

RESEARCH ARTICLE

***HUMBOLDTIA NAIRIANA* (FABACEAE-DETARIOIDEAE), A NEW SPECIES FROM KERALA, INDIA**

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Abstract: A new species of the genus *Humboldtia* (Fabaceae-Detarioideae), from Kerala (SW India), is described here with photographs. It is closely allied to *Humboldtia pomnudiana*, but differs in possessing warty bark; a creamy-white blaze; angled, glabrous branchlets; distinctly shorter, sparsely hairy, isometric stipules and appendages; relatively long petiolules; entire leaf margins; fewer lateral nerves, obscurely looped near the margins; flowers borne on long, axillary or lateral, erect racemes; larger flowers with comparatively long pedicels; glandular bracts and bracteoles; hairy styles; and elliptic-oblong fruits with a shorter beak. A detailed description, ecology and a key to the species for the identification of the genus is also provided.

Keywords: *Humboldtia*, Fabales, Kerala, Eudicots, South West India, Taxonomy

INTRODUCTION

The genus *Humboldtia* Vahl is a distinctive member of the subfamily Detarioideae within the family Fabaceae, as recognized by the Legume Phylogeny Working Group (LPWG 2017). The genus comprises 11 recognized taxa, in which 10 are strictly confined to the Western Ghats, underscoring this biodiversity hotspot as the primary centre of origin and diversification for the genus. The high degree of endemism exhibited by *Humboldtia* in this region highlights its significant evolutionary and biogeographical importance within the Indian subcontinent.

Among the members of the genus, *Humboldtia laurifolia* Vahl stands apart as the sole species endemic to Sri Lanka. Its restricted distribution outside the Indian mainland further emphasizes the genus's predominantly Western Ghats-centered radiation, while also reflecting historical floristic linkages between the southern Western Ghats and Sri Lanka (Sanjappa 1986, Sasidharan & Sujanalpal 2007, Udayan *et al.* 2007, Anoop *et al.* 2016a, 2016b, Kumar *et al.* 2022).

During a floristic exploration conducted in 2010 along the Cheenikkala–Pandimotta forest trail in the Shenduruney Wildlife Sanctuary, an unusual and taxonomically intriguing species of *Humboldtia* was collected. A few healthy seedlings were subsequently

introduced and established in the Arboretum of the Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) for *ex-situ* conservation and detailed observation. The plants adapted well to cultivation and, after a prolonged juvenile phase, commenced flowering and fruiting from 2022 onwards, eventually producing viable seedlings under garden conditions. The availability of flowering and fruiting material enabled comprehensive morphological assessment and critical comparison with existing literature (Sanjappa 1986; Sasidharan & Sujanalpal 2007; Udayan *et al.* 2007; Anoop *et al.* 2016; Kumar *et al.* 2022) and type descriptions. Although the specimens exhibit close affinity to *Humboldtia pomnudiana* E.S.S. Kumar *et al.*, they differ consistently in several diagnostic vegetative and reproductive characters. These stable and distinguishable features support the recognition of the taxon as a distinct species, which is herein described as new to science.

MATERIALS AND METHODS

The present study was undertaken as part of an ongoing programme on the *ex-situ* conservation of imperilled plant species of the Western Ghats. The taxonomic description is based on detailed examination of both living collections maintained under cultivation and herbarium specimens gathered

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during field surveys. Morphological characters were critically assessed through comparison with all relevant taxonomic literature, including the protologues, type specimens and authenticated collections of *Humboldtia* housed in the herbaria BM, C, CAL, K, L, MH and TBGT (herbarium acronyms following Thiers 2020+) to ensure accurate evaluation. Specimens preserved at BM, C, K and L were examined through high-resolution digital images accessed via JSTOR Global Plants (<https://jstor.org>), facilitating direct comparison with historical materials. The formal description was prepared primarily from fresh collections, which were meticulously studied under a Leica Wild M3Z stereo microscope at magnifications ranging from $\times 6.4$ to $\times 40$, enabling precise documentation of critical vegetative and reproductive characters.

Taxonomy

Humboldtia nairiana E.S.S.Kumar, Shareef *et* T.Sabu, *sp. nov.* (Figure 1)

Type:—INDIA, Kerala, Kollam District, Cheenikkala, ± 300 m., 15.03.2010, *E.S. Santhosh Kumar & S.M. Shareef 85818* (holotype TBGT!, isotype TBGT!, MH!, CAL!).

Diagnosis:—It is closely allied to *Humboldtia ponmudiana*, but differs in possessing warty bark; a creamy-white blaze; angled, glabrous branchlets; distinctly shorter, sparsely hairy, isometric stipules and appendages; relatively long petiolules; entire leaf margins; fewer lateral nerves, obscurely looped near the margins; flowers borne on long, axillary or lateral, erect racemes; larger flowers with comparatively long pedicels; glandular bracts and bracteoles; hairy styles; and elliptic-oblong fruits with a shorter beak.

Description:—Medium sized, evergreen tree, 5–8 m high; bark smooth, reddish brown, creamy-white blaze. Stipules ovate-lanceolate, 1.8–3.0 \times 0.8–1.2 cm, acuminate to cuspidate at apex, depressed glandular, sparsely brown; appendages 2.2–3.0 \times 1.5–3.0 cm, reniform, glabrescent at maturity. Leaves imparipinnate, 4–12 foliolate, rachis 20–45 cm long, obcordately and decurrently winged, wings reticulately veined, glabrous above, sparsely brown tomentose beneath; petiolule 8.0–10 mm long, not covered by rachis wings, sparsely brown tomentose; leaflets 10–30 \times 5.0–9.0 cm, ovate-lanceolate, narrowly elliptic or elliptic-lanceolate or elliptic-oblong, subcoriaceous, depressed glandular, broadly acute, rounded to subcordate at base, acuminate to caudate acuminate, margin not undulate, entire; midrib shallowly depressed above, slightly raised beneath. Lateral nerves 8–12 pairs,

shallowly depressed above and slightly raised beneath and arching 3.0–9.0 mm away from margin forming an obscurely intramarginal vein. Racemes 9.0–16 cm long, erect, axillary and lateral; peduncle 2.0–3.0 cm long, brown tomentose, many flowered. Flowers c.5 cm across at anthesis, pedicellate, pedicel 1.0–1.8 cm long, silky hairy. Bracts ovate, 1.3 \times 0.8 cm creamy-white, obtuse at apex, silky villous on both surfaces, glands present or absent, fugacious. Bracteoles 2, connate to middle or connate to middle on oneside, hairy on both surfaces, eglandular, 1.0–1.5 \times 1.0 cm, broadly obovate, obtuse at apex. Calyx tube 9.0–10 mm long, cylindrical silky villous; lobes 4, subequal, one larger than the rest, ovate-elliptic or linear-oblong, pink, 1.7–1.9 \times 0.7–0.9 cm, silky villous on both surfaces. Petals obovate to oblanceolate, 2.3–2.4 \times 0.8–0.9 cm, white with pink base, pilose within at the base, clawed, obtuse or acute at apex. Stamens 5, 3.8–4.0 cm long, filaments filiform, pink, sparsely pilose up to the middle; anthers 3.5–4.0 \times 1.0 mm, pink, obtuse at both ends. Ovary to 6.0–7.0 mm long, obliquely linear, silky villous, stipe 7.0–8.0 mm, silky villous; style 2.0–2.5 cm, pinkish, hairy upto 1/3 from the base; stigma capitate. Fruits 13–20 \times 4–5 cm, elliptic-oblong, compressed, velvety hairy, reticulate. Seeds 3–4, 3–4 cm across, suborbicular, flattened.

Phenology:—Flowering and fruiting occur during March–June.

Distribution:—It is so far known only from Kerala state (Thiruvananthapuram and Kollam districts).

Habitat, Ecology and Conservation status:—This species is found in the riparian forests of Cheenikkala in Shenduruney Wildlife Sanctuary about 300 m elevation in Agasthyamala Biosphere Reserve (ABR), Kerala. The main associated species are *Antidesma montanum* Blume, *Croton malabaricus* Beddome, *Dimocarpus longan* Loureiro, *Diospyros buxifolia* (Blume) Hiern, *Elaeocarpus tuberculatus* Roxburgh, *Humboldtia decurrens* Bedd. ex Oliv., *Humboldtia vahliana* Wight, *Pandanus thwaitesii* Martelli, *Syzygium stocksii* (Duthie) Gamble and *Vateria indica* L. The present population consists of less than 10 mature trees and several seedlings of various ages occupying an area of less than 2 km². Following the IUCN Red List criteria (IUCN 2024), *H. nairiana* is assessed as Data Deficient (DD).

Etymology:—This new species is named in honour of Prof. (Dr.) G. M. Nair, a distinguished Professor and former Director of the Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI), in recognition of his outstanding contributions to the

field of Botany and his dedicated efforts toward plant conservation. His extensive work in advancing botanical research and promoting the conservation of plant diversity has made a lasting impact on the scientific community.

Additional Specimens Examined: —INDIA, Kerala state, Thiruvananthapuram district, JNTBGRI Arboretum, 18.03.2026, *T. Sabu* 63235 (TBGT); *ibid.*, 25.03.2026, *T. Sabu* 63236 (TBGT).

Table 1. Diagnostic morphological characters of *Humboldtia nairiana* and related species

| Characters | <i>H. decurrens</i> | <i>H. bourdillonii</i> | <i>H. vahliana</i> | <i>H. ponmudiana</i> | <i>H. nairiana</i> |
|----------------|---|---|---|---|---|
| Bark | Rolled up, bluish green or brown; blaze pale pink | Smooth, dark brown mottled with white; blaze pale pink | Smooth, dark brown mottled with white; blaze pink | Warty, black, lenticellate; blaze light crimson | Warty, pale brown, lenticellate; blaze creamy-white |
| Branchlets | Pubescent when young, glabrous at maturity | Glabrous | Glabrous | Densely brown tomentose, glabrescent at maturity | Glabrous |
| Stipules | 5–8 × 1–2.5 cm, ovate to narrowly ovate, falcate | 2–3.5 × 1–1.5 cm, ovate, acute, prominently veined, glabrous | 1.5–3 × 2.2 cm, ovate-cordate, parallel veined, glabrous | 5.5–6.0 × 1.5–2.0 cm, ovate–lanceolate, slightly falcate, densely brown tomentose when young and glabrescent at maturity | 1.8–3 × 0.8–1.2 cm, ovate-lanceolate, depressed glandular, sparsely brown |
| Appendage | 2–4 × 1–2.5 cm, reniform, brown tomentose, depressed glandular | 0.8 × 0.6 cm, falcate-reniform, rounded, veined, slightly hairy | 1 × 2.2 cm, reniform, divergently veined, glandular, glabrous | 1.0–1.7 × 1.6–2.3 cm, reniform, obtuse or rarely acuminate on one side, densely tomentose when young, glabrescent at maturity | 2.2–3 × 1.5–3 cm, reniform, glabrescent at maturity |
| Leaves | 10–12 foliolate | 6–8 foliolate | 6–8 foliolate | 8–12 foliolate | 6–12 foliolate |
| Leaflets | 15–38 × 4–12 cm, narrowly ovate or elliptic, sometimes linear | 7.5–12 × 1.5–4 cm, linear to narrowly ovate | 12–25 × 3–5 cm, ovate to narrowly ovate or elliptic to narrowly elliptic | 10.5–37 × 3.0–7.0 cm, lanceolate or ovate-lanceolate | 10–30 × 5–9 cm, ovate-lanceolate, narrowly elliptic or elliptic-lanceolate or elliptic-oblong |
| Leaf base | Obtuse or rounded | Obtuse | Obtuse | Subcordate or rounded | Broadly acute, rounded to subcordate |
| Leaf apex | Obtuse to acuminate | Obtusely acuminate | Obtusely acuminate | Acuminate to caudate-acuminate | Acuminate to caudate acuminate |
| Leaf margin | Undulate | Slightly undulate | Entire | Slightly undulate | Entire |
| Lateral nerves | 15–18 pairs, deeply impressed above, prominently looped near margin | 7–10 pairs, obscurely looped near margin | 8–14 pairs, obscure above, slightly visible beneath, obscurely looped near margin | 10–19 pairs, shallowly depressed above, prominently raised beneath and looped near margin | 8–12 pairs, shallowly depressed above, slightly raised beneath, obscurely looped near margin |
| Petioulules | 4–5 mm long, covered by rachis wings, densely brown tomentose | 3–4 mm long, covered by rachis wings, stout, glabrous | 7–10 mm long, not covered by rachis wings, glabrous | 2–4 mm long, not covered by rachis wings, densely brown tomentose | 8–10 mm long, not covered by rachis wings, sparsely brown tomentose |
| Inflorescence | Racemes 5–8.5 cm long, | Corymbs to 5 cm long on | Racemes 10–15 cm long, axillary, | Racemes 5.0–9.0 cm long, axillary | Racemes 9–16 cm long, axillary and |

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| | axillary or cauliflorous, tawny villous | tubercles on main trunk and old branches; tawny velvety | racemes sometimes 2–3 per axil, brown velvety | or cauliflorous, brown tomentose | lateral |
| Flowers | Pink or white | Pinkish | White | White | White with pink base |
| Pedicels | 1–1.2 cm long, brown villous | 1.4–1.7 cm long, brown velvety | 5–6 mm long, brown tomentose | Sessile or rarely up to 0.2 cm long, brown villous | 1–1.8 cm long, silky hairy |
| Bracts | Broadly ovate, 7–8×5 mm, obtuse to acute at apex, brown villous without, glandular, fugacious | Ovate, 4 × 1.8 mm, acute, densely brown tomentose on both surfaces, glandular, fugacious | Lanceolate, 8–10×4 mm, acute, brown villous on both surfaces, eglandular, persistent | Broadly ovate, 1.0–1.2 × 0.7 cm, greenish white, acuminate at apex, brown villous and eglandular without, glabrous within, fugacious | Ovate, 1.3×0.8 cm, creamy-white, obtuse at apex, silky villous on both surfaces, glands present or absent, fugacious |
| Bracteoles | Connate at base, 7–13 × 4–5 mm, ovate, glandular, obtuse, brown villous on both surfaces | Connate almost throughout when young, splitting down to 1/3 at maturity, 8 × 1.5 mm, ovate-oblong, obtuse or rounded at apex, densely brown tomentose on both surfaces, glandular | Connate at base, 8–10 × 8 mm, obovate, rounded at apex, brown villous on both surfaces | Connate to middle in cauliflorous flowers or connate to middle on one side and free up to the base on the other side in axillary flowers, 1.0–1.3 × 0.7 cm, ovate, obtuse at apex, greenish-white, silky villous and glandular without, glabrous within | Connate to middle or connate to middle on one side, hairy on both surfaces, eglandular, 1–1.5×1 cm, broadly obovate, obtuse at apex |
| Sepals | Oblong or linear-oblong, rounded at apex, brown villous without, equal in size | Oblong, rounded at apex, densely brown tomentose on both surfaces, equal in size | Obovate-oblong, rounded at apex, slightly concave, brown villous without, equal in size | Elliptic-oblong or linear-oblong, subequal, one sepal larger than the rest, rounded at apex, silky villous on both surfaces | Ovate-elliptic or linear-oblong, crimson, subequal, one larger than the rest, silky villous on both surfaces |
| Petals | Pink or white, 2–2.5 × 0.5 cm, obovate or oblanceolate, clawed, obtuse to rounded at apex, pilose within at base (in cauliflorous flowers the petals to 2 × 0.5 cm, lanceolate, distinctly clawed, abruptly acute at apex, sparsely pilose at base within) | White with pink veins, 3 longer and 2 shorter, 16–20 × 6 mm, shortly clawed, obovate, obtuse to rounded at apex, sparsely pilose within, glabrous without, sometimes a brown gland present in the middle within, fugacious | White, 10–12 × 4 mm, obovate, shortly clawed, broadly rounded at apex, glabrous | White, 1.6–2.3 × 0.6–1.0 cm, obovate to oblanceolate, clawed at base, acute or slightly acuminate at apex, glabrous or minutely silky pilose along the midrib abaxially | White with pink base, 2.3–2.4 × 0.8–0.9 cm, obovate to oblanceolate, pilose within at the base, clawed, obtuse or acute at apex. |
| Ovary | 4.0–6.0 mm long, obliquely linear, brown villous, 3–6- | 8.0–10 mm long, obliquely oblong, brown | 4.0–5.0 mm long; obliquely linear, brown villous, 3–4 ovuled | 0.8–1.0 cm long, stipe 1.0–1.5 mm long, obliquely linear, silky | 6.0–7.0 mm long, obliquely linear, silky villous, 3–4 ovuled |

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| | ovuled | villous, 3–5 ovuled | | villous, 1–4 ovuled | |
| Style | 2 cm long, glabrous | 2 cm long, pilose | 1.0–1.5 cm long, pilose at base | 2.7–3.0 cm long, glabrous, rarely coiled | 2–2.5 cm, pinkish, hairy up to 1/3 from the base |
| Fruits | 7–12 × 4 cm, oblong or dolabriform, 2–3-seeded, brown, veined, rugulose and dark brown tomentose when young; sutures thick | 10–11 × 2.5 cm, oblong or dolabri-form, velvety brown pubescent, bright red or crimson, 3–5-seeded; sutures thick, valves prominently veins | 15–20 × 4–6 cm, elliptic, compressed; sutures thick (especially upper), valves prominently veined, brown villous, 3–4-seeded | 13–15 × 3–4 cm, oblong, silky tomentose; beak 2–2.5 cm long | 16–18 × 4–5 cm, elliptic- oblong, compressed, minutely densely hairy when young, obscurely reticulate |

Key to the species of *Humboldtia* Vahl

- 1. Stipules appendiculate at base 2
- 1. Stipules not appendiculate at base 9
- 2. Leaflets 4 3
- 2. Leaflets 6–12 4
- 3. Flowers crimson-red; petals up to 8 mm long; pods 1–2 seeded *H.brunonis* var. *raktapushapa*
- 3. Flowers white suffused with pink; petals 1.2–1.5 cm long; Pods 3–4 seeded *H.brunonis* var. *brunonis*
- 4. Rachis of leaves terete *H. laurifolia*
- 4. Rachis of leaves flattened and winged 5
- 5. Stipules 5–8 cm long 6
- 5. Stipules 2–3 cm long 7
- 6. Flowers with 1–1.2 cm long pedicels *H.decurrense*
- 6. Flowers sessile or rarely up to 0.2 cm long pedicels *H.ponmudiana*
- 7. Inflorescence corymbose, pods falcate, velvety *H. bourdillonii*
- 7. Inflorescence racemose, pods straight, tomentose 8
- 8. Bracts and bracteoles eglandular, sepals equal in size *H. vahliana*
- 8. Bracts and bracteoles glandular, one sepal larger than the rest *H. nairiana*
- 9. Flowers crimson, staminal filaments glabrous 10
- 9. Flowers white, staminal filaments pilose at base *H.sanjappae*
- 10. Leaflets 2 *H.unijuga* var. *unijuga*
- 10. Leaflets (4–) 6 (–8) *H.unijuga* var. *trijuga*

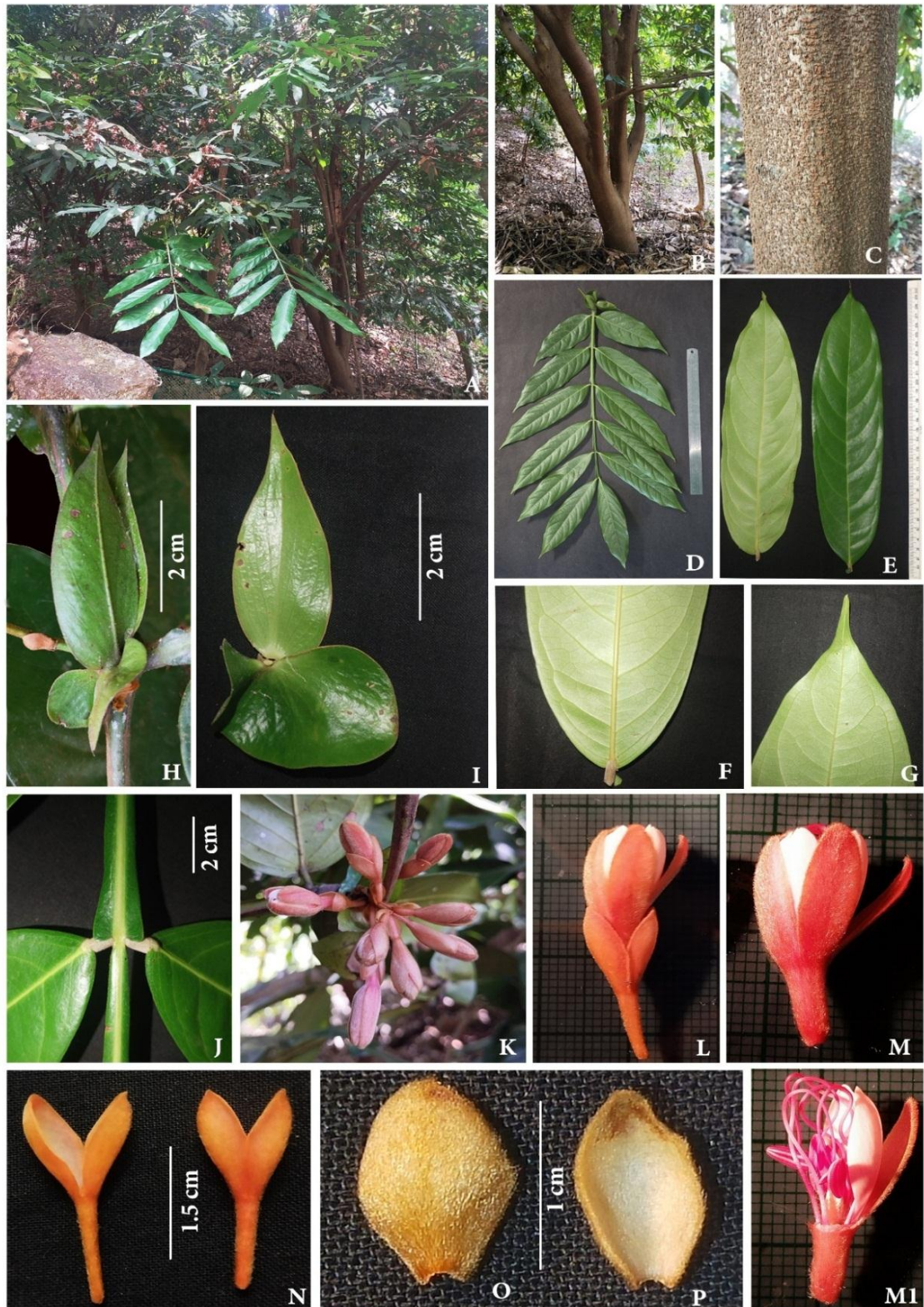


Figure 1. *Humboldtia nairiana* sp. nov. A. Habit, B. Basal stem region, C. Bark, D. Leaves, E. Leaflets, F. Leaflet-base, G. Leaflet-apex, H. & I. Stipules, J. Rachis showing petiolules, K. Flower buds, L. A Flower bud with bracteole, M. A flower bud removed bracteole, M1. A flower bud showing floral parts, N. Bracteoles with pedicels, O. & P. Bracts- dorsal and ventral view.



Figure 2. *Humboldtia nairiana* sp. nov. A. Inflorescences, B. A flower at anthesis, C. Calyx with ovary, D. A petal, E. A flower-(petals removed), F. A pistil, G. Ovary, H. L.S. of ovary showing ovules, I. Fruits, J. A seed.

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