

## Two new species of *Petrocosmea* (Gesneriaceae) from Thailand

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ABSTRACT. Two new species of *Petrocosmea* section *Deinantha* are described, *P. pubescens* D.J.Middleton & Triboun and *P. bicolor* D.J.Middleton & Triboun.

### INTRODUCTION

*Petrocosmea* Oliv. is a genus of small lithophytic herbs in Gesneriaceae subfamily Didymocarpoideae (see Möller et al., 2009). The last complete revision was by Wang (1985) in which 27 species and four varieties were recognised in three sections. The Chinese species were revised by Li & Wang (2004). The three sections are defined on easily observable morphological characters although as yet too few species have been phylogenetically investigated to establish whether these sections will hold up to closer scrutiny (Möller et al., 2009). Since Wang's revision three more species, all from Thailand, have been added to the genus (Burt, 1998, 2001).

Four species of *Petrocosmea* were recorded for Thailand by Burt (2001). Three of these four species, *Petrocosmea formosa* B.L.Burt, *P. heterophylla* B.L.Burt and *P. kerrii* Craib, belong to *Petrocosmea* sect. *Deinantha* W.T.Wang and the fourth, *P. umbelliformis* B.L.Burt, belongs to *Petrocosmea* sect. *Petrocosmea*. *Petrocosmea* sect. *Deinantha* is the smallest of the three sections, with just 5 or 6 species (depending on the status of *P. wardii* W.W.Smith) listed by Burt (1998). The section is defined by characteristic long tubules at the apices of the anthers (see Burt, 1998 for further discussion). During field work in northern Thailand in September 2008 and September 2009 two previously undescribed species belonging to *Petrocosmea* sect. *Deinantha* were collected and are here described as new. All previously known

species in this section have white corollas except for *Petrocosmea formosa* which can have white or very pale purple flowers. Both new species described here have predominantly purple flowers.

### DESCRIPTIONS

***Petrocosmea bicolor*** D.J.Middleton & Triboun, **sp. nov.** A *Petrocosmea grandifolia* et *Petrocosmea heterophylla* corollis bicoloribus et bulbillis in multis foliis adsunt distincta. Typus: Thailand, Chiang Mai, Fang District, Doi Ang Khang, vertical limestone cliff face in montane forest, 21 Sept. 2008, Middleton, Karaket, Triboun, Kawatkul & Meeboonya 4543 (holotype **BKF**; isotypes **A**, **BK**, **E**). Figs. 1, 3A–C.

Lithophytic perennial herb. Leaves all basal and of two types: small tightly clustered sessile leaves and much larger petiolate leaves around the margin; sessile leaves elliptic, to 3 by 1.8 cm, apex acute; petiolate leaves with petiole 8.5–20 cm long, sparsely to densely pubescent (hairs pale when alive, drying dark brown); blade ovate, slightly to strongly asymmetrical, 13–36 by 6.8–25 cm, 1.2–1.9 times as long as wide, apex acute, base subcordate to strongly cordate, margin irregularly dentate, base and tip of midrib often with bulbils, 8–11 secondary veins on each side of midrib, brochidodromous, tertiary venation reticulate, sparsely covered with coarse hairs above, more densely so with long hairs beneath, especially so

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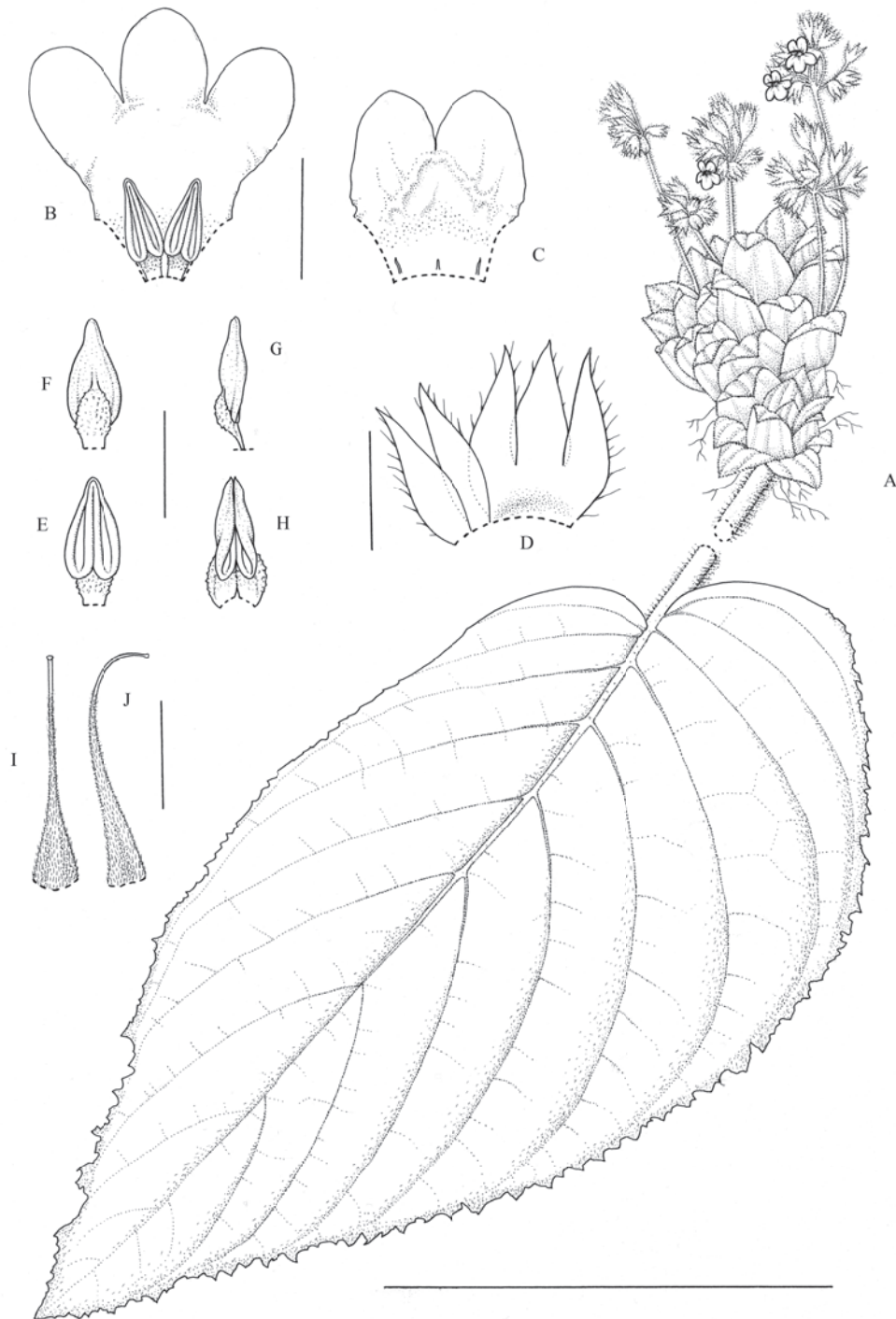


Figure 1. *Petrocosmea bicolor* D.J.Middleton & Triboun: A. habit; B. flower dissection, lower lip; C. flower dissection, upper lip; D. calyx opened out; E. stamen, dorsal view; F. stamen, ventral view; G. stamen, lateral view; H. stamens touching face to face as in flower; I. pistil, ventral view; J. pistil, lateral view. Scale bars: A = 15 cm, B–D, 6 mm, E–J = 4 mm. A from Middleton *et al.* 4543 (E); B–J from Middleton *et al.* 5024 (E).

on venation. Inflorescences arising out of dense cluster of sessile leaves, umbelliform, 8–14-flowered, 5.5–12 cm long; peduncles 3.5–10 cm long, densely covered in short and long glandular hairs; pedicels 4–13 mm long, pubescence as on peduncles; flower size varying greatly within a population. Calyx pale green to greenish white, of 2 free ventral lobes and 3 slightly fused dorsal lobes; 2 free ventral lobes elliptic, slightly falcate, 5.5–8 by 1.8–3.3 mm, apex acuminate; dorsal 3 lobes fused at base for 1.5–2 mm, lateral 2 lobes elliptic, slightly falcate, 6–8.5 by 2.1–3, apex acuminate, middle lobe elliptic, symmetrical, 7–9.5 by 2.8–4.2 mm, apex acute. Corolla 2-lipped, bicoloured with dark purple lower lip, white to pale purple upper lip, generally paler at base of upper lip when purple, darker purple ventrally and pale yellow dorsally inside tube. Corolla tube 3.3–5 mm long; upper lip 2-lobed, 4.5–5.5 mm long, individual lobes ovate, 4.5–5.5 by 3.5–3.8 mm, apex rounded; lower lip 6–7 mm long, lower lobe 3.5–5 by 2–3.1 mm, lateral lobes 3.3–3.7 by 3–3.3 mm; sparsely pubescent outside, especially on lobes, lobes ciliate, glandular papillose in tube and base of upper lip. Stamens 2, inserted at base of corolla tube, anthers adnate face to face; filaments 2–2.1 mm long, flattened for most of length and 0.9–1 mm wide, densely glandular-puberulent; anthers 4.1–4.2 by 2.1 mm, with tubules at apex 1.1 mm; 2 staminodes 0.9 mm long, 1 staminode 0.4 mm long. Ovary 2.5 mm long, densely covered with sessile glands and eglandular hairs; style 7–8.5 mm long, with only eglandular hairs at base to half way along, glabrous towards apex.

Thailand.— NORTHERN: Chiang Mai [Fang District, Doi Ang Khang, 21 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya* 4543 (A, BK, BKF, E); *ibid*, 30 Sept. 2009, *Middleton, Lindsay & Suksathan* 5024 (BK, BKF, E, K, L, QBG)].

Distribution.— Only known from Doi Ang Khang in Chiang Mai, Thailand.

Ecology.— In montane moist seasonal forest on karst shady limestone at ca 1,450 m in altitude. Flowering and fruiting periods unknown.

Notes.— This is the only species in *Petrocosmea* sect. *Deinanthera* with a strongly bicolourous corolla with the upper lip much paler

than the lower. It is otherwise rather similar to *Petrocosmea heterophylla* and *P. grandifolia*, both of which have larger white flowers. We have also not found any evidence that bulbils have previously been recorded in the genus.

***Petrocosmea pubescens*** D.J.Middleton & Triboun, **sp. nov.** Ab aliis speciebus *Petrocosmeae* sect. *Deinantherae* combinatione foliorum peltatorum, pilorum longorum villosorum et corollarum purpurearum differt. Typus: Thailand, Chiang Rai, Mae Fa Luang District, Doi Tung, montane deciduous forest on karst limestone, 23 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya* 4553 (holotype **BKF**; isotypes **BK, E**). Figs. 2, 3D–E.

Lithophytic rhizomatous perennial herb; rhizomes sparsely to densely covered in brown hairs. Leaves all basal, all petiolate, peltate; petiole 8–19 cm long, densely covered with long white spreading hairs to 7 mm long; blade suborbicular to very broadly obovate, 4–9.3 by 3.8–9 cm, 1–1.2 times as long as wide, apex rounded, base rounded, margin entire, petiole inserted at 0.5–2 cm from base of leaf (appearing cordate and not peltate in some damaged leaves), 3–5 secondary veins each side of blade, all but 1–2 from petiole insertion, brochidodromous, tertiary venation scalariform between basal sets of secondary veins, otherwise reticulate, densely covered in long appressed hairs above and beneath giving the leaves a silvery appearance when young. Inflorescences 1–2-flowered, 6–10 cm long; peduncle 4.5–7.5 cm long, densely covered with long white spreading hairs to 5 mm long; pedicels 7–17 mm long when 2-flowered. Calyx green, slightly zygomorphic with 2 lower lobes free to base and upper 3 lobes fused together at base for 2 mm, lower lobes linear, 5 by 1 mm, apex acute, upper lobes 5 mm long, each lobe 1–1.2 mm wide with the middle lobe widest. Corolla 2-lipped, purple outside, slightly darker purple inside, very dark purple at base of lower lobes but sometimes this broken up with paler patches, pale green at base of upper lobes; tube 4.5–4.7 mm long; upper lip 2-lobed, 6–8.5 mm long, individual lobes ovate, 6 by 6.5 mm, apex rounded; lower lip 11–12.5 mm long, lower lobe 8 by 8.7 mm, lateral lobes 9 by 8.1 mm; sparsely puberulent throughout outside, with sessile glands in tube and base of lobes inside, more densely so at base of upper

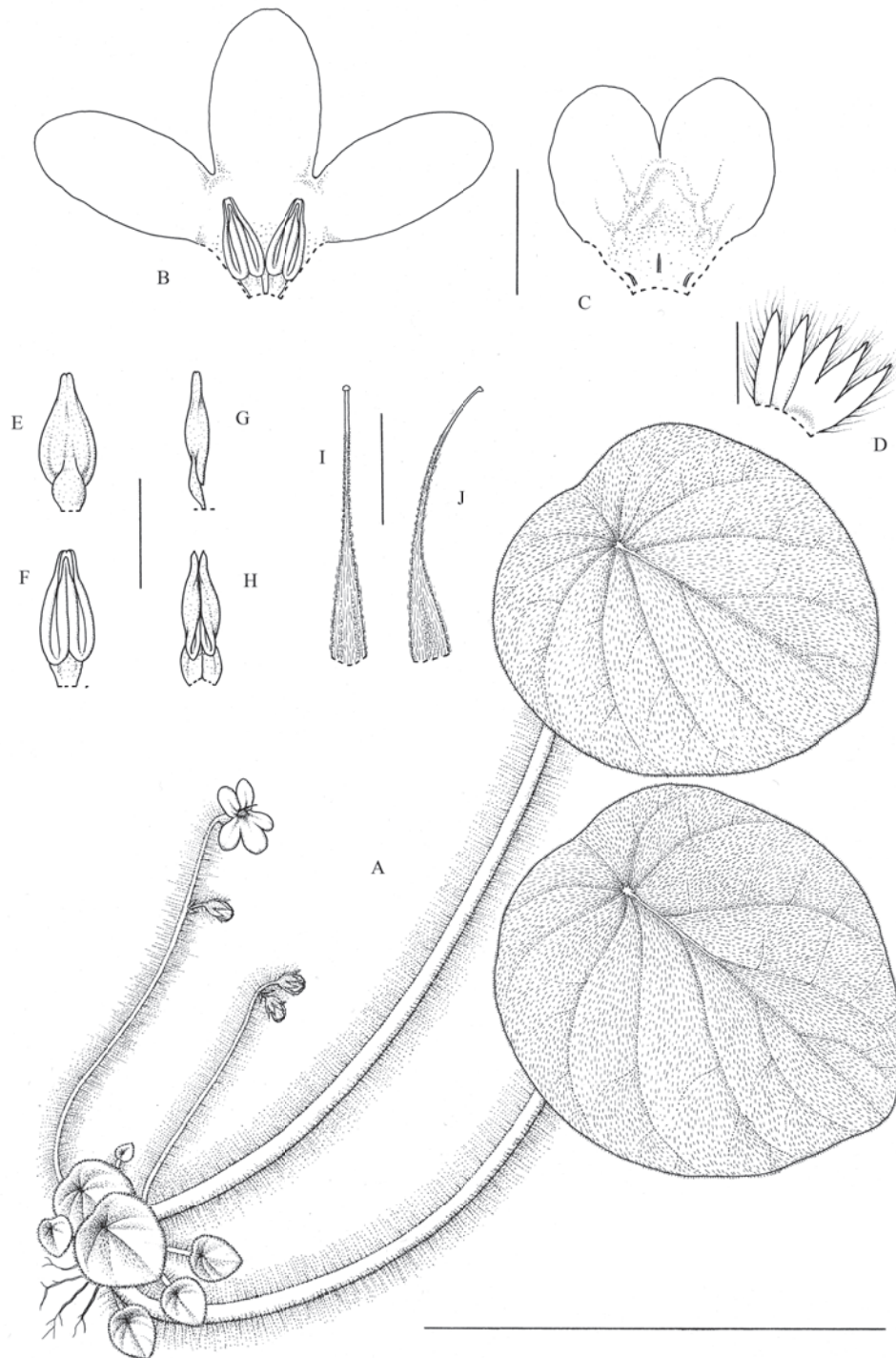


Figure 2. *Petrocosmea pubescens* D.J.Middleton & Triboun: A. habit; B. flower dissection, lower lip; C. flower dissection, upper lip; D. calyx opened out; E. stamen, dorsal view; F. stamen, ventral view; G. stamen, lateral view; H. stamens touching face to face as in flower; I. pistil, ventral view; J. pistil, lateral view. Scale bars: A = 10 cm, B, C, 6 mm, D–J = 4 mm. A–J from Middleton *et al.* 4553 (E).



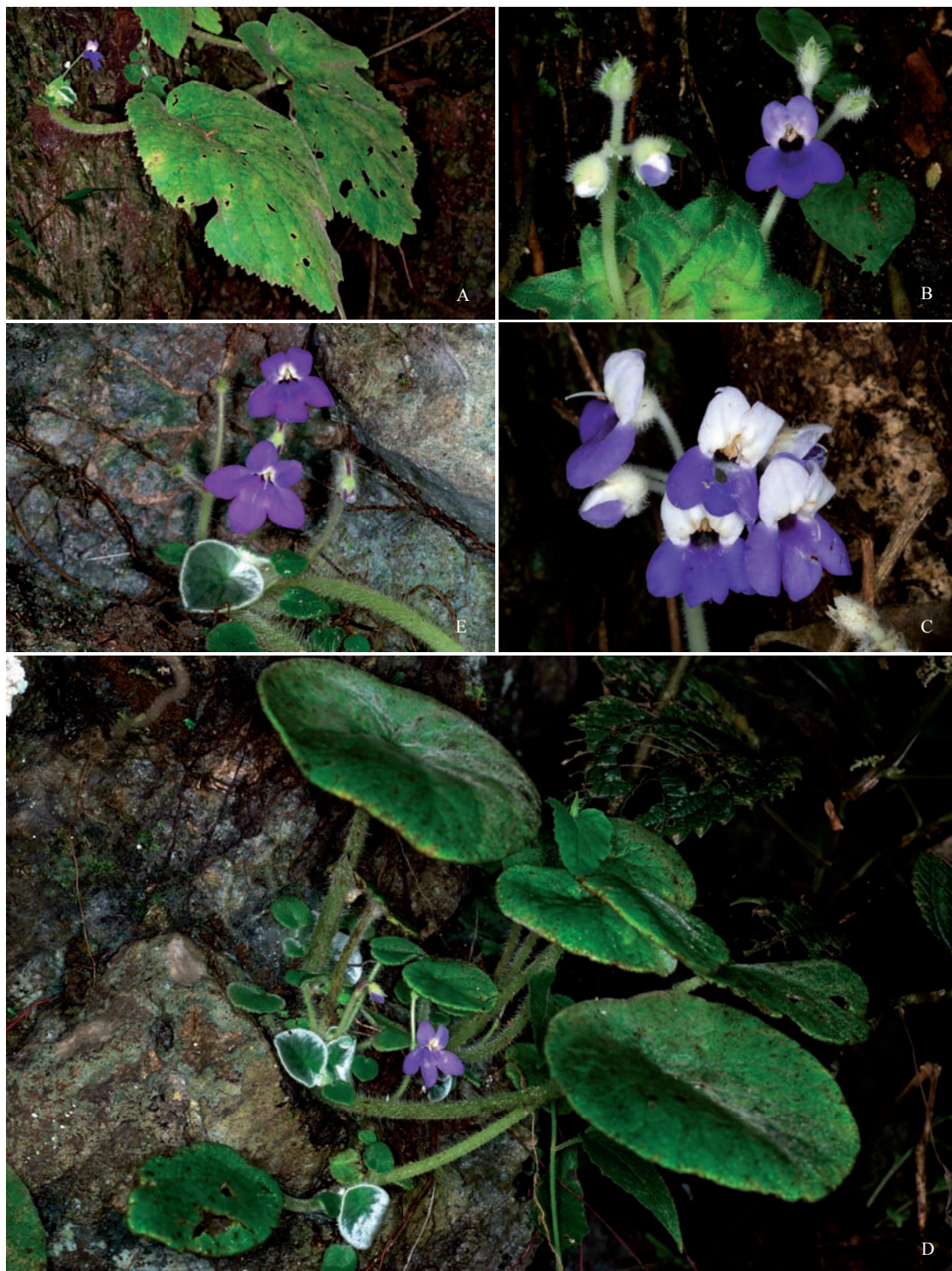


Figure 3. *Petrocosmea bicolor* D.J.Middleton & Triboun: A. whole plant showing both leaf types and an inflorescence; B. close up of flower and sessile leaves; C. flowers with paler upper corolla lobes. Both forms occur in mixed populations; *Petrocosmea pubescens* D.J.Middleton & Triboun: D. whole plant showing peltate leaves and purple flowers; E. close up of flowers.

lobes. Stamens 2, inserted at base of corolla tube, anthers adnate face to face; filaments 2.4 mm long, broadening at base to 1.2 mm wide; anthers 4 by 2.1 mm, covered in sessile glands, with tubules at apex 1.2 mm long; 3 staminodes 0.9 mm long. Ovary 2.6 mm long, densely long puberulent and with minute sessile glands; style 8.5 mm long, densely long puberulent at base, hairs becoming shorter and sparser towards apex where it is glabrous. Fruit a short capsule, 10–12 mm long.

Thailand.— NORTHERN: Chiang Rai [Mae Fa Luang District, Doi Tung, montane deciduous forest on karst limestone, 23 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya* 4553 (**BK, BKF, E**); Mae Sai District, Doi Tung, west side and below summit of Pa Hung, near entrance to Wat Pra Tat, 30 Oct. 2005, *Palee* 872 (**CMU**); *ibid*, 23 May 2006, *Palee* 947 (**CMU**); *ibid*, 2 Sept. 2006, *Palee* 1018 (**CMU**); *ibid*, 1350 m, 19 Oct. 2006, *Palee* 1040 (**CMU**)].

Distribution.— Only known from Doi Tung in Chiang Rai, Thailand.

Ecology.— In montane deciduous forest on karst limestone at 1350–1400 m in altitude. Flowering and fruiting periods unknown.

Notes.— This is perhaps the most distinctive species of *Petrocosmea* sect. *Deinantha* due to the peltate leaves and deep purple corollas. No other species in *Petrocosmea* sect. *Deinantha* have peltate leaves and only *Petrocosmea bicolor* has such deep purple corollas, albeit not uniformly in that species.

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