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A new species *Metapetrocosmea culaochamensis* and a new record of *Paraboea myriantha* (Gesneriaceae) from Vietnam

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Summary. A new species, *Metapetrocosmea culaochamensis*, discovered in central Vietnam, is described and illustrated. This species resembles *M. poilanei* but differs in its inflorescence in form of compound cymes with 2 or 3 orders of branching (vs. simple cyme, with 1 order of branching), larger bracts, 10–14 × 7–8.5 mm (vs. ca. 3 × 1.5 mm), corolla tube funnellform (vs. obliquely campanulate), and the stigma with an emarginate apex (vs. entire). In addition, *Paraboea myriantha*, a species previously known from China, is recorded for the first time in northern Vietnam, which essentially expands the known area of this species.

Новый вид *Metapetrocosmea culaochamensis* и новая находка *Paraboea myriantha* (Gesneriaceae) из Вьетнама

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Ключевые слова: разнообразие растений, таксономия растений, флора Вьетнама, эндемизм.

Аннотация. В статье приведено иллюстрированное описание нового вида *Metapetrocosmea culaochamensis*, обнаруженного в Центральном Вьетнаме. Этот вид похож на *M. poilanei*, но отличается по строению соцветия, которое имеет 2 или 3 порядка ветвления (против соцветия с 1 порядком ветвления), более крупными прицветниками, 10–14 × 7–8,5 мм (против 3 × 1,5 мм), воронковидной формой венчика (против венчика скошенно-колокольчатого) и выемчатым рыльцем (против цельного). Кроме того, в Северном Вьетнаме впервые отмечен вид *Paraboea myriantha*, ранее известный из Китая, что существенно расширяет известный ареал этого вида.

Introduction

The genus *Metapetrocosmea* W. T. Wang was initially established based on *Metapetrocosmea peltata* (Merr. et Chun) W. T. Wang (Wang, 1981), a species transferred from *Petrocosmea* Oliv. (Oliver, 1887). Some time, *Metapetrocosmea* remained a monotypic genus endemic to Hainan Island, China. Recent molecular phylogenetic analyses (Li et al., 2022) have revealed that *M. peltata* forms a strongly supported clade with all species of *Deinostigma* W. T. Wang et Z. Y. Li, prompting Li et al. to propose eight new combinations. Since then, a new species from central Vietnam and an additional new combination have been proposed (Zheng et al., 2023; Li et al., 2024), expanding the total number of recognized taxa within the genus to eleven.

The genus is characterized by alternate leaves, often with peltate to sub-peltate blades, arcuate filaments, densely lanate anthers bearing granular or vermiform appendages, hooked hairs, T-shaped glandular hairs across the entire plant, and ribbed seed surfaces (Li et al., 2022). Its geographic distribution extends from southern China to southern Vietnam, with many species being highly localized, often known from only a few gatherings (Li et al., 2022).

During a botanical expedition in 2022, the authors discovered an unusual species of Gesneriaceae from Hon Lao Island (Cu Lao Cham Islands, Quang Nam Province), located in central Vietnam. A subsequent visit to the site in 2024 allowed for a more detailed study confirming that this plant fits within the diagnostic characteristics of the genus *Metapetrocosmea*. Morphologically, it resembles *M. poilanei* (F. Wen, N. T. Le et D. Dien) P. W. Li et F. Wen (Li et al., 2022) and *M. peltata* but exhibits significant differences in several characters.

Comprehensive morphological and literature comparisons have confirmed that this species is distinct from all previously described taxa in the genus. Therefore, we formally describe and illustrate

this new species as *Metapetrocosmea culaochamensis*. In addition, this article also reports the discovery of a newly recorded species for Vietnam, *Paraboea myriantha*, previously known only from China (Shui et al., 2020).

Material and Methods

The measurements and descriptions of the studied species are based on living plants collected in 2024. Voucher herbarium specimens and additional alcohol-preserved materials are stored at the VNF Herbarium (Vietnam National University of Forestry, Hanoi). The conservation status was assessed using the IUCN Red List Guidelines (IUCN 2024), and the morphological terminology follows Harris J., Harris M. (2006), Hickey, King (2013), and Beentje (2016).

Taxonomic treatment

Metapetrocosmea culaochamensis C. H. Nguyen, N. H. Dang et C. W. Lin, **sp. nov.** (Figs. 1, 2).

Type: “Vietnam, Quang Nam Province, Hoi An City area, Cu Lao Cham Islands (Tan Hiep Commune, Hon Lao Island), secondary dry evergreen broad-leaved forest in moist shady places near waterfalls, along streams, around point 15°57'11"N, 108°31'12"E, at elevation 390 m a. s. l., terrestrial and lithophytic herb on shady cliffs near hill top, flowers white with purple stripes, very rare. 8 III 2024. Nguyen Huu Cuong, Vo Dai Hai, Nguyen Hai Dang. NHC20240308030” (VNF; photo of plant used for the preparation of the type specimen – LE: LE01255209, <https://en.herbariumle.ru/?t=occ&id=241402>).

Etymology. The specific epithet refers to the name of Cu Lao Cham Islands, where the new species was discovered.

Description. Perennial, terrestrial and lithophytic herb up to 40 cm tall. **Stem** ascending, erect and pendulous on cliffs becoming procumbent, light

greenish to pale brown, with adventitious roots at the base, few branched, 10–40 cm long, 4.5–6 mm in diameter, internodes up to 5 cm long in basal half of stem, becoming gradually shorter towards the apex, densely puberulous, hirsute-hispid with minutely hooked trichomes to glabrescent. **Leaves** petiolate, alternate, spirally arranged, congested to the stem apex, held horizontally; petiole light green, subterete, 2.3–6 cm long, 2–3 mm in diameter, densely puberulous, hirsute-hispid with minutely hooked trichomes; leaf blade broadly ovate to elliptic-ovate, 3.5–7.6 × 2.2–4 cm, acute to obtuse, at base rounded, margin obtuse-dentate, bright green adaxially, hispid-hirsute, very pale greenish abaxially, densely hirsute-hispid on veins; lateral veins 5 or 6 on each side of main vein. **Inflorescence** axillary compound cymes, with 2–3 orders of branching, of 5–9 flowers; peduncle pale green, erect, 6.7–13 cm long, hirsute-hispid with minutely hooked or glandular trichomes; bracts 2, pale green, ovate to ovate-elliptic, cymbiform, caducous, 10–14 × 7–8.5 mm, abaxially hirsute-hispid with minutely hooked and glandular trichomes, more dense along veins; bracteoles similar to bracts but distally gradually smaller; pedicel pale green, 5–7.5 mm long, densely hirsute-hispid with hooked and glandular trichomes. **Calyx** 5-lobed dissected to the base, pale green; lobes oblong-lanceolate to elliptic-lanceolate, 6–7 × 1.5–2.5 mm, obtuse to acute, margin entire, abaxially hirsute-hispid with minutely hooked and glandular trichomes, adaxially with minutely hooked trichomes. **Corolla** zygomorphic, 17.5–20 mm long, 5.5–7 mm in diameter at the mouth, outside white to white with purple tint, inside white, with a purple stripe at the fusion of the upper two lobes, lower three lobes have 11 dark purple longitudinal stripes of various lengths, extending from corolla throat to near the base of corolla tube; tube funnellform, ca. 1 cm long, 4–5 mm in diameter at the middle, at base gradually constricted, 2–2.6 mm in diameter, puberulous and hirsute-puberulous, inside glabrous; limb distinctly 2-lipped; adaxial lip 2-lobed to about middle, slightly obliquely crescent-shaped, rounded at apex, 3–5 × 4.5–6.2 mm; abaxial lip 3-lobed dissected to about middle, lateral ones slightly obliquely obovate-oblong to crescent-shaped, 4–5 × 5–6 mm, central one crescent-shaped, rounded at apex, 5–5.5 × 4.8–5.2 mm. **Stamens** 2, adnate to corolla tube 2.5–3 mm from base, coherent in pair at the anther; anthers pale yellow, ellipsoid, ca. 1.2 × 0.7 mm, densely white woolly-villous; filaments white,

glabrous, 5–6 mm long; staminode 2, white, 4–5 mm long, sparsely white villous, more densely on apex, adnate to corolla tube ca. 2 mm from base. **Disc** ring-like, pale green, ca. 0.7 mm high, margin 5-lobed, glabrous. **Pistil** ca. 12 mm long; ovary pale green, cylindrical, densely hirsute-hispid with glandular hairs, ca. 4 mm long, 1 mm in diameter; style white, linear, ca. 8 mm long, 0.5 mm in diameter; stigmas obtuse-trapeziform, emarginate. **Capsule** obliquely cylindrical, 9.5–12 mm long, 2.5–3 mm in diameter, slightly curved, dehiscing loculicidally from the base, splitting along one suture, straight, not twisted.

Ecology and habitat. Primary dry evergreen broad-leaved forest on granite at elevations of about 390 m a. s. l.

Phenology. Flowers in March – June, fruits in July – August.

Distribution. Vietnam (Quang Nam Province, Hoi An City area, Cu Lao Cham Islands, Hon Lao and Hon La Islands).

Conservation status. According to currently available data, *Metapetrocosmea culaochamensis* is a rather uncommon plant. The species inhabits lowland forests at elevations of 100–400 m a. s. l. in the officially protected area of Cu Lao Cham Island. Its presently observed and documented extent of occurrence (EOO) and area of occupancy (AOO) are obviously less than 100 km² and 10 km² respectively. Despite official protection of the territory harboring the species population, it is negatively influenced by recreation and other tourism activity. Before special studies, the conservation status of the new species may be tentatively estimated as Near Threatened (NT) following the guidance of the IUCN Red List (2024).

Notes. In plant habit, *Metapetrocosmea culaochamensis* has a strong resemblance to *M. cicatricosa* (W. T. Wang) Yin Z. Wang et P. W. Li (Fig. 3E) and *M. poilanei* (Pellegr.) Yin Z. Wang et P. W. Li (Li et al., 2022) (Fig. 3A–D). These three species share such morphological traits as spreading, branched stems, forming clumps and sub-peltate leaves with obtusely dentate margins. However, despite these vegetative similarities, significant differences are observed in their floral structures.

Metapetrocosmea cicatricosa has a larger corolla, reaching up to 4.5 cm in length (vs. 1.75–2 cm in *M. culaochamensis*), with a striking bluish-purple hue (vs. white to purplish-white). Its capsule is straight narrowly fusiform to 4 cm long (vs. obliquely cylindrical, to 1.2 cm).

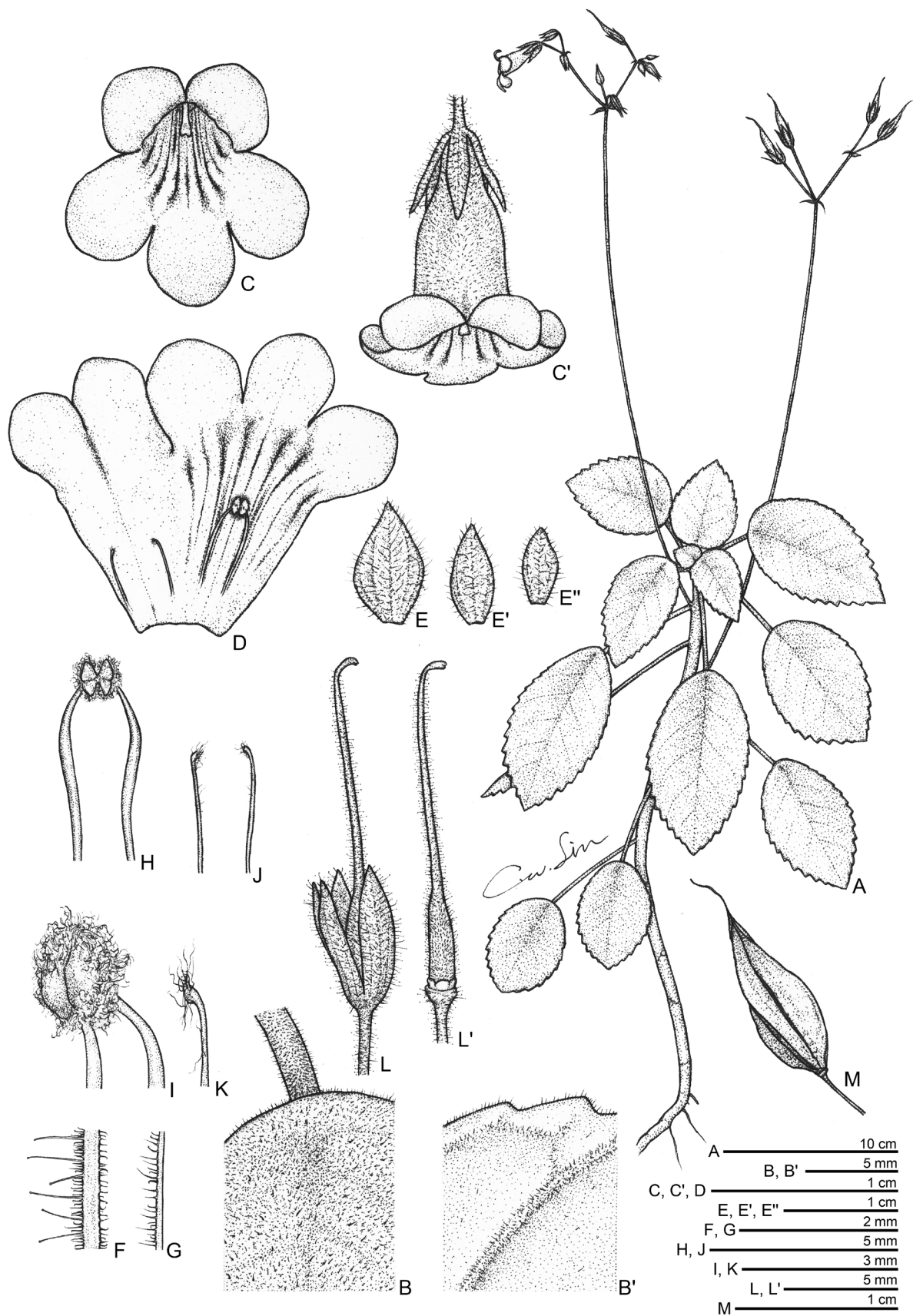


Fig. 1. *Metapetrocosmea culaochamensis*: A – habit; B, B' – portion of leaf, adaxial and abaxial surfaces; C, C' – flower, front and lateral views; D – dissected and flattened corolla, showing stamens and staminodes; E, E', E'' – bracts; F – cross section of calyx lobe; G – cross section of corolla; H, I – stamens; J, K – staminodes; L, L' – pistil, also showing disc; M – old capsule. Drawing by C. W. Lin from the type specimen NHC20240308030.

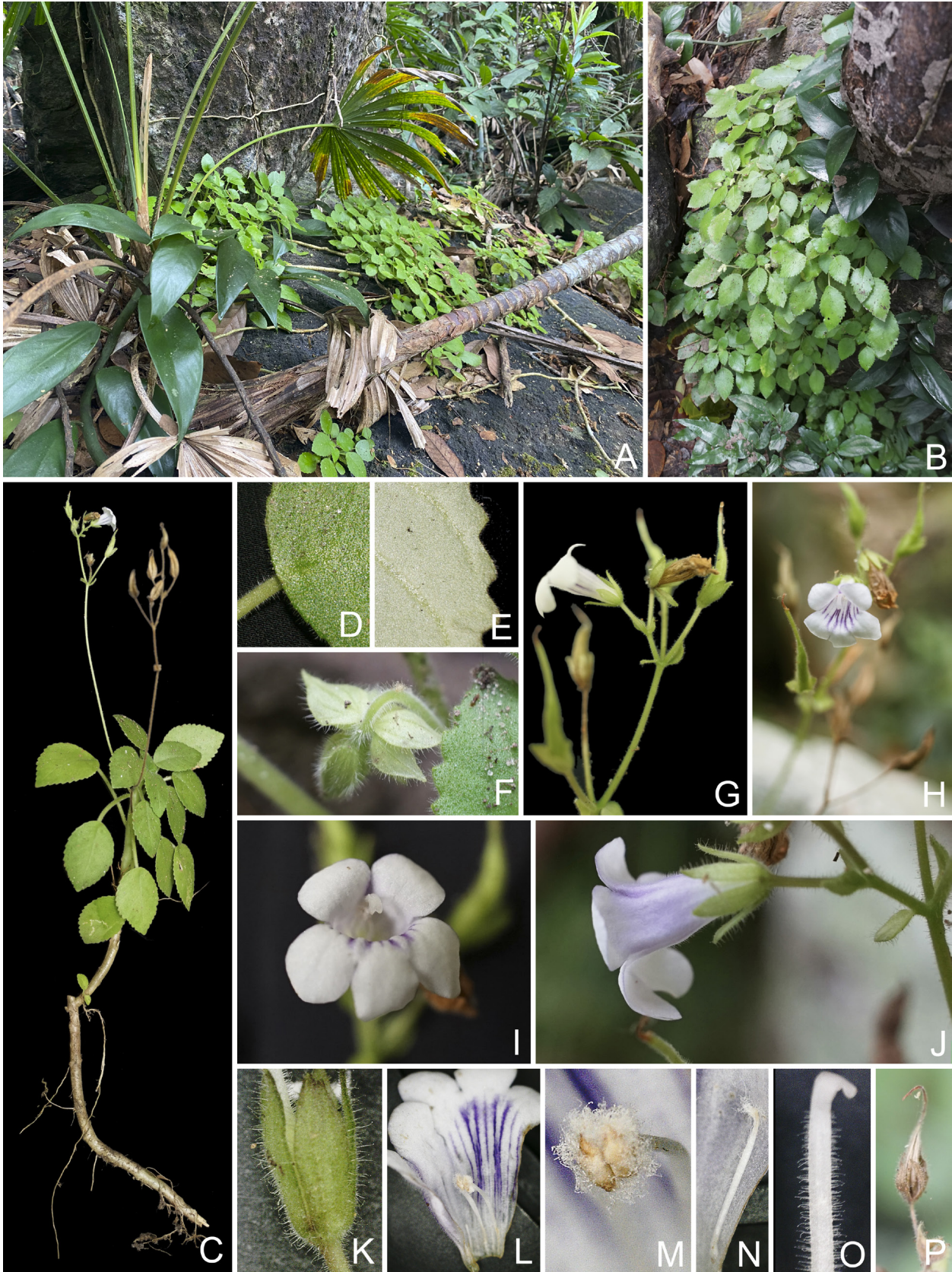


Fig. 2. *Metapetrocosmea culaochamensis*: A, B – plant in natural habitat; C – habit; D, E – portion of leaf, adaxial and abaxial surfaces; F – flowering and fruiting branchlets; G – branch with young inflorescences; H – immature inflorescence, showing bracts; I, J – flowers, front and lateral views; K – calyx; L – dissected and flattened corolla, showing stamens and staminodes; M – stamens; N – staminodes; O – apex of style; P – old capsule. Photos by C. H. Nguyen from the type specimen NHC20240308030.

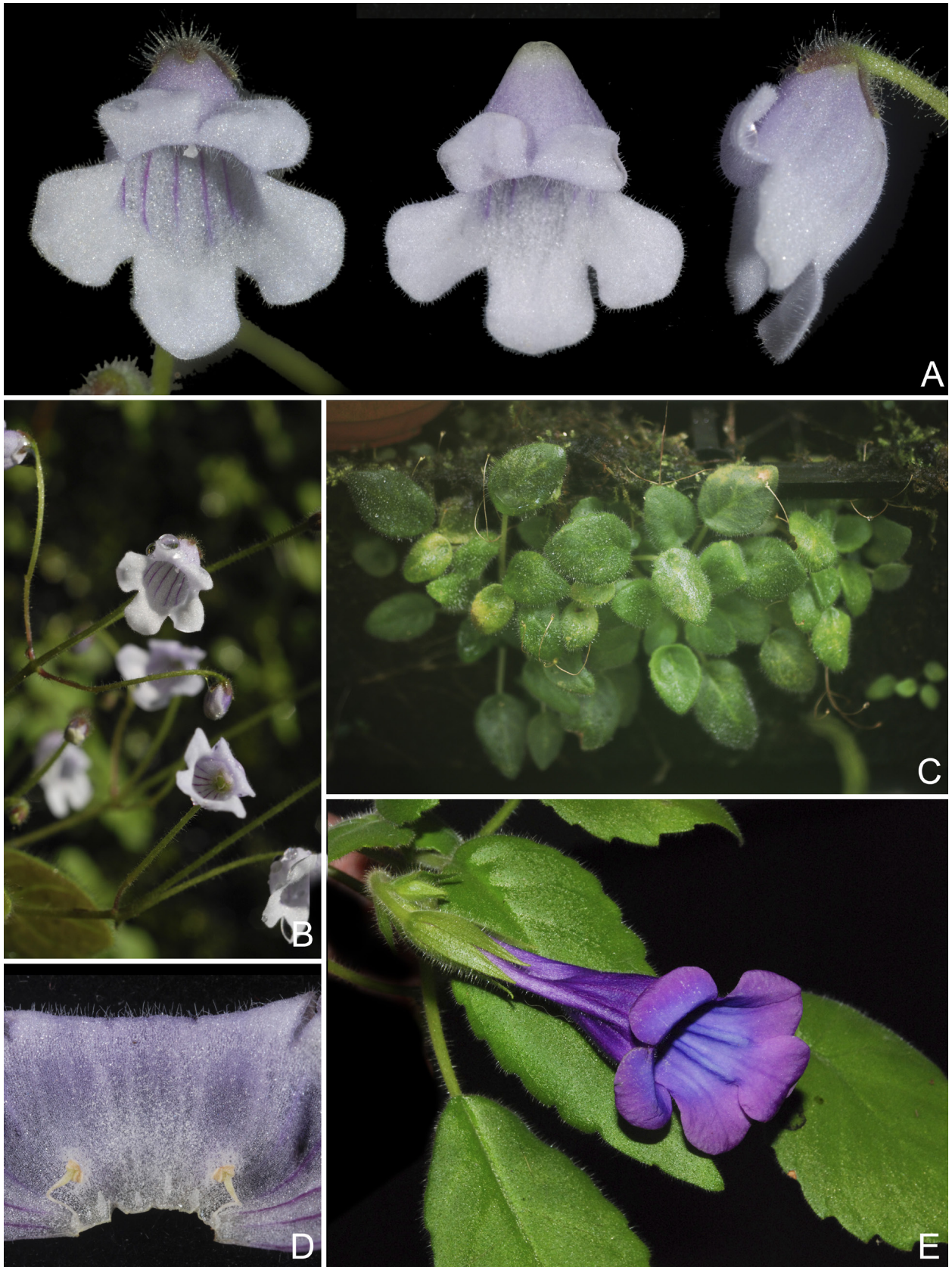


Fig. 3. *Metapetrocosmea peltata* (A–D); *M. cicatricosa* (E): A – flower, front and lateral views; B – inflorescences; D – flowering branches; C – habits; D – dissected and flattened corolla. E – flowering branch. Photos by C. W. Lin, A–D from specimen CWL723; E from specimen CWL724.



Fig. 4. *Paraboea myriantha*: A – plant in natural habitat; B – habit, also showing inflorescence; C – immature leaves; D – petioles; E – leaf-like bracts; F – inflorescence; G, H – corolla; I, J – longitudinal section of corolla; K – stamens; L – not ripe capsules; M – pistil. Photos A-F by C. H. Nguyen; Photos G-M by L.V. Le of plants used for the preparation of type herbarium specimen MDH 20231201102 and CLL20180815110.

Metapetrocosmea poilanei has inflorescences in form of simple cymes, branching only once (vs. 2–3 orders of branching), bearing 1–2 flowers (vs. 5–9 flowers), it has smaller bracts 4×2 mm (vs. $10\text{--}14 \times 7\text{--}8.5$ mm), and a shorter corolla, 10–12 mm long (vs. 17.5–20 mm), which is obliquely campanulate (vs. funnellform), and entire stigma (vs. emarginate). The leaves are smaller, $2\text{--}3 \times 1.5$ cm (vs. $3.5\text{--}7.6 \times 2.2\text{--}4$ cm), with 3 or 4 pairs of lateral veins (vs. 5 or 6 pairs).

Metapetrocosmea culaochamensis in its glandular-hairy inflorescence and white to purplish-white corollas marked with several dark purple longitudinal stripes somewhat resembles *M. peltata* (Figs. 3A–D). However, it is distinct from latter in its slender stems with leaves clustered at the upper part of stem (vs. arranged in a rosette on a short rhizome, sub-appressed to the substrate). Also *M. peltata* has an obliquely campanulate corolla tube (vs. funnellform in *M. culaochamensis*), smaller stamens, ca. 0.5 mm long (vs. ca. 1.2 mm long), 3 staminodes (vs. 2), and a globose capsule (vs. obliquely cylindrical).

Additional specimens examined. “Vietnam, Quang Nam Province, Hoi An City area, Cu Lao Cham Islands, Hon Lao Island, around $15^{\circ}56'55''\text{N}$, $108^{\circ}31'34''\text{E}$, secondary dry evergreen broad-leaved forest in moist shady places near waterfalls, along streams, at elevation 405 m a. s. l., terrestrial and lithophytic herb on shady cliffs near mountain top, flower white, very rare. 23 VI 2022. Nguyen Huu Cuong, Dang Van Ha, Nguyen Sinh Khang, Cao Xuan Hai. CHKH 20220623010” (VNF, LE: LE01170227; <https://en.herbariumle.ru/?t=occ&id=163377>); “Vietnam, Quang Nam Province, Hoi An City area, Cu Lao Cham Islands, Hon La Island, around $15^{\circ}54'32''\text{N}$, $108^{\circ}32'04''\text{E}$, secondary dry evergreen broad-leaved secondary forest in moist shady places, along streams, at elevation 125 m a. s. l., terrestrial and lithophytic herb on shady steep rocky slope near mountain top, flower white, not rare. 2 VII 2024. Nguyen Huu Cuong, Nguyen Hai Dang, Nguyen Van Ly. NHC 20240702108” (VNF).

Paraboea myriantha W. H. Chen et Y. M. Shui, 2020, *Phytokeys* 157: 209.

Type: “China, Yunnan Province, Hekou County, Nanxi Community, $22^{\circ}38'18.44''\text{N}$, $104^{\circ}00'28.93''\text{E}$, in the limestone forests, alt. 900 m. 26 VIII 2005. In flowers. Y. M. Shui et al. 44536” (KUN) (Fig. 4).

Distribution. Vietnam (Thanh Hoa Province, Quan Hoa District, Nam Dong Conservation Area). China (SE Yunnan, recorded by Shui et al., 2020).

Ecology and habitat. Primary broad-leaved evergreen humid forest on tops of remnant karstic mountains composed with solid, marble-like highly eroded limestone at elevations of 1050–1200 m a. s. l. In China this species grows in limestone evergreen broad-leaved forests at elevations about 900 m a. s. l. (Shui et al., 2020).

Conservation status. The species is presently known only from a single location with about 50 mature individuals on total square less than 5 km². The currently available observations suggest that species in Vietnam is very rare. More field studies are needed for assessment of its true national conservation status. According to the IUCN criteria (IUCN, 2024) it may be tentatively assessed at present as nationally “Data Deficient” (DD).

Specimen examined: “Vietnam, Thanh Hoa Province, Nam Dong Conservation Area, primary broad-leaved evergreen and mixed (with *Taxus chinensis*) humid forest on very steep rocky slopes on solid, marble-like highly eroded limestone, around point $20^{\circ}18'27.5''\text{N}$, $104^{\circ}53'17.9''\text{E}$, at elevation of about 1050 m a. s. l., not common. 1 XII 2023. Nguyen Huu Cuong, Nguyen Van Ly. MDH20231201102” (VNF); Vietnam, Thanh Hoa Province, Nam Dong Conservation Area, primary broad-leaved evergreen and mixed (with *Pinus kwangtungensis*) humid forest on tops of remnant karstic mountains composed with solid, marble-like highly eroded limestone, around point $20^{\circ}18'48.7''\text{N}$, $104^{\circ}53'39.6''\text{E}$, at elevation 1129 m a. s. l. 4 V 2024. Nguyen Huu Cuong, Nguyen Van Ly, L. Averyanov, T. Maisak. NHC20240504020” (VNF); “Vietnam, Thanh Hoa Province, Nam Dong Conservation Area, primary broad-leaved evergreen humid forest on tops of remnant karstic mountains composed with solid, marble-like highly eroded limestone, around point $20^{\circ}18'8.01''\text{N}$, $104^{\circ}53'7.05''\text{E}$, at elevation 1161 m a. s. l. 15 VIII 2018. Nguyen Huu Cuong, Nguyen Van Ly, Le Van Luc. CLL20180815110” (VNF, LE: LE01255210; <https://en.herbariumle.ru/?t=occ&id=241556>).

Notes: *Paraboea myriantha* was described in 2020 as endemic to the Hekou and Maguan counties in Yunnan, China, near the China-Vietnam border (Shui et al., 2020). Thus, the recent discovery of this species in Vietnam was predictable. *Paraboea myrianthais* somewhat similar to *P. glutinosa* (Hand.-Mazz.) K. Y. Pan and *P. thorelii* (Pellegr.) B. L. Burt in morphology and distribution range. *Paraboea myrianthais* in Vietnam has minor differences from the type specimens, including stems up to 40 cm tall

(vs. 10–20 cm), flowers in August to December (vs. June to November), and habitat elevation 1050–1200 m a. s. l. (vs. 750–950 m).

This species can be distinguished from other closely related taxa within the genus by its winged petioles, inflorescence with leaf-like bracts, obliquely campanulate corolla tube that is glandular-puberulent outside, and glandular-puberulent filaments.

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