 4 mm diam., branchlets 2 mm diam., sparsely hirsute. Leaf petioles 5 mm long, hirsute; blade oblong to oblong-lanceolate, 6–12 × 2–3.5 cm, chartaceous, both surfaces sparsely hirsute; apex acuminate to shortly caudate; base obtuse to acute, slightly oblique; margins slightly curved; midrib adaxially sunken, abaxially prominent and puberulous; secondary veins 5–6 pairs, ascending at angles of 45° from midrib, curved to margin, prominent beneath; tertiary veins parallel, adaxially faintly prominent, abaxi-

Fig. 6. *Lasianthus krabiensis* (from the holotype). — **A:** Leaf arrangement. — **B:** Calyx (flowering stage). — **C:** Fruit. — **D:** Inflorescence. — **E:** Flowers. Drawn by Miss Wan-wisa Bhuchaisri.

ally prominent. Stipules lanceolate, 2–2.5 mm long, hirsute. Inflorescences cymose; peduncles 1–1.5 cm long, hirsute; bracts two per node, linear with midrib, unequal, longer ones linear 5–7 mm long, sparsely hirsute; shorter ones linear, 3–5 mm long, sparsely hirsute. Flowers stalked; pedicels 1 mm long, hirsute; calyx obconical, 5 mm long, hirsute, tube 0.5–1 mm long, limbs 5-lobed, narrowly lanceolate, $3.5\text{--}4 \times 1$ mm, hirsute outside; corolla funnel-shaped, 1–1.5 cm long, 4-lobed, broadly triangular, apex obtuse, 2–3 mm long, hirsute inside,

sparsely hirsute outside. Fruits drupaceous, ovoid, verrucose, $0.5\text{--}0.7 \times 0.5$ mm, five narrowly lanceolate calyx lobes on crown, 4 pyrenes. Flowering and fruiting June–July.

DISTRIBUTION AND HABITAT: On Khao Phanom Bencha hill, Krabi Province. In Thailand, this species was found in evergreen forest at 900–1000 m elevation.

Lasianthus krabiensis is morphologically close to *L. lancilobus*, but differs from it by having abaxial leaf surface sparsely hirsute (glabrous), the peduncle 1–1.5 cm (not 2.5–3 mm)

long, the pedicels are very short, only 1 mm or less (not 3 mm long) and several characters mentioned in Table 1.

Key to *L. kailarsenii*, *L. tennissarimensis*, *L. oblongus*, *L. krabiensis*, and some other allied species

1. Bracts absent from peduncle 2
1. Bracts present, two unequal bracts per node 3
2. Stipules 1 mm long or less, triangular; calyx obconical with triangular teeth *L. pedicellatus*
2. Stipules 3–4 mm long, triangular; calyx cupular, truncate *L. oblongus*
3. Calyx campanulate and calyx tube glabrous; drupe with 8 pyrenes *L. kailarsenii*
3. Calyx obconical and calyx tube not glabrous; drupe with less than 8 pyrenes 4
4. Calyx hirsute, calyx tube 0.5–1 mm long, usually shorter than corolla tube *L. lancilobus*
4. Calyx tomentose or pilose, calyx tube more than 2 mm long, usually longer than or equal to corolla tube 5
5. Branches and peduncles sparsely hirsute ... *L. krabiensis*
5. Branches and peduncles densely tomentose. 6
6. Leaves usually oblong, 12–16 × 3.5–5 cm; secondary veins 8–9 pairs; stipules 4–5 mm long; flower peduncles 5–6 cm long *L. robinsonii*
6. Leaves lanceolate, 7.5–10 × 3–4 cm; secondary veins 5–6 pairs; stipules 2–3 mm long; flower peduncles 2.5–4 cm long *L. tennissarimensis*

SPECIMENS EXAMINED of additional species in the key. — *Lasianthus pedicellatus*: **Indonesia**. Sulawesi: *E.F. De Vogel* 5344 (online photograph seen, holotype L! barcode 0306722, isotype L! barcode 0306731); *E.F. De Vogel* 5136 (online photograph seen, L! barcode 0306726); **Malaysia**. Sabah: *John H. Beaman* 8928 (online photograph seen, L! barcode 0310501). — *Lasianthus lancilobus*: **Indonesia**. W Kalimantan: *Church et al.* 2639 (online photograph of holotype L!; isotype K!).

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