

Notes on Apocynaceae in Laos: *Chilocarpus denudatus*, *Kopsia vidalii* and *Parsonsia penangiana*

PHETLASY SOULADETH^{1,*}, SHUICHIRO TAGANE²,
KEOODOONE SOUVANNAKHOUMMANE³ & DEUANTA KONGXAISAVATH¹

ABSTRACT

Two species of Apocynaceae, *Chilocarpus denudatus* and *Kopsia vidalii*, are newly recorded for Laos. The genus *Chilocarpus* is also a new generic record for Laos. Notes on *Parsonsia penangiana* are also provided. A description, photographs, ecological information, vernacular names, and an IUCN conservation status based on our collections are provided for each species.

KEYWORDS: Bolaven Plateau, Dong Hua Sao NP, Gentianales, Nam Kading NPA, taxonomy.

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INTRODUCTION

Laos is one of the most under-collected regions in Continental South-East Asia (Newman *et al.*, 2017 onward; Middleton *et al.*, 2019) and many new species and records have been reported from recent botanical inventories (e.g. Souladeth *et al.*, 2017, 2019; Souvannakhoummane *et al.*, 2019; Tagane *et al.*, 2018, 2020).

In this paper, we report three species of Apocynaceae, *Chilocarpus denudatus* Blume, *Kopsia vidalii* D.J.Middleton and *Parsonsia penangiana* King & Gamble for the flora of Laos. The former two species and the genus *Chilocarpus* were not previously known to occur in Laos. *Parsonsia penangiana* was reported to occur in Thailand and Peninsular Malaysia by Middleton (1997). It was not reported for Laos in Middleton (2014) but was later reported for the country from one specimen by Newman *et al.* (2017 onwards). Descriptions based on our Lao collections are provided, along with photographs, ecological notes, vernacular names, and IUCN conservation status.

MATERIALS & METHODS

Voucher specimens were collected during our field surveys in Nam Kading National Protected Area (Nam Kading NPA) in central Laos in 2017, and Dong Hua Sao National Park (Dong Hua Sao NP) on the Bolaven Plateau in southern Laos in 2019. To identify the species and examine the distribution records in Laos, we consulted taxonomic literature (Middleton, 1997; Middleton, 2014; Newman *et al.*, 2017 onwards; Middleton *et al.*, 2019), herbarium specimens at FOF and KAG, as well as digitized specimen images available on the online resources (e.g. JSTOR Global Plants <https://plants.jstor.org>).

The conservation assessments were evaluated using The IUCN Red List Categories and Criteria (IUCN, 2019). The area of occupancy (AOO) and the extent of occurrence (EEO) were analysed using the Geospatial Conservation Assessment Tool (GeoCAT) (Bachman *et al.*, 2011) with the cell size set to 2 × 2 km.

¹ Faculty of Forest Science, National University of Laos, Dongdok Campus, 01170, Xaythany District, Vientiane Capital, Laos.

² The Kagoshima University Museum, Kagoshima University, 1-21-30 Korimoto, Kagoshima 890-0065, Japan.

³ Faculty of Natural Science, National University of Laos, Dongdok Campus, Xaythany District, Vientiane Capital, Laos.

* Corresponding author: p.souladeth@nuol.edu.la

TAXONOMIC TREATMENT

1. *Chilocarpus denudatus* Blume, Bijdr. Fl. Ned. Ind. 16: 1025. 1826. Type: Indonesia, Java, *Blume s.n.* (lectotype L [L0004455], photo seen, designated by Middleton (2006); isolectotypes A [A00106492], photo seen, L [L0004456], photo seen). Fig 1.

Woody climber, to 10 m tall. *Current year twigs* 1–1.5 mm in diam., grey-green, glabrous, old twigs greyish brown; internodes 2–7 cm. *Leaves* opposite; petioles 0.7–1.3 cm long, glabrous; blades coriaceous, oblong-elliptic to oblong-lanceolate, 5–9.5 × 2–4 cm, apex acuminate, base cuneate, margin entire, midrib sunken adaxially, prominent abaxially, secondary veins 25–30 pairs, flat in young leaves or slightly prominent abaxially in mature leaves, intramarginal vein 1, 0.5–1 mm from the margin. *Inflorescence* not seen. *Infructescence* 6.5–13 cm long, axillary; peduncle 0.4–1.7 cm long, glabrous. *Fruits* ellipsoid to narrowly obovate, 4.6–6 cm long, 1.5–1.9 cm in diam., glabrous, dehiscent when mature. *Seeds* ovoid, 6–7 mm long, ca 4 mm wide, ca 3 mm thick, with a translucent aril.

Distribution.— India, Myanmar, Thailand, Laos (Attapeu), Cambodia, Vietnam, Malaysia, Indonesia, Papua New Guinea.

Ecology in Laos.— In dry evergreen forest; alt. ca 500 m. Flowering period unknown. Fruiting in December.

Vernacular name.— ເຄືອຍາງກະສວຍ [Kheua Yang Ka-souay], suggested here. ‘Kheua Yang’ in Lao refers to a climber with latex and ‘Ka-souay’ in Lao refers to the fruit shape being like that of a shuttle used in weaving.

IUCN conservation assessment.— Least Concern (LC) (IUCN Standards and Petitions Committee, 2019). This species has a wide distribution, ranging from southern continental Southeast Asia through Malesia to Papua New Guinea.

Notes.— Though our collection lacks flowers, this species is easily recognized by its oblong-elliptic to oblong-lanceolate leaf blades, strait and narrowly spaced 25–30 pairs of secondary veins (Fig. 1B), dehiscent fruits at maturity, and seeds with a translucent aril (Fig. 1C).

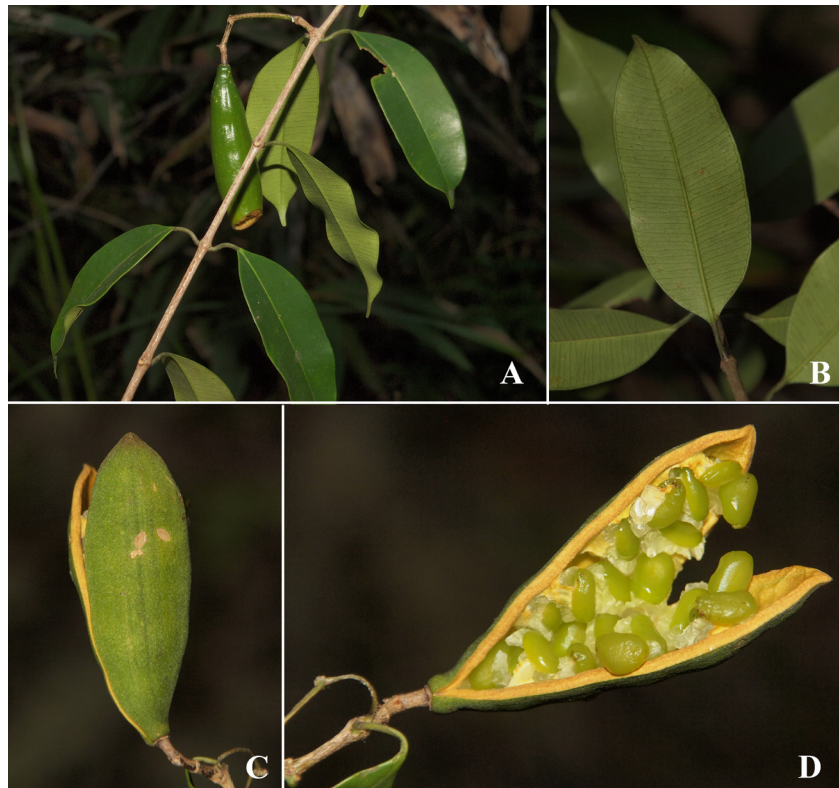


Figure 1. *Chilocarpus denudatus* Blume: A. branch with fruit; B. lower surface of leaf; C. fruit; D. fruit with seeds. Photos from Souladeth et al. L3736 by S. Tagane.

Specimens examined.— LAOS. Attapeu Province: Phouvong District, Vong Somphou Village, 14°33'14.01"N, 106°52'07.69"E, alt. 504 m, 21 Dec. 2019, *Souladeth et al.* L3736 (FOF [FOF0007066], KAG [KAG156096]).

2. *Kopsia vidalii* D.J.Middleton, *Adansonia* 27(2): 288. 2005. Type: Vietnam, Thua Thien-Huê, Mt Bach Ma, 9 Apr. 1944, *Vidal 681A* (holotype P [P00646534], photo seen). Fig. 2.

Trees, evergreen, 6 m tall; latex white. *Current year twigs* pale green, glabrous, old twigs light yellowish brown, sparsely lenticellate. *Leaves* opposite; petioles 3–5 mm long, glabrous; blades oblong-elliptic to elliptic, 6.2–11.5 × 1.4–4.7 cm, 2.7–4.4 times as long as wide, papery, glabrous, apex acuminate with a blunt tip, margin entire, base cuneate,

midrib sunken adaxially, prominent abaxially, secondary veins 13–15 pairs, slightly prominent on both surfaces, intramarginal vein at 0.2–1 mm from the margin, tertiary veins reticulate, slightly prominent, faintly visible abaxially. *Inflorescence* terminal, dichasial, lax, 4.5–7.5 cm long, 3–7-flowered; peduncle 1–3.4 cm long, glabrous; bracts and bracteoles ovate-triangular, 0.8–1.1 mm long. *Flowers* fragrant, 5-merous, pedicel 8–11 mm long. *Sepals* ovate-triangular, 1.2–1.4 × 0.7–0.9 mm, apex obtuse to acute, margin ciliate or not. *Corolla* pale yellow, tube 13–15 mm long, ca 1 mm in diam. at base, gradually wider towards throat, ca 1.5 mm wide at throat, not twisted, outside glabrous, inside upper 1/3 pubescent; lobes linear, 18–19 × 2.5–2.9 mm, 6.5–7.2 times as long as wide, densely hairy near base (throat of corolla) adaxially, apex acute. *Stamens* 5, inserted at 0.8–0.9 of corolla tube length from base,

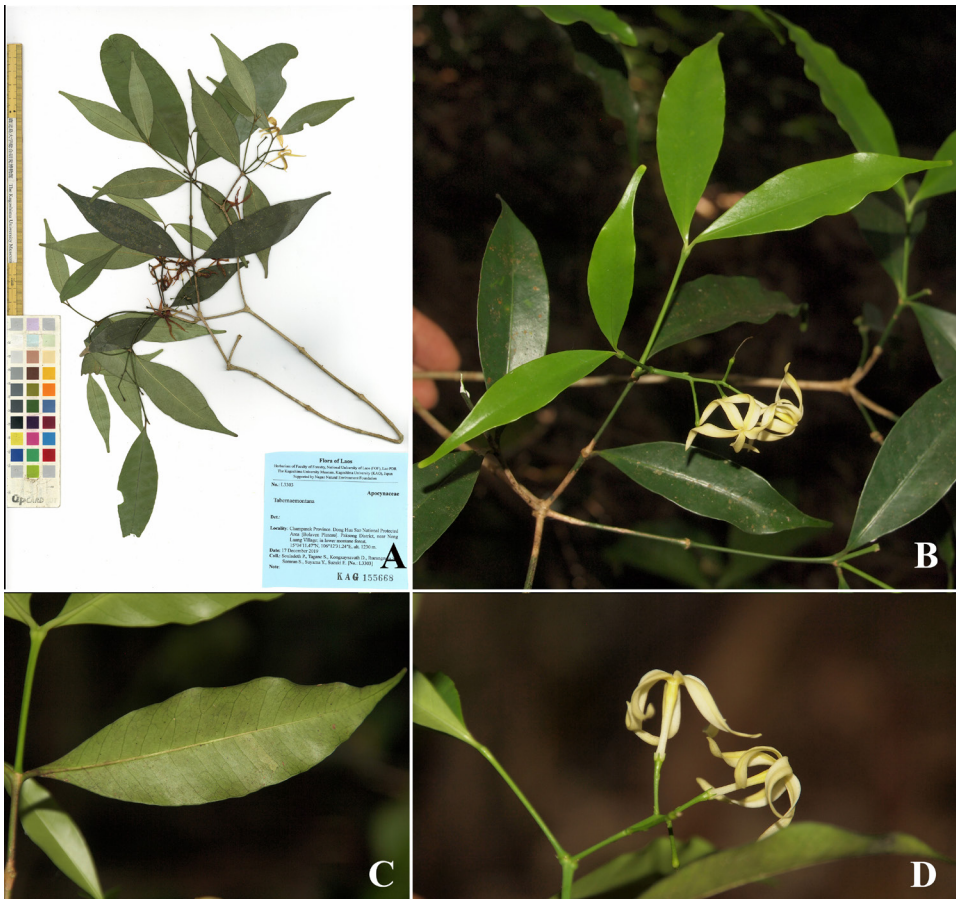


Figure 2. *Kopsia vidalii* D.J.Middleton: A. herbarium sheet of *Souladeth et al.* L3303 (KAG [KAG155668]); B. branch with flowers; C. abaxial side of leaf; D. inflorescence. Photos from *Souladeth et al.* L3303 by S. Tagane.

anthers narrowly triangular, ca 2.2 mm long, apex acute, base slightly cordate, filaments ca 1.5 mm long, folded at ca $\frac{2}{3}$. *Disk* scales awl-shaped, ca 0.7 mm long, glabrous. *Ovaries* ca 0.8 mm long, glabrous; style filiform, ca 9.5 mm long, glabrous; style head oblong, ca 1 mm long. *Fruits* and seeds not seen.

Distribution.— Laos (Champasak), Vietnam.

Ecology in Laos.— In lower montane forest; ca 1,250 m elevation. Flowering from December to February. Fruiting period unknown.

Vernacular name.— ຕົ້ນພອດດົງ [Ton Phoud Dong], suggested here. ‘Ton Phoud’ in Lao refers to the common name for the family Apocynaceae and ‘Dong’ in Lao refers to an area covered with trees or forest.

IUCN conservation assessment.— Critically Endangered (CR B1ab(iii)). Previously, this species had been known only from the type locality, Mt Bach Ma of Thua Thien Hue Province in Vietnam (Middleton, 2014). The collection from the Bolaven Plateau in Laos is the second locality for this species. The two distribution areas are fragmented and the distance between the two is ca 216 km. The extent of occurrence (EOO) and area of occupancy (AOO) are 14 km² and 8 km² respectively. Both localities are within protected areas, Bach Ma National Park and Dong Hua Sao NP, but the habitat in the latter area has been recently disturbed for the expansion of agricultural land for coffee cultivation. Given this situation, this species is assessed as CR (IUCN Standards and Petitions Committee, 2019).

Notes.— Our Lao collections are slightly different in floral characters from the variation reported by Middleton (2014): shorter petioles (3–5 mm long in Laos vs. 7–8 mm long in Vietnam), longer peduncle (1.4–3.4 cm long vs. 0.3–0.4 cm long), longer corolla lobes (18–19 mm long vs. 13–14 mm long), and longer filament (1.5 mm long vs. ca 0.6 mm long). However, the other characters match well, and we consider these to be within the infraspecific variation of *Kopsia vidalii*.

Specimens examined.— LAOS. Champasak Province: Paksong District, near Nong Luang Village, [Dong Hua Sao NP, Bolaven Plateau], 15°04′11.41″N, 106°12′31.24″E, 1230 m elevation, 17 Dec. 2019, *Souladeth et al.* L3303 (FOF [FOF0006634], KAG [KAG155668]).

3. *Parsonsia penangiana* King & Gamble, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(2): 458. 1908. Type: Peninsular Malaysia, Penang, at the Waterfall, *Curtis*, *C. s.n.* (holotype K [K000857544] photo seen). Figs. 3–4.

Twining climbers, ca 3 m tall. *Stems* and branches sparsely puberulent to glabrous. *Leaves* opposite, petiolate; petioles 2–4.5 cm long, slightly grooved adaxially, rounded abaxially, glabrous, greenish yellow; blades coriaceous, broadly ovate-elliptic, 8–19 × 3.5–10 cm, apex acuminate, margin undulate, base rounded, adaxially dark green, glabrous, abaxially pale green, sparsely puberulent, secondary veins 5–9 pairs, prominent abaxially. *Inflorescences* compound corymbs, 40–60-flowered; peduncles 8–10 cm long, glabrous to sparsely puberulent; branches 1.5–2 cm long, sparsely puberulent; bracts sparsely puberulent, triangular, 2–3 mm long, apex acuminate, margin entire; pedicels 5.9–9.2 mm long, glabrous. *Flower bud* ovoid, papillose outside. *Sepals* 5, puberulent, ovate-triangular, 1.3–2.5 × 1.2–1.5 mm, apex acute, margin entire. *Corolla* pale green to yellowish or white; tube 3–4 mm long; lobes ovate-triangular, 3–4 × 2–3.2 mm, apex acute, outer surface on lobes puberulent, inner surface on tubes densely long pubescent. *Stamens* 5; filaments curved, 2–4 mm long, strongly bent; anthers yellowish, narrowly cordate to hastate, 4–5 × 0.8–1.2 mm. *Disk* annular, 1–1.5 mm long, white, 5-crenate. *Ovaries* 2, carpels adnate, ca 1 mm long; style and pistil head 3–4 mm long, white. *Fruits and seeds* not seen.

Distribution.— Thailand, Laos (Bolikhambai), Malaysia (Penang).

Ecology in Laos.— In evergreen and semi-evergreen forests on limestone; 250–550 m elevation. Flowering June–July. Fruiting period unknown.

Vernacular name.— ຄໍ້ອີດອກມຸກຂົວ (Kheua Dok Mouk Khiew), suggested here. ‘Kheua Dok Mouk’ in Lao refers to a beautiful climber and ‘Khiew’ refers to the colour green.

IUCN conservation assessment.— Vulnerable (VU B2ab(ii, iii)). This species is known from only a small number of collections; one in Malaysia (Penang, type at K) (Middleton, 1997), four provinces in Thailand (Saraburi, Rayong and Phattalung, Middleton 1999; Phitsanulok, specimens at QBG),

and two in Laos (Luang Phrabang specimens at **SING** and Bolikhamxai reported here). The Extent of Occurrence (EOO) is 345,001 km² and the Area of Occupancy (AOO) is 32 km². Given that *Parsonsia penangiana* is only known from seven populations, that it has a small area of occupancy, and that habitat loss has occurred in the region during the last 50 years, this species is assessed as VU (IUCN Standards and Petitions Committee, 2019).

Notes.— Our Lao collection shows slight differences from the previously known variation of *Parsonsia penangiana*; longer inflorescence 10–12 cm long (vs. 6.8–8 cm long) and glabrous pedicel (vs. shaggy-villous), but we consider these to be included within the infraspecific variation of this species. In the Checklist of the Vascular Plants of

Lao PDR (Newman *et al.*, 2017 onwards), this species was recorded from Louangphabang, northern Laos. We have examined an image of this specimen as well as field photos.

Specimens examined.— LAOS. Bolikhamxai Province, Pak Kading District, [Nam Kading National Protected Area], 18°12'06.8"N, 104°23'18.7"E, 268 m elevation, 27 June 2017, *Tagane et al. L1051* (**FOF!**, **FU**); same locality, 18°38'28.22"N, 104°18'33.2"E, alt. 539 m, 28 June 2017, *Tagane et al. L1084* (**FOF!**, **FU**). Louangphabang Province, Chom Phet District, Ban Pak Leung, 19°52'27"N, 102°12'22"E, 370 m elevation, evergreen broad-leaved forest, 12 June 2012, *Leong-Škorničková et al. OS6249* (**SING** [SING0201153], photo seen).

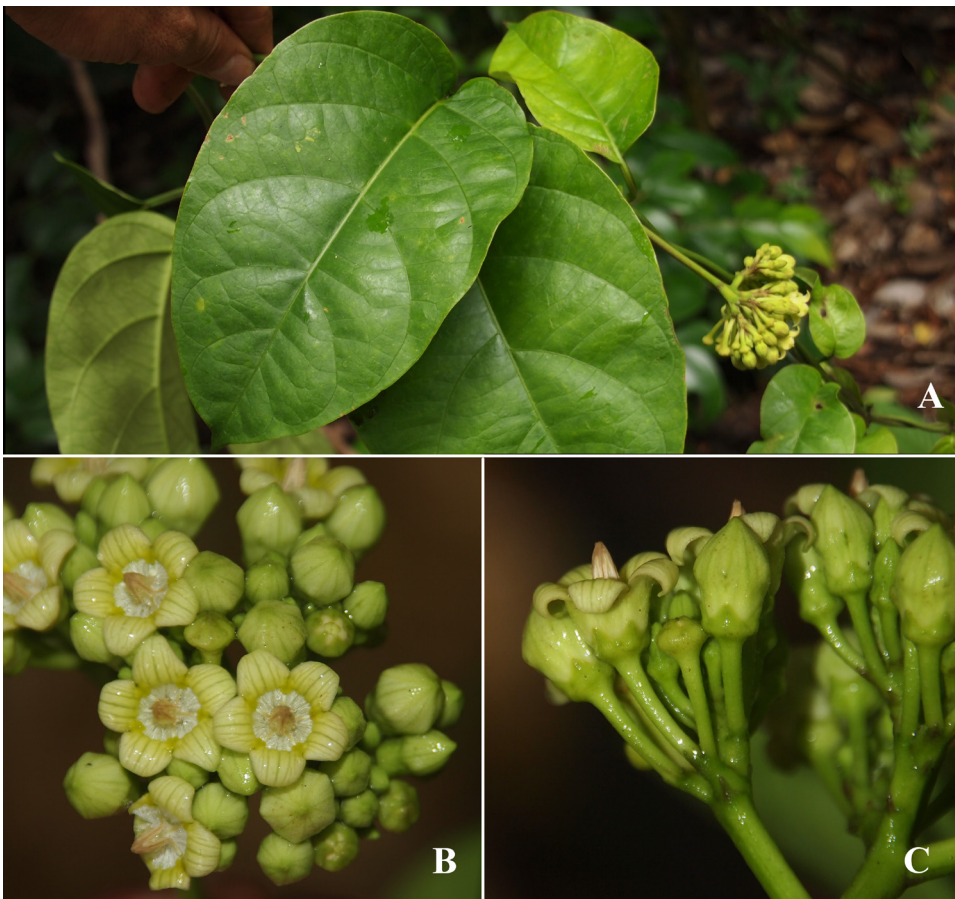


Figure 3. *Parsonsia penangiana* King & Gamble: A. climbing branches; B. flower front view; C. flower vertical view. A. from *Tagane et al. L1084*, B–C. from *Tagane et al. L1051*. Photos by S. Tagane.

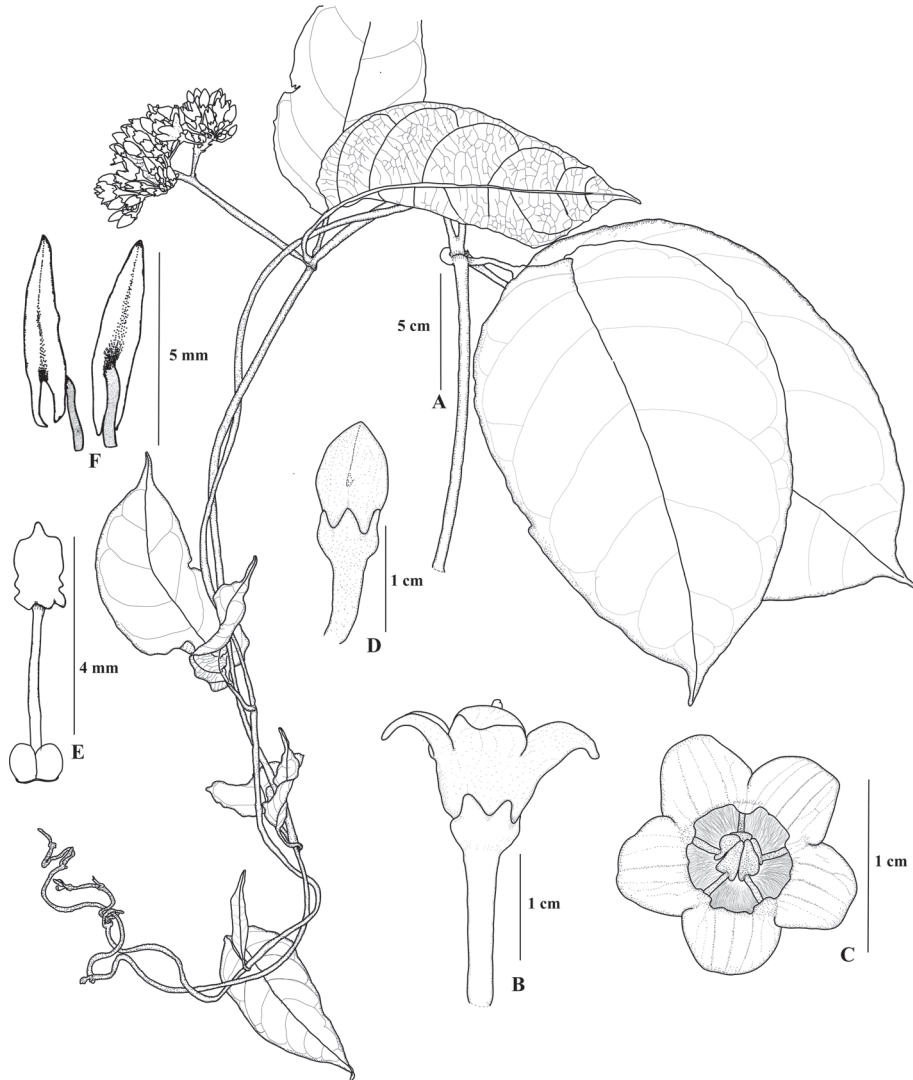


Figure 4. *Parsonsia penangiana* King & Gamble: A. flowering branches; B. flower (lateral view); C. flower (frontal view); D. flower bud; E. pistil; F. stamens. Drawn by K. Souvannakhoumane from *Tagane et al. L1084* (FOF).

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