

RESEARCH ARTICLE

Henckelia arupii (Gesneriaceae): A new species from Arunachal Pradesh, India

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Abstract

Henckelia arupii, a new species discovered from Arunachal Pradesh, India, is described and illustrated. The new species is superficially similar to *Henckelia adenocalyx* and three other Northeast Indian species in habit, in the broadly ovate foliaceous bracts covering the flower buds, in the parallel-convergent venation of the bracts and in the infundibuliform corolla. However, it differs in having cymes reduced to solitary flowers, a campanulate, narrowly pleated calyx and lanceolate to elliptic revolute calyx segments. A detailed description and photographic illustration of the morphological characters is presented. So far, *Henckelia arupii* is only known from the type locality.

KEYWORDS

Arunachal Pradesh, Gesneriad, *Henckelia*, India, new species

1 | INTRODUCTION

The genus *Henckelia* Spreng. is a member of the family Gesneriaceae. It presently includes about 75 species (GRC, 2022; Nampy et al., 2021; Shi & Yang, 2021; Shi et al., 2021; Taram et al., 2021). The genus is distributed in India, Bangladesh, Nepal, Bhutan, China, Myanmar, Sri Lanka, Thailand, Laos and Vietnam (Kanthraj et al., 2020; Taram et al., 2021). In India, the genus is so far represented by 36 species (GRC, 2022; Taram et al., 2021), 22 of them are found occurring in the North East India and the Himalayas (Borah et al., 2019; Kanthraj et al., 2020; Krishna & Lakshminarasimhan, 2018; Nampy et al., 2021; Taram et al., 2021). After recircumscription of the genus *Henckelia* (Weber et al., 2011), more than 17 species have been described (Shi & Yang, 2021). The *Henckelia* species of North East India along with the species found in Sri Lanka were formerly attributed to *Chirita* sect. *Chirita* (Möller et al., 2017; Weber et al., 2011). They are mostly characterized by a caulescent habit, decussate leaves, chiritoid stigma, orthocarpic capsules and unappendaged seeds (Möller et al., 2017; Taram et al., 2020). During our trips to the Mishmi Hills of Arunachal Pradesh (Eastern Himalaya) in September 2021, a couple of interesting specimens of *Henckelia* were collected.

They were critically examined and turn out to represent a new species. This new species has broadly ovate, parallel-convergent veined bracts enclosing flower buds and pedicel similar to four other North East Indian species of *Henckelia* (*H. adenocalyx*, *H. dasii*, *H. pathakii* and *H. umbellata*). Also, the yellow flowers found in this species are fairly uncommon as only few species of *Henckelia* with yellow flowers are known from India and China (*H. calva*, *H. dimidiata*, *H. pathakii*, *H. shuii*, *H. siangensis*, *H. xingpingensis*; Taram et al., 2020). However, corolla color can vary considerably within a single species due to edaphic, climatic or other factors (Wood, 1974). Therefore, the range of corolla color is amply documented below for the new and probably closely allied *Henckelia* species such as *H. adenocalyx*, *H. dasii*, *H. pathakii* and *H. umbellata* (Figure 3). This alliance is characterized by bracts enclosing flower buds and the venation type of bracts. A key to these species is provided.

2 | MATERIALS AND METHODS

Flowering specimens of the new *Henckelia* species were collected at the Lower Dibang Valley District of Arunachal Pradesh, North East India on 10 September

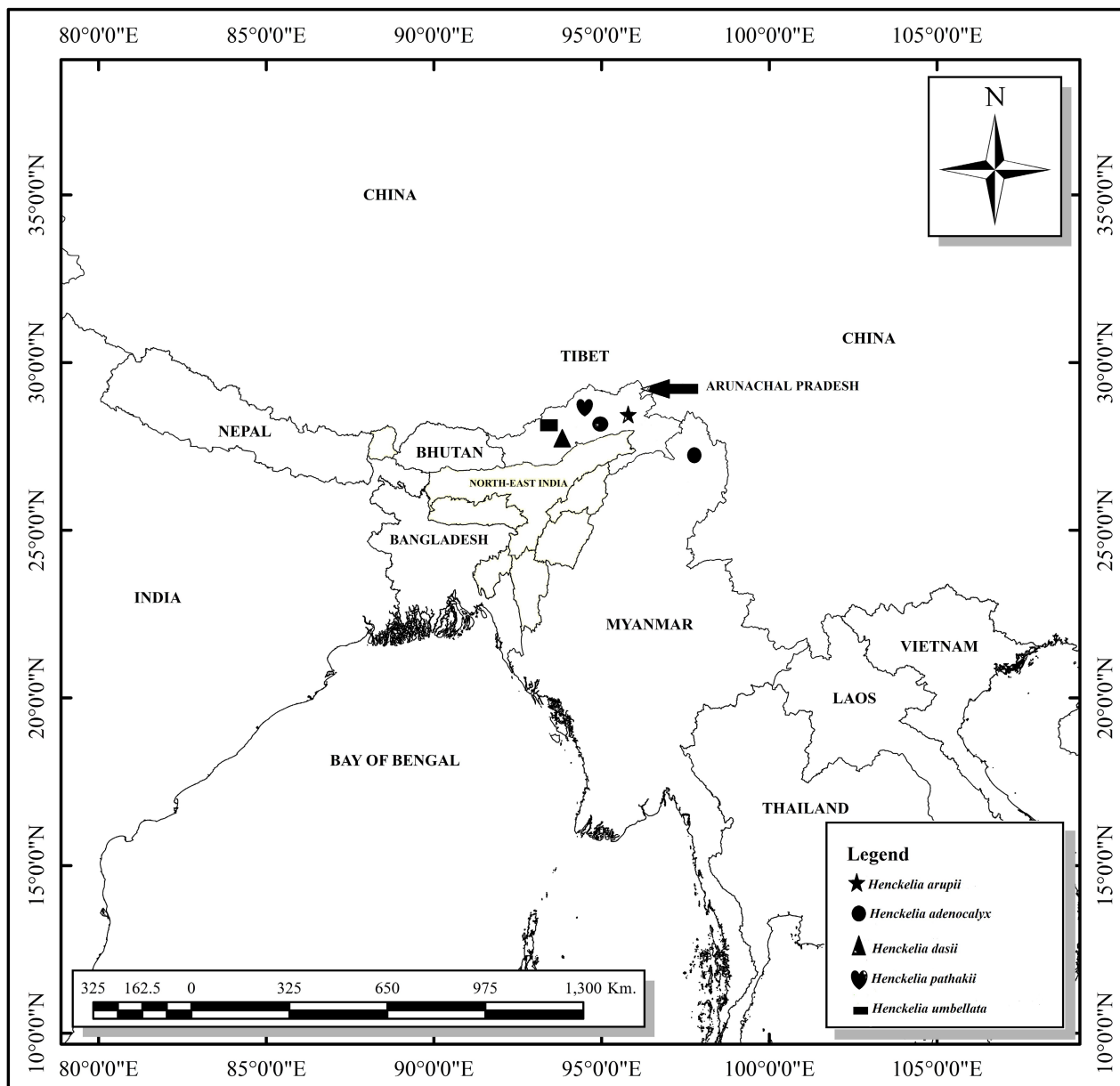


FIGURE 1 Map showing currently known localities of *Henckelia arupii* and its closely related species in Arunachal Pradesh, north East India.

2021 (Figure 1). All parts of the plant were photographed using a digital camera (Nikon COOLPIX B600, Nikon Inc.). GPS coordinates were recorded using GPS (Garmin Montana 680, Garmin Ltd.). The collected specimens were processed using standard herbarium methods (Jain & Rao, 1977) and deposited in the Indian herbaria ASSAM and CAL. Measurements of morphological characters were made in both freshly collected and dried specimens. Micro morphological characters were examined with a stereomicroscope (Leica S8APO, Leica Microsystems Inc., Germany). Relevant literatures were consulted (Borah et al., 2019; Bui et al., 2020; Burt et al., 1988; Cai et al., 2019; Chatterjee, 1948; Clarke, 1874, 1883; Hooker, 1885; Janeesha & Nampy, 2020; Kanthraj et al., 2020; Krishna

& Lakshminarasimhan, 2018; Middleton et al., 2013; Möller et al., 2017; Sinha & Datta, 2016; Sirimongkol et al., 2019; Taram et al., 2020, 2021; Wang et al., 1998; Weber et al., 2011; Weitzman et al., 1997; Wood, 1974; Yang et al., 2019) and digital images of type specimens available from K, E and PE, as well as actual sheets housed at ASSAM, ARUN and CAL were studied.

3 | TAXONOMIC TREATMENT

Henckelia arupii Taram & Tag, *sp. nov.* (Figure 2).

Diagnosis: The new species *Henckelia arupii* is significantly different from all other species of *Henckelia* by its cyme reduced to solitary, calyx campanulate,

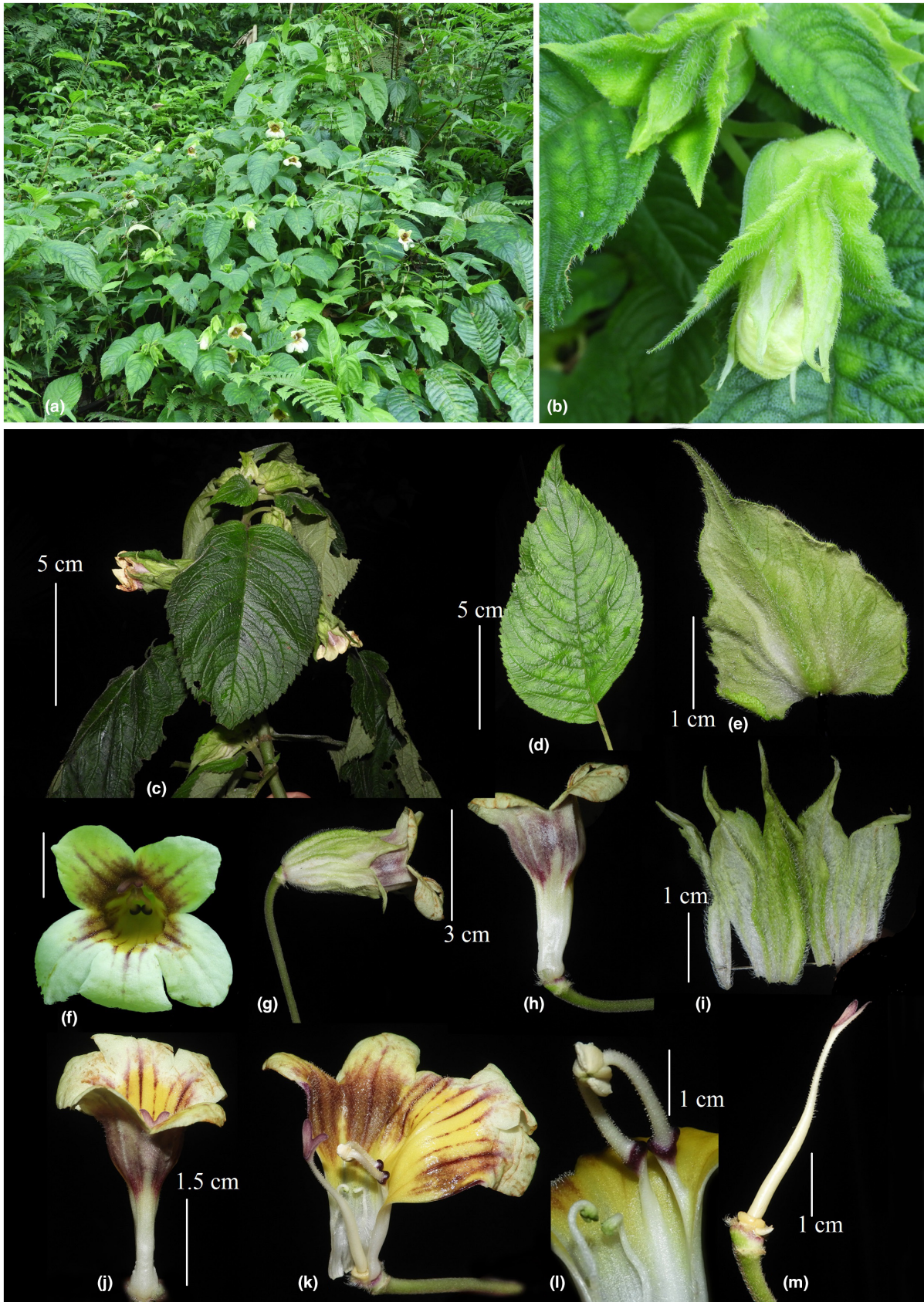


FIGURE 2 *Henckelia arupii* (a) habit. (b) Flowering buds. (c) Flowering plant. (d) Leaf. (e) Bracts. (f) Flower in frontal view. (g) Flower in side view. (h) Corolla in side view. (i) Calyx. (j) Corolla seen from above. (k) Dissected corolla. (l) Stamens and staminodes. (m) Pistil and disk. (photographs by Momang Taram).

narrowly pleated and lanceolate to elliptic-ovate revolute calyx segments. The species is superficially similar to *H. adenocalyx* (Chatterjee) D.J.Middleton & Mich.Möller in broadly ovate foliaceous bracts with prominent veins, parallel-convergent venation and annular disc, but can be easily distinguished by cyme reduced to solitary (vs. 1- several flowered cyme), calyx campanulate, narrowly pleated, (vs. tubular calyx), calyx surface hairy on both sides (vs. calyx glabrous inside and hairy outside) and lanceolate to elliptic revolute calyx segments (vs. narrowly triangular recurved calyx segments).

Type: India, Arunachal Pradesh, Lower Dibang Valley District, Tiwari Gao Area, 28°18'48"N, 95°57'34"E, 1109 m asl., 10 September 2021, *Ojar Taku* and *Momang Taram* 05009 (holotype CAL; isotype ASSAM, ARUN).

Perennial herb, erect with decumbent base, caulescent; stem 80–120 cm long, 0.7–1 cm in diameter, terete, pubescent. *Leaves* decussate; petiole terete, pubescent, slightly ridged at base, 4–12 cm long; lamina elliptic-ovate to lanceolate, 10–28 cm × 6.5–20 cm, base oblique, apex acute to shortly acuminate, margin serrate, dark green above, pale green below; glandular-pubescent on both surfaces, more prominent on veins; secondary veins 6–10 on each side, sub-opposite, raised beneath. *Inflorescences* solitary cyme per axils peduncle 5.8–6.5 × 0.4–0.5 cm, pubescent; pedicel pubescent, short, 0.2–0.4 cm long and 0.5–0.6 cm in diameter. *Bracts* 2, concealing the flower buds, foliaceous, pubescent, green, opposite, free but seemingly like connate due to overlap of margins, broadly ovate to elliptic-ovate, 5–6 × 3.5–4.5 cm, sub-entire to serrate, acute to acuminate, veins 7–11 prominent, parallel-convergent. *Calyx* creamy white to dark green, campanulate, 4.3–5.2 cm long, narrowly pleated 5-sect, densely pubescent outside, sparsely pubescent inside; tube 3–4.5 cm long; segments 4.3–5.2 × 0.9–1.2 cm, lanceolate to elliptic-ovate, sub-entire to serrate with revolute margin, acute to acuminate. *Corolla* infundibuliform, 4.8–5.1 × 3.3–3.6 cm across the mouth, dark pink to purplish brown stripes on lobes near throat, more prominent on lower lip, glandular pubescent on both sides (dense within tube), distinctly 2 lipped, lips divergent; upper (posterior) lip 2-lobed, sub-equal, broadly ovate, 1–1.5 × 1.4–1.6 cm, entire, tips round; lower (anterior) lip 3-lobed, sub-equal, broadly ovate, 1.3–1.5 × 1.2–1.5 cm, entire, apex rounded; tube 3.8–4.2 × 2.5–2.8 cm; throat dark yellow. *Stamens* 2, inserted 1.9–2.2 cm above corolla base, filaments 1–1.4 cm long, creamy white, glandular pubescent, strongly geniculate near base, knee dark pink; anthers 0.4–0.6 × 0.1–0.2 cm, cohering face to face. *Staminodes* 3, inserted at 0.9–1.2 cm above corolla base, lateral staminodes 2, divergent (sometimes coiled), 0.8–1.2 cm long, glabrescent to papillose, white, central staminode white, 0.4–0.6 cm

long, antherodes white-green, 0.2–0.3 cm long. *Pistil* 3.8–4.2 cm long; style 1.3–1.7 cm long, glandular pubescent; stigma chiritoid, dark pink, lower lip 2 lobed, lobes 0.4–0.6 cm × 0.3–0.4 cm, apex acute to round; disc yellow, annular, ca. 0.1 cm high; ovary 1.8–2.1 × 0.2 cm, creamy white, glabrous. Fruits not seen.

Phenology: Flowering: September–October.

Etymology: The species is named in the honor of Prof. Arup Kumar Das, Retired Professor of Botany, Rajiv Gandhi University, Rono Hills, Doimukh, Arunachal Pradesh, India, for his pioneering and invaluable contribution made toward understanding the flora and ethnobotanical knowledge of the Eastern Himalayan region of India.

Distribution: So far, *Henckelia arupii* is only known from type locality.

Habitat and ecology: The species was found growing in moist shady places along road and stream sides in association with *Henckelia grandifolia* A.Dietr. (Gesneriaceae), *Henckelia pumila* (D.Don) A.Dietr. (Gesneriaceae), *Begonia josephii* A.DC. (Begoniaceae), *Elatostema sessile* J.R.Forst. & G.Forst. (Urticaceae), *Pilea umbrosa* Blume (Urticaceae), *Nephrolepis cordifolia* (L.) C.Presl. (Nephrolepidaceae), *Impatiens citrina* Hook.f., *Impatiens arguta* Hook.f. & Thomson (Balsaminaceae).

Related species: *H. arupii* belongs to a group of North East Indian species characterized by foliaceous bracts concealing the flower buds and exhibiting a parallel-convergent venation (Figures 2 & 3). Here, a key to the species is provided:

1a. Leaves glabrescent above, glaucescent beneath, bracts fused to form a cup, coriaceous, calyx glabrous, corolla 3.5–4 cm long.....*H. pathakii*.

1b. Leaves pubescent or puberulent on both sides, bracts free opposite, chartaceous, calyx pubescent, corolla 4–7 cm long.....0.2.

2a. Inflorescence an umbel like cyme, pedicel 1.2–2.2 cm long, glabrous, disk tubular, 5-lobed, upto 7 mm high.....*H. umbellata*.

2b. Inflorescence axillary cyme, pedicel 2–8 mm long, hairy, disk annular ring, upto 2 mm high.....0.3.

3a. Lamina crenate–dentate, calyx urceolate, lobes 2–6 mm long, corolla with two yellow flanges from center of the tube to the lower lip.....*H. dasii*.

3b. Lamina serrate, calyx campanulate or tubular, lobes more than 10 mm, corolla slightly pouched, flanges absent.....4.

4a. Axillary cyme, 1—several-flowered, calyx tubular, lobes narrowly triangular, margin entire, apex recurved...*H. adenocalyx*.

4b. Axillary cyme reduced to a solitary flower, calyx campanulate, narrowly pleated, lobes lanceolate to elliptic-ovate, margin serrate, revolute.....*H. arupii*.

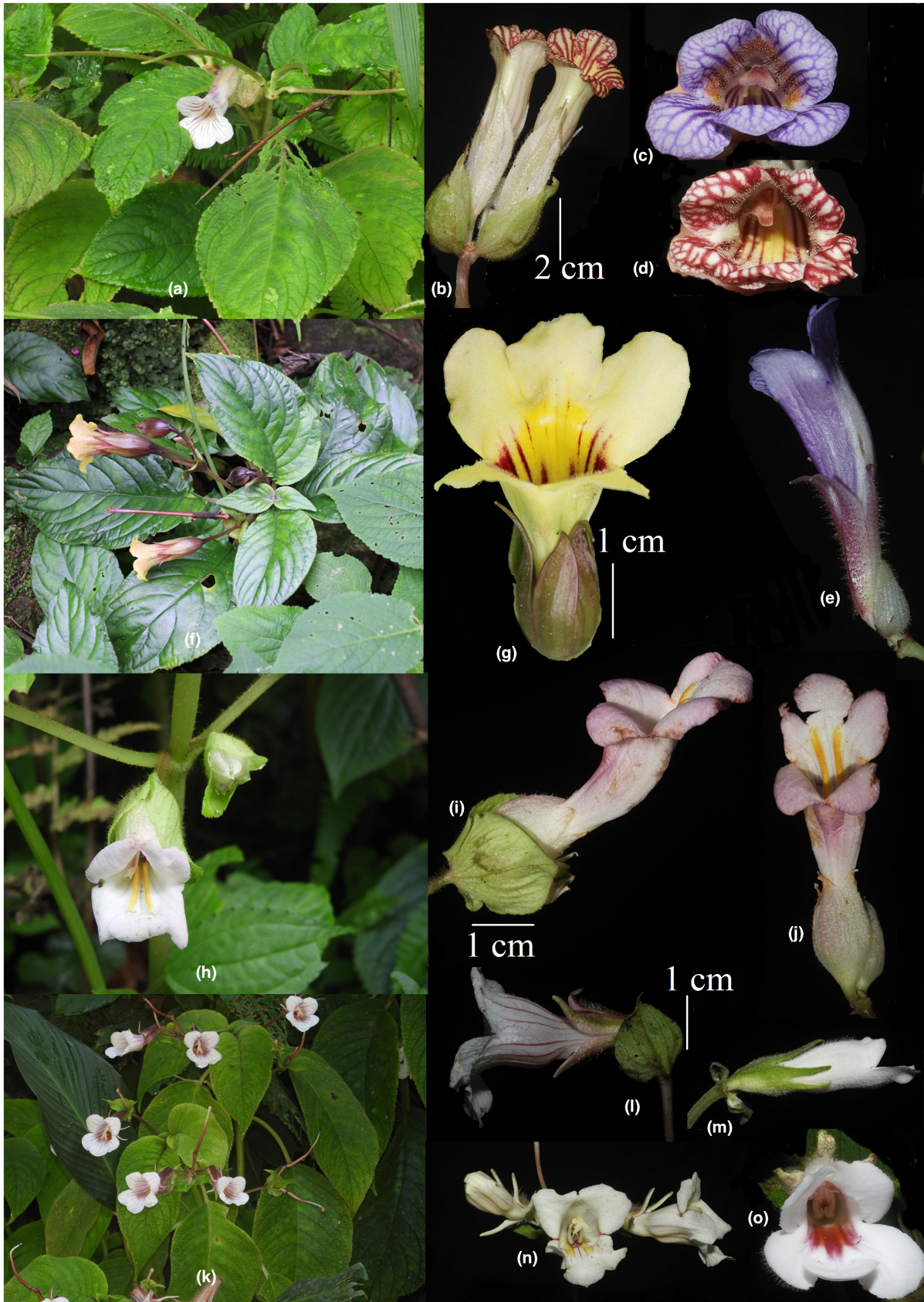


FIGURE 3 (a–e) *Henckelia umbellata*. (f–g) *Henckelia pathakii*. (h–j) *Henckelia dasii* (k–o) *Henckelia adenocalyx*.

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CONFLICT OF INTEREST

The authors declared that we have no financial/commercial conflicts of interest.

DATA AVAILABILITY STATEMENT

All the Data cited are either available in URL/DOI links provided in reference section and also available in printed books cited. These data cited/ mentioned in reference section are also available in libraries and reputed publishers online/offlines.

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