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Cover: Oil painting of Humpback Whale *Megaptera novaeangliae*. © R. Mahesh.

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ARTICLE

Addition of five lesser known angiosperm species from Mizoram, India

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Abstract: Five angiosperm species, *Cajanus elongatus* (Benth.) Maesen (Fabaceae), *Crotalaria meghalayensis* Danda & A.K.Pandey (Fabaceae), *Mycetia malayana* (G.Don) Craib (Rubiaceae), *Microchirita karaketii* D.J.Middleton & Triboun (Gesneriaceae), and *Peliosanthes griffithii* Baker (Asparagaceae) are reported as new distribution records for Mizoram, India. Species identification was confirmed through detailed morphological examination, supported by relevant literature and herbarium studies. Comprehensive taxonomic descriptions, distribution data, and photographic documentation are provided.

Keywords: *Cajanus elongatus*, *Crotalaria meghalayensis*, Indo-Burma hotspot, *Microchirita karaketii*, *Mycetia malayana*, northeastern India, *Peliosanthes griffithii*.

Mizo: Angiosperm (Pangpar nei chi) hrang hrang panga -*Cajanus elongatus* (Benth.) Maesen (Fabaceae), *Crotalaria meghalayensis* Danda & A.K.Pandey (Fabaceae), *Mycetia malayana* (G.Don) Craib(Rubiaceae), *Microchirita karaketii* D.J. Middleton & Triboun (Gesneriaceae), leh *Peliosanthes griffithii* Baker (Asparagaceae) te chu Mizoram, India-ah a vawikhat nan hmuh thar an ni. Hei hi uluk taka an pianhmang (morphology) zirchianna te, lehkhabu hrang hrang (literature) leh thlai ro vawnna hmun (herbarium) te nen a khaikhin anih hnuah nemngheh a ni. He zirchianna ah hian thlai tin te nihphung (taxonomic descriptions), an awmna hmun (distribution), leh an thlalak te tarlan tel a ni.

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Author contribution: RL—field surveys, conceptualization, investigation, and initial manuscript drafting; DL, VS, RLD and RLI—field surveys, investigation, methodology and proofreading; SDY and SDK—conceptualization, supervision, photographic preparation, writing, editing and finalization of the manuscript. All authors read and approved the final manuscript.

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INTRODUCTION

Mizoram, situated within the Indo-Burma biodiversity hotspot, is a region of exceptional ecological significance that urgently requires comprehensive taxonomic investigation (Mittermeier et al. 2004; Rai & Lalramnghinglova 2010; Khomdram et al. 2026). The state, located in northeastern India, spans an area of about 21,087 km² and shares international boundaries with Myanmar to the east and south, and Bangladesh to the west. Despite its diverse physiography and climatic conditions supporting major vegetation types such as tropical wet evergreen, montane subtropical, temperate, bamboo forests, Quercus forests, and jhumland, floristic documentation remains far from complete (Singh et al. 2002). The ecological heterogeneity of the state fosters high endemism and floristic richness, making it a critical repository of plant genetic resources. Botanical investigations in Mizoram have lagged behind those in other parts of the Himalaya and northeastern India, leaving significant gaps in floristic knowledge. In recent years, the discovery of several new species has markedly enriched global plant diversity and the known flora of Mizoram, emphasizing the exceptional and ongoing potential for botanical exploration in the region.

The last few decades have witnessed multiple additions to the documented plants' distribution of Mizoram (Panday et al. 2014, 2016, 2020; Rathi et al. 2016; Sarkar et al. 2022; Tlanhlui et al. 2023; Lalnunfeli et al. 2024). Although Singh (1997) established a baseline of 2,141 angiosperm species in Mizoram (1,627 dicots and approximately 500 monocots), the discovery of more than 11 species new to science in intensive surveys since 2021 demonstrates the continued significance of the region as an expanding frontier for botanical discovery (Krishna et al. 2021; Prasanna & Gowda 2021; Lalhlupuii et al. 2023, 2025; Sengupta & Dash 2024, 2026; Lalfakawma et al. 2024; Sâwmliana et al. 2024; Tlanhlui et al. 2025; Lalnunfeli et al. 2026; Sailo et al. 2026).

During floristic surveys of 2024 to 2025 across diverse habitats in Mizoram, five angiosperm species—*Cajanus elongatus* (Fabaceae), *Crotalaria meghalayensis* (Fabaceae), *Microchirita karaketii* (Gesneriaceae), *Mycetia malayana* (Rubiaceae), and *Peliosanthes griffithii* (Asparagaceae)—were recorded for the first time from the state. These findings represent significant additions to the floristic inventory of the state, situated within the Indo-Burma biodiversity hotspot, and highlight the importance of continued botanical exploration.

MATERIALS AND METHODS

Extensive floristic explorations were carried out in various habitats across Aizawl and Mamit districts of Mizoram during 2025. Herbarium voucher specimens were deposited in the Herbarium of the Department of Botany, Mizoram University (MZUH). Species identification relied on available floras and relevant literature (Singh et al. 2002; Chen & Taylor 2011; Danda et al. 2016; Leeratwong et al. 2018; Tanaka 2018; Kumar et al. 2022; Rhuthuparna & Gowda 2024; Bora et al. 2025), and all accepted names were cross verified through Plants of the World Online (POWO 2025) and the World Flora Online (WFO 2025). The documented species are arranged alphabetically and include detailed descriptions covering type, taxonomy, phenology, habitat, ecology, distribution, and examined specimens. Morphological features were analyzed using photographs and microphotographs captured with a Sony DSC-W610 digital camera and a BT-E Benchtop Biological Digital Microscope.

RESULTS

Taxonomic treatment

***Cajanus elongatus* (Benth.)** (Image 1)

Maesen Agric. Univ. Wageningen Pap. 85(4): 115 (1986)

Type: Nepal, 1821, Wallich 5543 (holotype K-W [K001121245!]; isotypes BM [BM000574466!], CAL n.v., E [E00301629!], G [G00364706!, G00364708!], K [K000900563!, K000900564!], K-W [K000900562!], L [L0018799!], LE [LE00014567!, LE00014568!]).

Synonyms: *Atylosia elongata* Benth. in F.A.W.Miquel, Pl. Jungh.: 243 (1852), *Cantharospermum elongatum* (Benth.) Raizada in H.Mooney, Suppl. Bot. Bihar & Orissa: 53 (1950).

Climbing or crawling vine with a twining stem. Stem round, densely covered with yellow-brown fine hairs. Leaves trifoliate, terminal leaflet circular-rhomboid or obovate-rhomboid, base slightly cordate, 2.2–4.6 × 2–3.5 cm, lateral leaflets obliquely ovate, rounded cuneate base, 2.0–3.6 × 1.1–2.7 cm, apex acute, margin entire, hairy with more hairs along margin and midrib, secondary veins 3–4 pairs. Petioles 1.0–7.0 × 0.5–1.0 cm, covered with long brownish hairs, petiolules 0.1–0.2 cm, pulvinate. Stipules caducous, 2.5–3 × 0.5–2 cm, hairy, ovate triangular. Inflorescence axillary raceme, 3–8.4 cm long, lax, 2–4 flowers per inflorescence, peduncle 3.0–5.0 cm, flowers one pair at each node, pedicel 0.4–1.0

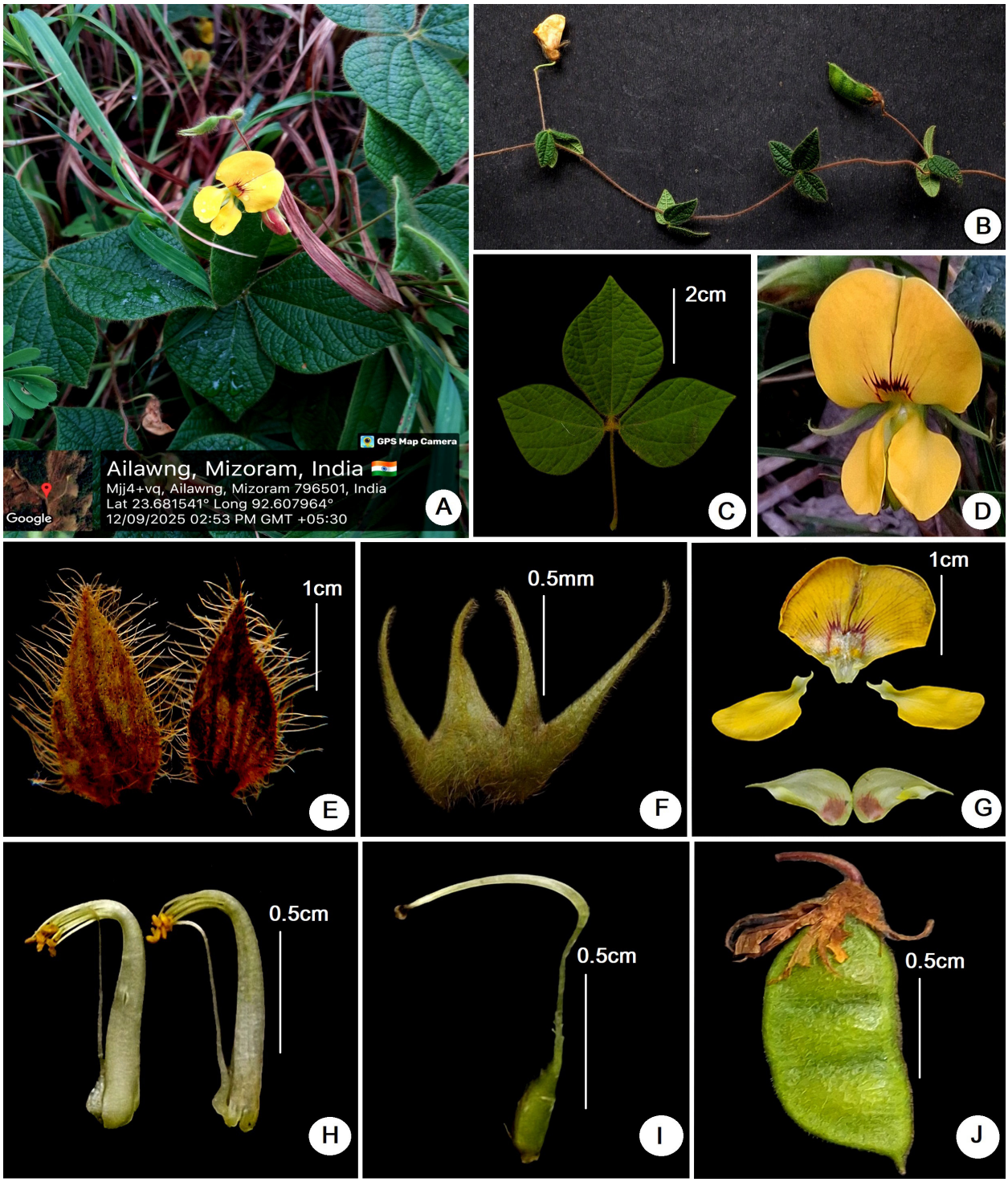

Image 1. ***Cajanus elongatus*** **(Benth.) Maesen: A—Habitat | B—Habit | C—Palmately 3-foliolate leaves | D—Flower | E—Stipules | F—Calyx | G—Dissected petals | H—Androecium | I—Gynoecium | J—Pod. © Dorothy Lalbiakhluni.**

cm. Calyx 5-lobed, hairy, upper lobes 0.5–0.7 cm, lower lobes 1.0–1.2 cm, upper two lobes fused for up to half of their length, sepal cup 0.3–0.4 cm. Corolla yellow, glabrous. Standard petal striated with crimson-red veins, obovate, 1.3–1.5 × 1.1–1.6 cm, apex emarginate, base bi-auriculate, claw 1–2 mm; wing petals irregularly oblong, 1.0–1.4 × 0.5–0.7 cm, auriculate, limb incurved, claw 2–3 mm long; keel petals boat shaped, 8–12 × 5–8 mm, obtuse apex, limbs incurved. Stamen diadelphous, staminal tube 0.8–1.3 cm, free part of filament 3.5–

4.5 mm anthers dorsifixed, all fertile, ovate-oblong to elliptic. Gynoecium 1–1.7 cm long, ovary 2–5 × 1–1.5 mm, densely hairy, style 1–1.2 cm, glabrous, bent at the upper part like a falcate. Pods hairy, 3–4 seeded, 2.4–3.5 × 0.7–1.0 cm, stalk 6–9 mm.

Phenology: August to November.

Habitat and ecology: Found on dry, open subtropical montane grasslands. Thrives in wet tropical biome.

Distribution: India (Assam, Meghalaya, Mizoram, Odisha), Myanmar, Nepal, Thailand, Vietnam.

Species examined: India, Mizoram, Mamit District, Reiek Village, 23.681° N, 92.607° E, 1,465 m elevation, 03.ix.2025, Dorothy Lalbiakhluni, 201101 (MZUH001312) (Image 6).

Conservation status: A recent extinction-risk analysis concludes that Cajanus elongatus does not currently meet the criteria for a threatened species (Bachman 2024). Nevertheless, its highly fragmented distribution across dry, open hillsides and grasslands points to underlying potential vulnerabilities, emphasizing the necessity for targeted field surveys to precisely evaluate its national conservation status.

Crotalaria meghalayensis Danda & A.K.Pandey (Image 2)

Syst. Bot. 41: 309 (2016).

Type: India, Meghalaya: Jaintia hills, Jarain, 25.491° N, 92.061° E, 17.x.2014, S. Danda & A.K.Pandey 1318 (holotype: DUH!; isotypes: DUH!, BSD!).

Herb up to 67 cm tall; stems slender, green, pubescent. Root a well-developed taproot; lateral roots are nodulated. Leaves simple, narrowly lanceolate, 6.5–9.5 × 1.6–1.8 cm; apex acute; base cuneate–attenuate; margin entire; adaxial surface sparsely hairy along midrib; abaxial surface densely pubescent with simple uniseriate multicellular hairs; venation pinnate with prominent midrib and 6–9 secondary veins; petiole 2–2.5 × 1.2–1.5 mm; stipules absent. Inflorescence axillary or terminal raceme, terminal raceme to 6 cm, 7–12 flowered; pedicel 4–6 mm, pubescent. Bracts oblong–lanceolate, 3.5–5 × 0.5–0.8 mm, base truncate, apex acute–acuminate, pubescent. Calyx bilabiate, externally densely hairy, internally glabrous, imbricate, 4-veined; upper lip bilobed, lobes ovate–obovate, apex abruptly acute, mucronulate, 1.6–2.5 × 0.8–1.2 cm; lower lip trilobed, lobes narrowly lanceolate, apex acute, 1.7–2.5 × 0.3–0.8 cm. Standard petal broadly obovate–orbicular, 1.15–1.5 × 1–1.4 cm, apex rounded, central dark blue patch; claw 2–3 mm, woolly at margins. Wings narrowly obovate, 1.2–1.3 × 0.5–0.6 cm, apex obtuse–rounded. Keel sub-angled, 1.2–1.4 × 0.4–0.5 cm, apex rostrate with twisted beak; surface paleaceous-tomentose, white-silky. Androecium monoadelphous, 10-merous, 5–8 mm; 5 stamens fertile with dorsifixed ovoid–sagittate anthers, 5 sterile with basifixed elongate anthers. Ovary sessile, 3.5–6 × 1–2.5 mm; style 1.2–1.3 cm, geniculate; placentation marginal. Pods cylindric, elliptic to oblong.

Phenology: August to November.

Habitat and ecology: The species inhabits open subtropical montane grasslands on well-drained slopes at 1,400–1,800 m elevation, growing among tall grasses and sparse shrubs in sunny, exposed hill environments.

Distribution: India (Meghalaya, Mizoram).

Species examined: India, Mizoram, Mamit District, Reiek Village, 23.683° N, 92.608° E, 1,465 m elevation, 03.ix.2025, Dorothy Lalbiakhluni, 201100 (MZUH001313) (Image 7).

Conservation status: The present record from Mizoram represents a significant range extension, underscoring the need for further surveys to assess population status.

Microchirita karaketii D.J.Middleton & Triboun (Image 3)

Thai Forest Bull., Bot. 41: 17 (2013)

Type: Thailand, Chiang Dao, Chiang Mai, Middleton, Karaket & Triboun 4526 (holotype at BKF; isotypes at E, P, QBG).

Lithophytic herbs, caulescent, up to 25 cm tall, with fibrous roots. Stem erect to sub-erect, green to maroon tinge below, 1–24 × 0.15–0.5 cm, glabrous or sparsely clothed with eglandular hairs. Leaves 1–5, opposite towards apex, lowermost solitary; petiole 2–6 × 2–4 mm, green, sparsely pubescent, lamina ovate, 5–16.3 × 4–11.2 cm, base cordate, margins entire, ciliate, apex acuminate, sparse uniseriate hairs on both surfaces, secondary veins 6–16 pairs, adaxially dark green, abaxially pale green. Inflorescence cristate, few to many flowered, peduncles 10 mm; bracts absent. Pedicels 3–14.5 mm, pale green, sparsely pubescent. Calyx green, bilabiate, lower lip three lobed, lobes free to the base; upper lip two unequal lobed, irregularly fused; lobes narrowly lanceolate, 1–5 × 0.7–1.2 mm, margins entire, apex acuminate, sparsely hairy. Corolla white, throat with a central yellow stripe, a lavender patch on either side of the stripe; lobes white; tube slender, curved downwards, upper 11.5–15 mm long, lower 12–16 mm, outer with uniseriate hairs, glabrous within; lobes orbicular to elliptic; upper lobes spreading, 3.2–4.4 × 3.3–5.2 mm; lateral lobes 3.7–4.4 × 4.2–5.2 mm; lower lobes 3.5–4.4 × 3.8–4.7 mm, apices rounded to

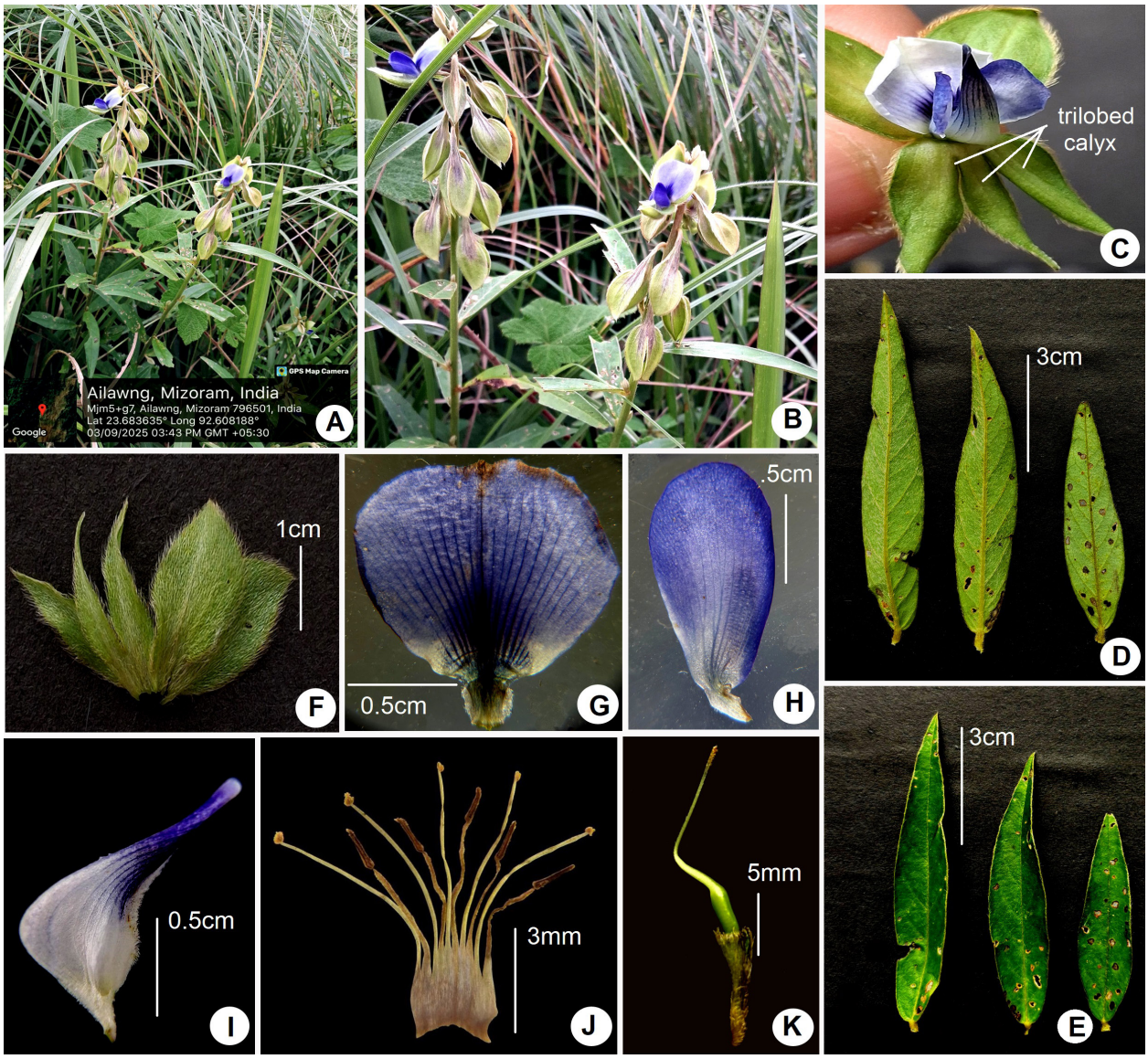

Image 2. ***Crotalaria meghalayensis*** **Danda & A.K.Pandey: A & B—Habitat | C—Flower | D— Leaves, abaxial view | E—Leaves, adaxial view | F—Calyx | G—Standard petal | H—Wing petals with cavae | I—Keel petals with twisted beak | J—Androecium | K—Gynoecium with geniculate style. © Dorothy Lalbiakhluni.**

occasionally obtuse. Stamens two, arising 4.4–6.5 mm above the corolla base, straight, 2.2–3.6 mm × 0.4 mm, glabrous, creamy white. Anthers 1.4–2 × 0.9–1.3 mm, pale yellow, sparse long hairs at the point of attachment, thecae coherent face to face. Disk absent or represented by a ventral half-ring. Pistil 9.5–15 mm long; ovary 3.6–5 mm long, 1 mm in diameter, pale green and papillose; style 5–7 mm long, pubescent, creamy white; stigma chiritoid, 1 mm long, creamy white. Fruit (immature, indehiscent) 4–5 cm long, 2 mm in diameter, glabrous at the base, pubescence at the upper half, green. Seeds narrowly elliptic, 0.4 × 0.2 mm, brown.

Phenology: September to December.

Habitat and ecology: Lithophytic, typically occurring near streams and other persistently damp locations. They often anchor themselves in small crevices or thin soil layers on moist rock faces, thriving in humid, shaded microhabitats.

Distribution: India (Meghalaya, Mizoram), Myanmar, Thailand.

Species examined: India, Mizoram, Aizawl District, Tanhril, 23.746° N, 92.643° E, 732 m elevation, 30.ix.2025, Vanlalawmpuia Sailo, 202000 (MZUH001314) (Image 8).

Conservation status: In India, it is restricted to a single known population in Meghalaya and Rhuthuparna & Gowda (2024) consider it as Critically Endangered. The

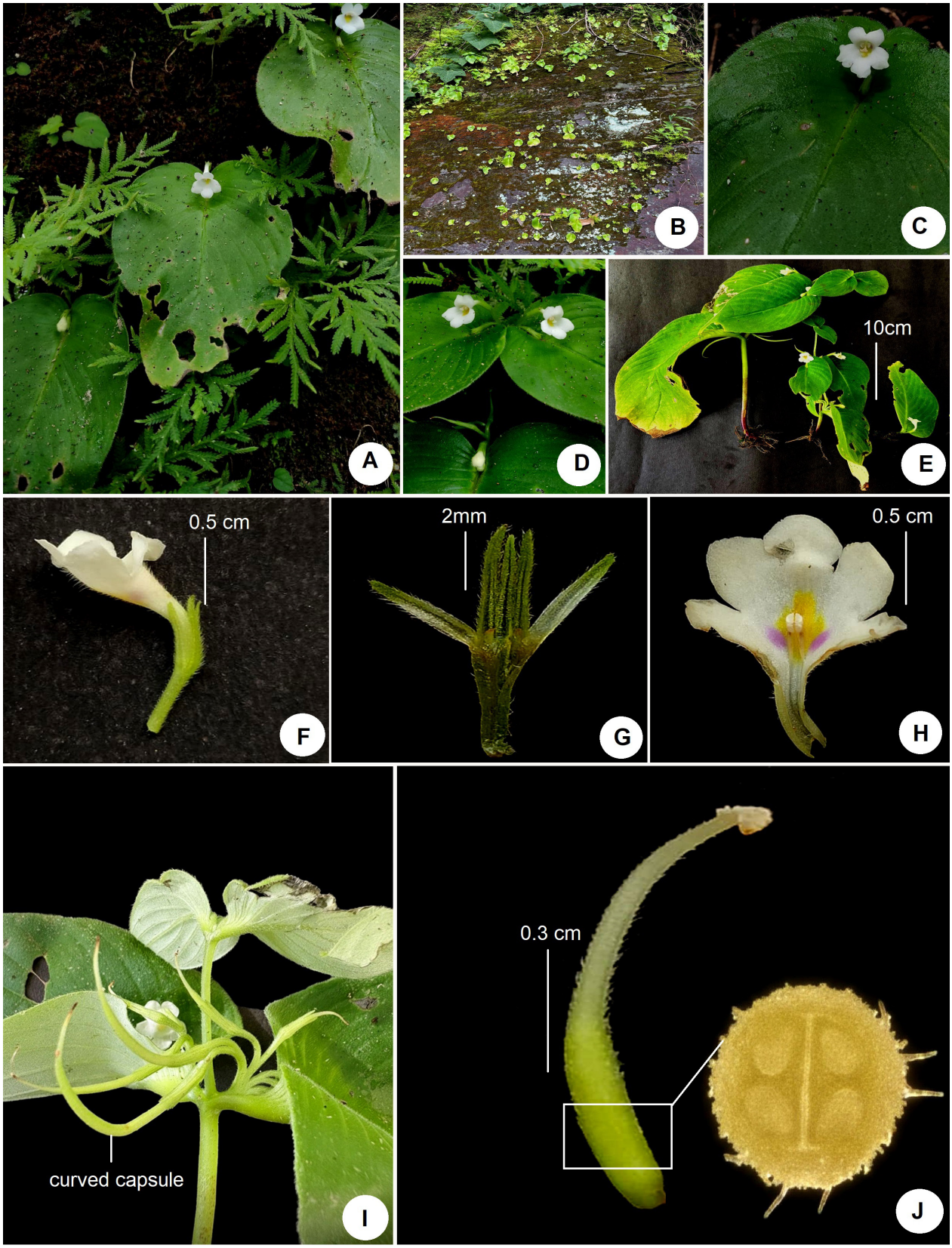

Image 3. *Microchirita karaketii* D.J.Middleton & Triboun: A & B—Habitat | C–E—Habit | F—Flower | G—Opened calyx | H—L.S. flower | I—Young curved fruits | J—Gynoecium with cross section of ovary showing hairs. © Vanlalawmpuia Sailo.

present record from Mizoram represents a significant range extension, emphasizing the urgent need for detailed population studies, habitat assessment, and conservation planning to ensure its long-term survival.

Mycetia malayana (G.Don) Craib. (Image 4)

Bull. Misc. Inform. Kew 1914: 29 (1914)

Type: Malaysia, Penang, Wallich s.n. [EIC 6282], lecto K [K000760581] (Designated by Wong et al. 2019).

Synonyms: *Adenosacme malayana* (G.Don) Wall. ex Ridl. in Fl. Malay Penins. 2: 63 (1923), *Wendlandia malayana* G.Don in Gen. Hist. 3: 519 (1834).

Shrub or small tree, single-stemmed, often unbranched, up to 1 m tall; young shoots hairy, matured glabrous; bark smooth, shining white. Stipules lanceolate, 4–6 mm. Leaves crowded toward upper stem, slightly anisophyllous; petioles 1–1.5 cm, sometimes weakly winged at base; lamina membranous, oblanceolate to elliptic-lanceolate, 8–23.6 × 2.5–6.8 cm, base gradually tapering, apex acuminate, surfaces pale green; secondary veins 10–20 pairs; hairs present along nerves beneath. Inflorescences terminal, many-branched cymes, numerous-flowered, 7–8 cm long; branchlets slender; bracts minute, 3–4 mm; peduncle 2.5–3.5 mm. Flowers 5–6 merous; pedicels slender, 4–8 mm; calyx lobes triangular, c. 2 mm, margins with stalked colleters; corolla 4–5 mm, tube urceolate, green, 2–3 mm, glabrous externally and internally except hairy throat; lobes triangular, 1.0–1.2 mm, short-pilose on both surfaces. Stamens subsessile; filaments 0.2–0.5 mm; anthers 0.8–1.0 mm, inserted just below corolla throat. Style 0.3–0.4 mm; stigma bifid, 0.7–0.8 mm, included, ovary 2-locular, ovules numerous, glabrous. Berry small, smooth, fleshy, glabrous, globose to subglobose, 7 × 5 mm, creamy white.

Phenology: April to November.

Habitat and ecology: Occurring along roadsides, often mixed with other weedy vegetation, typically grows in moist, shaded habitats where soil remains damp, thriving in partially disturbed areas such as forest margins, drainage edges, and shaded embankments.

Distribution: India (Mizoram, Tripura), Bangladesh, Borneo, Malaya, Thailand.

Species examined: India, Mizoram, Mamit District, Ailawng Village, 23.712° N, 92.660° E, 1,139 m elevation, 23.v.2025, R. Lalhruaitluangi, 201150 (MZUH001315) (Image 9).

Conservation status: *Mycetia malayana* is a 'Least Concern' species on the IUCN Red List of Threatened Species (Oldfield 2021). It was regarded as nationally extinct in Singapore (Wong et al. 2019). Within India, previously documented only from a single population in Tripura (Bora et al. 2025). The present record from Mizoram indicates a broader distribution than previously recognized. The new record shows wider distribution, but insufficient data necessitate urgent surveys and monitoring for conservation planning.

Peliosanthes griffithii Baker (Image 5)

J. Linn. Soc., Bot. 17: 506 (1879).

Type: India, Darjiling, W. Griffith 5840 (holotype at K herbarium, specimen number K-000099365)

Perennial, rhizomatous herbs, up to 26 cm tall. Rhizomes short and slightly creeping, bearing numerous wiry roots up to 33 cm long and ca. 2.5 mm in diameter, densely clothed with root hairs. Stem short, stout, and erect, 0.4–4 × 0.4–0.8 cm, purplish to creamy white. Cataphylls up to 8.1 cm long and 1.5 cm wide, chartaceous, triangular-ovate to lanceolate. Leaves 7–14, arising in clusters from the stem apex. Petiole rigid, adaxially flattened, erect or curved, 0.8–2.3 x 0.13–0.2 cm. Lamina narrowly elliptic-lanceolate to lanceolate, 8.3–15 × 2.2–4.3 cm; apex acute to acuminate, base attenuate to cuneate, margin entire, surface glabrous. Venation parallel with 7–11 distinct veins visible adaxially and slightly raised abaxially, texture sub-coriaceous, glossy green above, paler beneath. Inflorescence solitary, arising from the leaf base, racemose, slender, 15–31 cm long, purplish to dark violet. Peduncle erect, 5–10 cm long, glabrous, dark violet. Sterile bracts 1.3–1.5 × 0.15–0.3 cm, triangular. Rachis densely flowered, bearing up to 91 flowers arranged spirally. Fertile bracts two at the base of each pedicel, small, ovate-triangular to linear-lanceolate, 0.8–1 × 0.1–0.2 cm, inner bracts usually twice smaller. Pedicels green to violet, 3–4.2 × 0.5 mm. Flowers bisexual, actinomorphic, greenish purple to dark violet, 5–6 mm in diameter. Perianth six, free, linear-lanceolate, 2–3 × 0.7–1.3 mm, concave, homochlamydeous, with valvate aestivation; segments revolute, greenish purple to violet. Stamens 6; filaments united, forming a fleshy corona-like structure, corona stellate to triangular-ovate, 0.7–1 x 2 mm in diameter, margin serrate to sinuate. Anthers six, sessile, inserted on the inner surface of the corona lobes just below the orifice; introrse, dorsifixed, minute (less than 0.5 mm long), oblong to ovate, bilobed. Gynoecium c. 2.5 mm high; ovary perigynous, trilocular, globose to ovoid, with three longitudinal parietal folds meeting at the center, exhibiting axile placentation; style 0.6–0.9 mm long; stigma distinctly 3-carinal. Seeds 12, ovoid to narrowly ovoid.

Phenology: October to December.

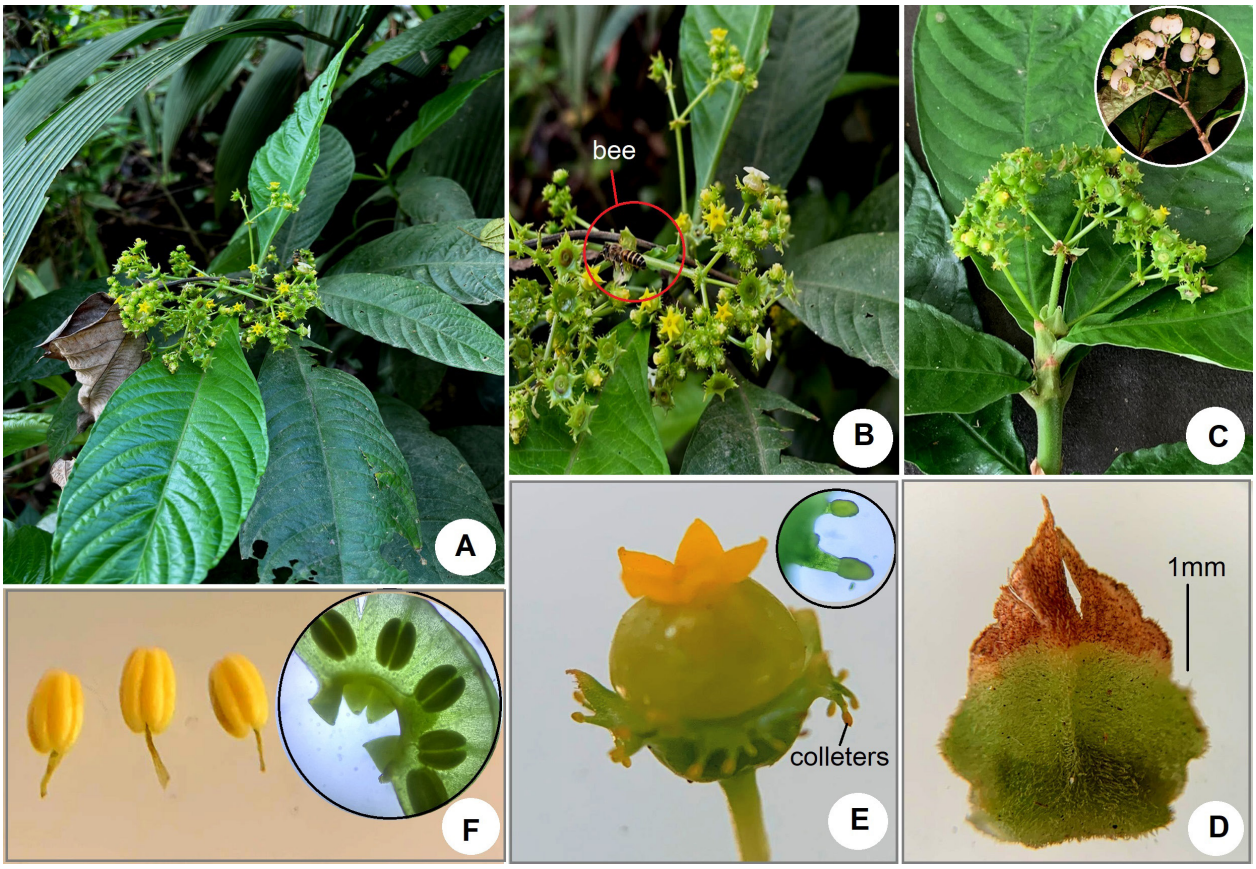

Image 4. *Mycetia malayana* (G.Don) Craib: A—Habit | B—Flowering twig with pollinator | C—Inflorescence (inset: matured infructescence) | D—Stipule | E—A single flower (inset: stalked colleters on calyx lobe margins) | F—Stamens (inset: subsessile stamens below corolla throat). © R. Lalhruaitluangi.

Habitat and ecology: Rhizomatous forest herb grows in the shady, moist understorey of evergreen and semi-evergreen forests. It prefers humus-rich, well-drained soil and occurs at mid to high elevations (up to 1,600 m).

Distribution: India (Assam, Mizoram), eastern Himalaya, Nepal, Vietnam.

Species examined: India, Mizoram, Aizawl District, Hmuifang Village, 23.455° N, 92.754° E, 1,619 m elevation, 16.x.2025, R. Lalthantluanga, 201010 (MZUH001316) (Image 10).

Conservation status: Within India, its distribution appears highly fragmented and restricted to scattered populations in forest understorey habitats, suggesting potential vulnerability to habitat disturbance and warranting further field assessments to determine its national conservation status.

DISCUSSION

The present record of *Cajanus elongatus*, an uncommon and sparsely distributed species, extends its known range and underscores the need for targeted field surveys and conservation attention in view of its fragmented populations. Similarly, *Crotalaria meghalayensis*, originally described from Meghalaya and long known only from its type locality, exhibits a highly restricted distribution with its occurrence in Mizoram; therefore, it represents a significant range extension for this regionally rare species (Danda et al. 2016). *Mycetia malayana*, previously reported from peninsular Malaysia, Thailand, and Borneo, was only recently recorded in India from Tripura, highlighting its extreme rarity within the country and representation by a single confirmed locality (Bora et al. 2025). *Microchirita karaketii*, first documented from northern Thailand and Myanmar, shows a highly restricted and localized presence in northeastern India with very few collections reported, supporting its rarity within the Indian flora

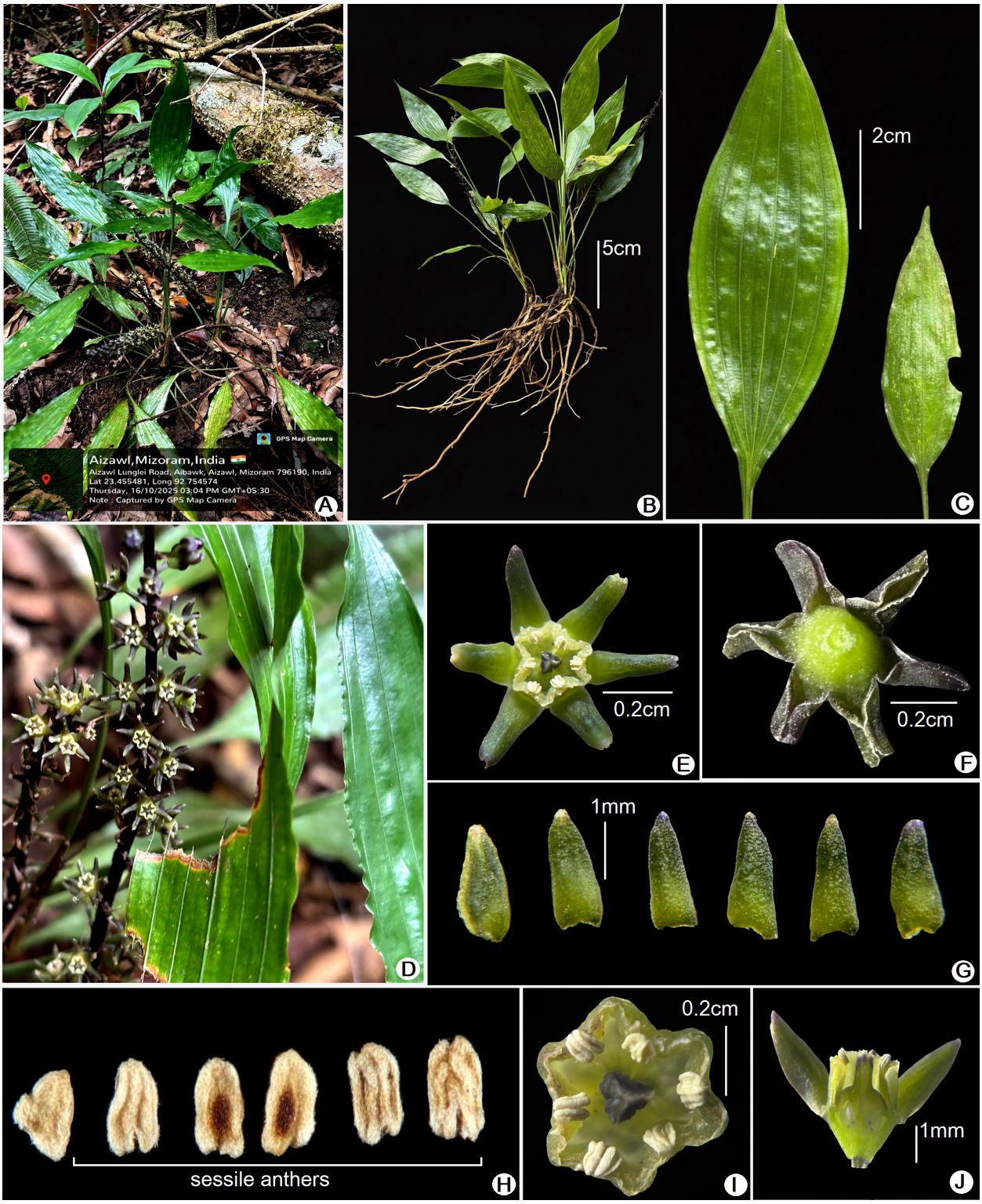

Image 5. ***Peliosanthes griffithii*** **Baker: A—Habitat | B—Habit | C—Leaves | D—Inflorescence | E—Flower, front view | F—Flower, dorsal view | G—Tepals | H—Sessile anthers | I—Corona, front view | J—Flower, sagittal section. © R. Lalthantluanga.**

(Rhuthuparna & Gowda 2024). *Peliosanthes griffithii* occurs in Nepal, northeastern India, and adjacent regions of southeastern Asia, but within India, it is found as scattered populations with limited occurrences in forest understorey habitats, indicating a rare status depending on locality (Baker 1879; Tanaka 2018). Overall, the five

Image 6. Herbarium sheet of *Cajanus elongatus* [# MZUH001312].

angiosperm species reported in the present study may be considered rare, based on their restricted distributions, limited collections, and localized occurrences.

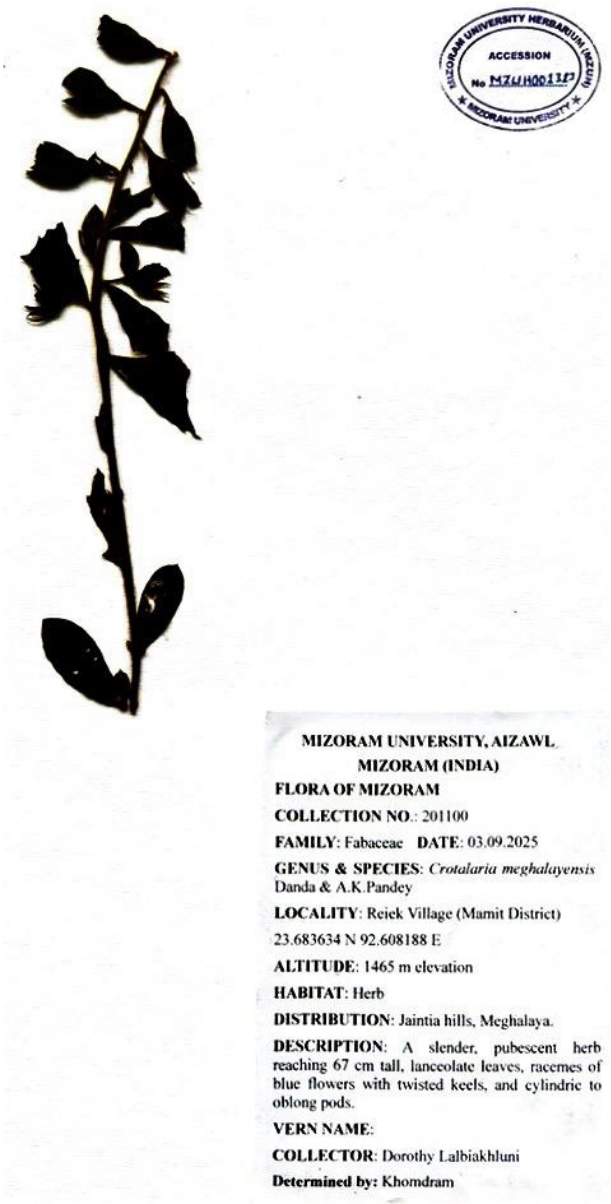

Image 7. Herbarium sheet of *Crotalaria meghalayensis* [# MZUH001313].

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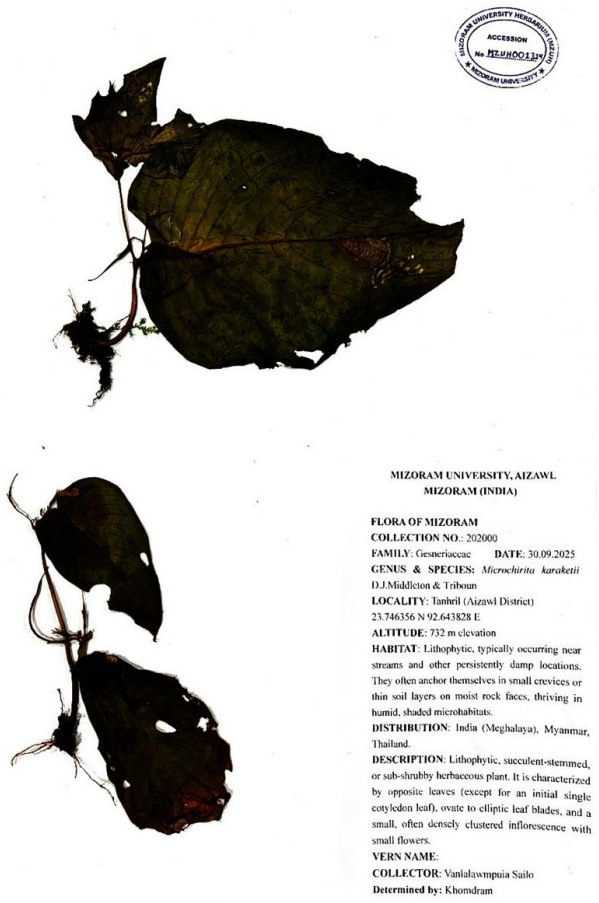

Image 6. Herbarium sheet of *Microchirita karaketii* [# MZUH001314].

Image 8. Herbarium sheet of *Mycetia malayana* [# MZUH001315].

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Image 10. Herbarium sheet of *Peliosanthes griffithii* [# MZUH001316].

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