



# Two new records of *Henckelia* for India from Arunachal Pradesh

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Received: 26 June 2023 / Revised: 12 December 2023 / Accepted: 20 April 2024  
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## Abstract

Two species of the genus *Henckelia*, *H. forrestii* (J. Anthony) D.J. Middleton & Mich. Möller and *H. infundibuliformis* (W. T. Wang) D. J. Middleton & Mich. Möller are recorded as new for the Flora of India from Arunachal Pradesh, India. Extended taxonomic descriptions are provided for the species accompanied by photographs and ecology.

**Keywords** New records · Flora of India · Gesneriaceae · *Henckelia* · Arunachal Pradesh

## Introduction

The genus *Henckelia* Spreng. with 78 species, is distributed in Sri Lanka, South and Northeast India, Nepal, Bhutan, S China, N Vietnam, N Laos and N Thailand (*vide* Gesneriaceae Resource Centre, Royal Botanic Gardens, Edinburgh). In India, there are basically two groups of species in *Henckelia*, corresponding to species previously belonging to *Chirita* sect. *Chirita* in the northeast and those of *Henckelia* sect. *Henckelia* in South India. The species of Northeast India along with the others found in Sri Lanka formerly attributed to *Chirita* sect. *Chirita* (Moller et al. 2017) are characterized by caulescent habit, leaves in whorls of 2 or 3, and orthocarpic capsules dehiscent along both the upper and lower sutures (Wood 1974; Moller et al. 2017). *Henckelia* Spreng. is the largest genus of Gesneriaceae in India, so far it is represented by 41 species (*Vide* GRC RBGE), of which, 25 species occurs in Northeast India (Sinha and Dutta 2016; Krishna and Lakshminarasimhan 2018; Borah et al. 2019; Kanthraj et al. 2020; Taram et al. 2020, 2021, 2022) and 16 species in South India (Janeesha and Nampy 2020; Mathew et al. 2022).

## Materials and methods

While conducting routine botanical explorations for collections of Gesneriaceae in different parts of Northeast India we encountered several interesting specimen of *Henckelia* in flowers. After comparison with all the species found in India and neighboring regions using relevant literature (Wood 1974; Wang et al. 1998; Ranasinghe et al. 2016; Sinha and Datta 2016; Sirimongkol 2020), two of them are identified as new records for India and are reported here. Herbarium specimens were prepared following standard methods (Jain and Rao 1977) and deposited in the herbarium of the Rajiv Gandhi University, Arunachal Pradesh. Morphological observation and measurement of floral parts were carried out from fresh samples using a Stereo microscope (Stemi 508, Carl Zeiss) and photographed using a digital camera (Nikon D3300).

## Taxonomic treatment

### *Henckelia forrestii*

(J. Anthony) D.J. Middleton & Mich. Möller. *Taxon* 60(3): 775. 2011. Type: China, NW Yunnan, Beyti Shan, on moist humus-covered boulders by streams, 27°45'N, 100°18'E, 2133–2438 m a.s.l., June 1921 (flowering), Forrest 20,564 (lectotype, E00135139, designated in Wood 1974) (Fig. 1).

Basionym: *Chirita forrestii* J. Anthony, *Notes Roy. Bot. Gard. Edinburgh* 18: 192 (1934).

Synonym: *Didymocarpus forrestii* (Anthony) Hand.-Mazz., *Symb. Sin.* 7:882 (I ii 1936).

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*Chirita forrestii* var. *acutidentata* W.T.Wang, Acta Phytotax. Sin 13:103. (1975)

Perennial caulescent herb; stem erect, pubescent, 9–30 × ca. 0.3 cm, internodes 2–11 cm long. Leaves opposite; lamina ovate to ovate-elliptic, 6–10 × 3–5.5 cm, base oblique to rounded, margin serrate, apex acute, adaxially densely pubescent, abaxially densely pubescent along veins; lateral veins 5–9 pairs; petiole 0.8–4.0 cm long, densely pubescent, dilated at base and connate with the opposite one. Inflorescence axillary, 1–8-flowered cyme; peduncles 3–10 cm long, densely pubescent; bracts 2, opposite, free, lanceolate to triangular, 0.5–1.5 × 0.2–0.5 cm, margin sub entire, apex acute, pubescent; pedicels 1.5–3 cm long, densely pubescent. Calyx tubular, 5-lobed, fused upto the middle, later splitting to near the base; lobes broadly lanceolate, 0.8–1.8 × c. 0.2 cm, acuminate at apex, with entire margin, pubescent outside, glabrous inside. Corolla infundibuliform, 4.5–5.5 × 2.3–2.8 cm; throat with two yellow flanges and dark blue stripes on the lower side and two prominent longitudinal flaps at upper side, densely pubescent outside, glabrous inside; tube bluish purple to light blue, 3.5–4.5 cm long; limb bluish purple, distinctly 2-lipped; adaxial lip 2-lobed, lobes broadly ovate, c. 0.7 × 1–1.3 cm, rounded at apex; abaxial lip 3-lobed, with oblong lobes, 0.8–1.1 × 0.6–0.9 cm,

rounded at apex. Stamens 2; filaments adnate present at 1–1.2 cm above corolla tube base, slightly geniculate just below middle, twisted in lower half, white, sometimes with yellow marking, sparsely pubescent near the top; anthers coherent face to face, ca. 0.3 × 0.2 cm, glabrous. Staminodes 3; lateral staminodes ca. 0.5 cm long; central staminodes ca. 0.1 cm long. Pistil 3–4 cm long; stigma deeply 2-lobed, 0.3–0.5 cm long; style 0.6–1 cm long, pubescent; ovary 2.5–3 cm long, densely pubescent. Disk annular, white ca. 1 mm high. Capsule c. 12 cm long, linear, pubescent (Fig. 1).

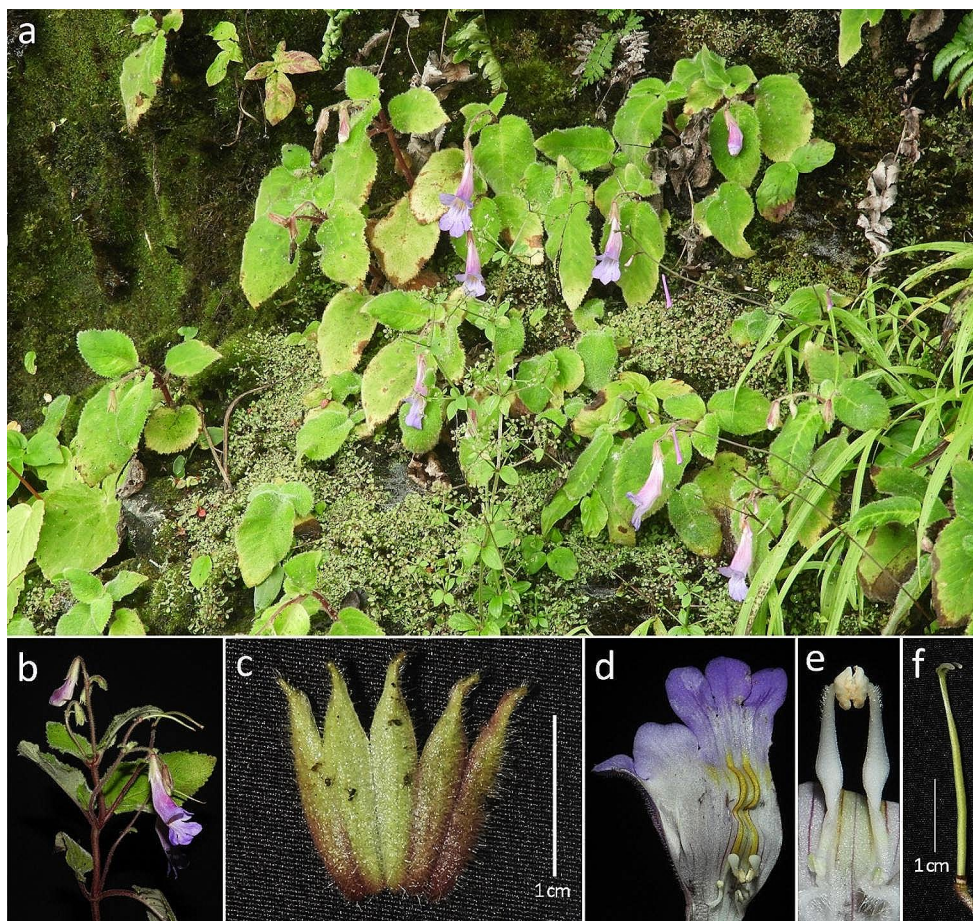
### Flowering and fruiting

July–October.

### Habitat and ecology

The species grows on rock surfaces at shady places in sub tropical forest in association with *Henckelia pumila* (D.Don) A.Dietr. (Gesneriaceae), *Impatiens arguta* Hook.f. & Thomson (Balsaminaceae), *Impatiens citrina* Hook.f. (Balsaminaceae), *Begonia asperifolia* Irmsch. (Begoniaceae), *Liparis*

**Fig. 1** *Henckelia forrestii* (J. Anthony) D.J. Middleton & Mich. Möller (a) Habitat. (b) Whole plant. (c) Calyx. (d) Split-ted corolla (e) Stamens. (f) pistil



sp. (Orchidaceae), *Elatostemma* sp. (Urticaceae), and other plant species.

### Distribution

China, India (Mishmi Hills of Arunachal Pradesh).

### Specimen examined

India, Arunachal Pradesh, Lower Dibang Valley, Mayudia, N 28°13' × 15'', E 95°51' × 46'', 1455 m amsl, 16-08-2021, M. Taram & O.Taku 128, Rajiv Gandhi University Herbarium; India, Arunachal Pradesh, Shi Yomi district, Tato, N 28°33' × 21'', E 94°13' × 38'', 1762 m amsl, 5-08-2022, M.Taram & D.Borah 9723 (Rajiv Gandhi University Herbarium; ARUN).

### Notes

*Henckelia forrestii* was described by John Anthony in 1934 on collections made by George Forrest on 1921 from NW Yunnan China (Wood 1974). The species superficially resembles *Henckelia pumila* (D.Don) A.Dietr. and, is often confused with this species, but can be recognized easily by its lanceolate to triangular bracts, bluish purple to light blue corolla tube with distinct flanges on lower lobes, persistent disc and glandular pubescence stamens, ovary and fruits. The species also resembles *Henckelia connata* X. Z. Shi & Li H. Yang (Shi and Yang, 2021) described recently from China, but ascertaining the correct relationship between both these species needs careful scrutiny of the type specimens. We also observed variations in its calyx lobes (splitting to base and non-recurved in collections from Mishmi Hills, where jointed without segmentation upto middle with lobes often recurved in the collections from Siang Hills). These collection represents its first record from India.

### *Henckelia infundibuliformis*

(W. T. Wang) D. J. Middleton & Mich. Möller, Taxon 60: 775. 2011. Type: Tibet, 1700 m a.s.l., 20th August 1974, Qinghai-Xizang expedition, collection no. 4437 (holo, PE [PE - 1110378 - 00032248]) (Fig. 2)

Basionym: *Chirita infundibuliformis* W.T.Wang, Acta Phytotax. Sin. 17(1): 111 (1979).

Perennial caulescent herb. Stems erect or decumbent 20–60 cm long, rooting at base, internodes 5–9 × 0.5–0.8 cm, densely pubescent. Leaves opposite; petioles 1–6 × 1–3 mm, pubescent; lamina ovate to elliptic-oblong, 8–14 × 4–8 cm, apex acute, margins serrate, base cordate to oblique or round, pubescent both sides; lateral veins 9–13 pairs, sub-opposite. Inflorescence axillary, 1 or mostly

2-flowered cyme; peduncles 4–7 cm long, stout, terete, densely hairy; bracts 2, free, enclosing the flower buds, orbicular to broadly ovate, 1.5–2 × 2–3 cm, seemingly connate due to overlapping margins; apex acute, margin serrate, purplish pink, pubescent outside, glabrous inside, veins prominent, parallel convergent; pedicels 0.3–0.7 cm long, pubescent. Calyx campanulate, 2–3 cm long, 5-lobed, fused almost up to middle, purplish-pink or greenish-white; lobes lanceolate to triangular, apex acuminate, reflexed, margin entire, pubescent outside, glabrous inside. Corolla purple-red, 4.5–5.2 cm long, outside sparsely puberulent, inside glabrous or glandular hairy; tube nearly tubular, c. 4 × 1 cm, distinctly 2-lipped; throat with yellow and maroon stripes; lobes purple; adaxial lip c. 6 mm; abaxial lip c. 8 mm. Stamens strongly geniculate; filaments c. 1.1 cm, glanduliferous apically; knee distinct maroon; anthers fused by entire adaxial surfaces, c. 6 mm, glabrous; staminodes 3, lateral staminodes c. 6 mm, central c. 1 mm. Disk creamy white, c. 2 mm high, margin irregular. Pistil 4–5 cm; ovary 1–1.5 cm, glabrous. Style puberulent; stigma deeply bilobed, c. 4 mm (Fig. 2).

### Phenology

July–September.

### Habitat and ecology

Grows on moist shaded areas at an elevation from 400 to 900 m asl in associations with *Viola* sp. (Violaceae), *Boeica filiformis* C.B.Clarke (Gesneriaceae), *Begonia handelii* Irmsch. (Begoniaceae), *Impatiens drepanophora* Hook.f. (Balsaminaceae), *Pilea umbrosa* Blume (Urticaceae), *Elatostemma* sp. (Urticaceae), ferns, liverworts and mosses.

### Distribution

SE-Tibet, India (Arunachal Pradesh).

### Specimen examined

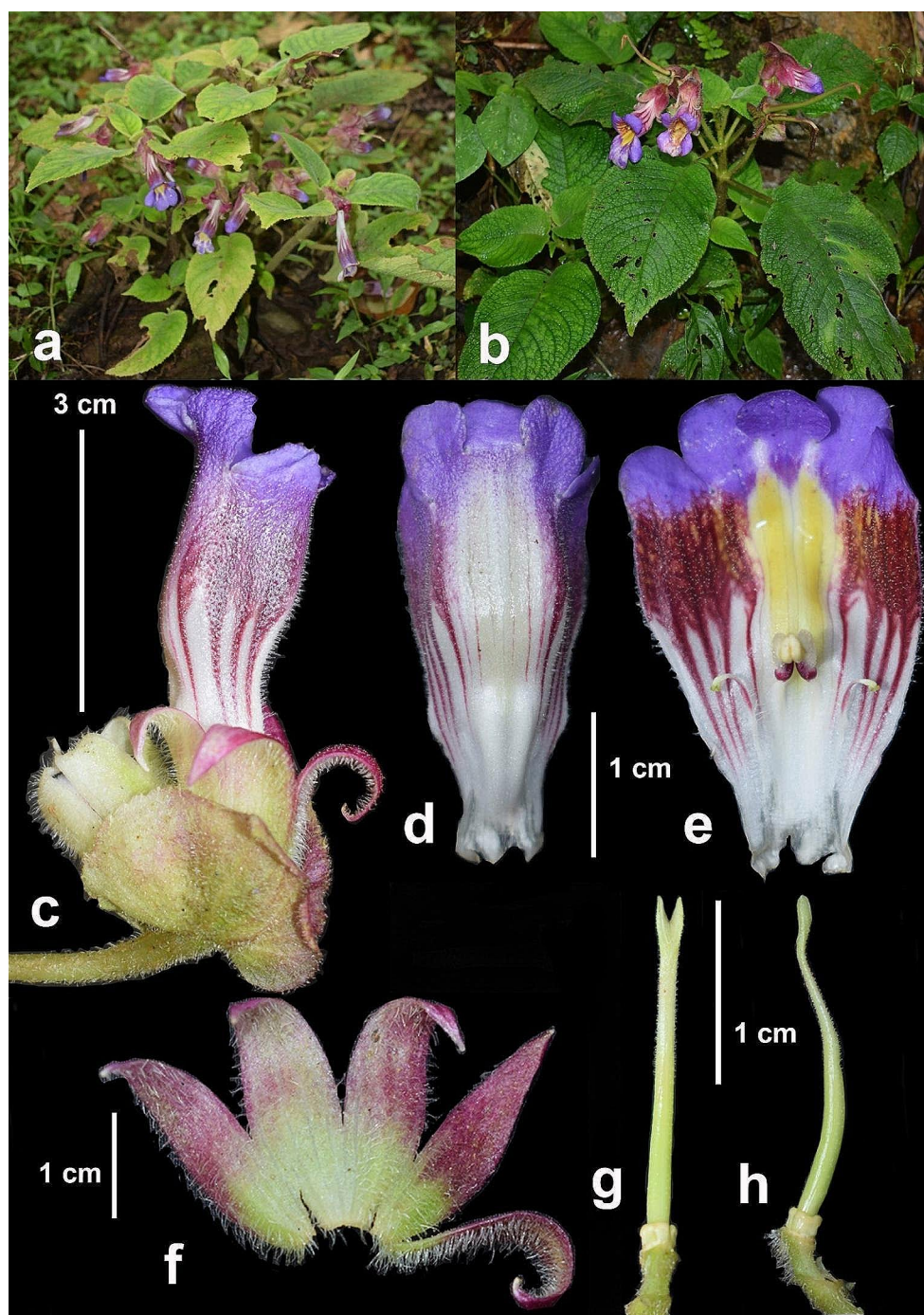
India, Arunachal Pradesh, Upper Siang, Geku to Katan road, 550 m amsl, 5.08. 2022, Momang Taram-9725, Rajiv Gandhi University Herbarium.

### Notes

*Chirita infundibuliformis* was described by W. T. Wang (1979), based on specimens from the Tibet Autonomous Region. Later, Krishna and Lakshminarayan (2018) described *Henckelia pathakii* (2018: 397) based on specimens collected from Tuting, Arunachal Pradesh. While



**Fig. 2** *Henckelia infundibuliformis* (W. T. Wang) D. J. Middleton & Mich. Möller (a–b) Habitat and habit. (c) Inflorescence with orbicular bracts. (d–e) corolla. (f) calyx. (g–h) pistil



describing *H. pathakii*, the authors diagnosed it with *H. grandifolia* and *H. adenocalyx* as allied taxa. However they were not aware of *H. infundibuliformis* so far known from China. *H. pathakii* differed from all Indian species of *Henckelia* by cupular (infundibuliform) bracts forming a funnelform involucre, glabrous calyx divided up to middle, which are also shared by *H. infundibuliformis*. The difference observed from the protologue of *H. pathakii* and *H. infundibuliformis* are glabrous corolla in *H. pathakii* (which is erroneous as white pubescence can be observed in

the photo plate provided in the protologue as well as specimens collected from Siang by the present authors). But on observation in the field, we found the bracts are overlapping at margin, appearing connate in *H. infundibuliformis*, whereas in *H. pathakii* it is completely connate. Apart from *H. pathakii*, *H. infundibuliformis* is also similar to *H. urticifolia* in calyx texture, strongly reflexed calyx, corolla shape and colour however can easily separated by the shape of its bracts. This collection represents its first record from India.

**Acknowledgements** The authors are thankful to Ojar Taku for his help in collection.

**Data availability** Data will be made available to only on personal request.

## Declarations

**Conflict of interest** The authors declare that they have no conflict of interest.

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