Taiwania 63(4): 397-401, 2018
DOI: 10.6165/tai.2018.63.397

A new species of *Henckelia* (Gesneriaceae) from Arunachal Pradesh, India

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(Manuscript received 29 May 2018; accepted 31 October 2018; online published 9 November 2018)

ABSTRACT: *Henckelia pathakii* G. Krishna & Lakshmin. *sp. nov.*, is described and illustrated here from Upper Siang district of Arunachal Pradesh, India. It differs from its closely related species *H. adenocalyx* and *H. grandifolia* in having cupular bracts (vs. free and slightly connate at base) and glabrous (vs. densely hairy or sparsely pubescent), eglandular calyx. As it is narrowly confined to Upper Siang district of Arunachal Pradesh in a small population comprising about 20 individuals in a single location. The threat status of this new species is provisionally assessed here as "Critically Endangered" following the IUCN Red List Categories and Criteria version 3.1 (2012).

KEY WORDS: Arunachal Pradesh, Gesneriaceae, *Henckelia pathakii*, India.

INTRODUCTION

The genus *Henckelia* Spreng. was established in 1817 with the species *H. incana* (Vahl) Spreng., presently belongs to the subfamily Didymocarpoideae Arn., tribe Trichosporeae Nees and sub-tribe Didymocarpinae G. Don (Weber *et al.*, 2013). The genus *Chirita* Buch.-Ham. ex D. Don, revised by de Candolle (1845), and subsequently followed by Clarke (1883) and Wood (1974) also included *Didymocarpus* Wall. Weber and Burtt (1997) resurrected *Henckelia* Spreng. from the synonymy of *Didymocarpus* Wall. Subsequently, Weber *et al*. (2011) remodeled the genus to include the species of *Henckelia* sect. *Henckelia*, *Chirita* sect. *Chirita* (excluding the species under *Damrongia* Kerr ex Craib), the monotypic genus *Hemiboeopsis* W.T. Wang and excluded the species of *Henckelia* belongings to sections *Loxocarpus*, *Didymanthus*, *Heteroboea* and *Glossadenia* and recognized 56 species, distributed in Bhutan, India (Northeast and Southern regions), Nepal, Vietnam, Laos, Thailand, Sri Lanka and China (Middleton *et al.*, 2013). In recent years, three new species from India namely *H. pradeepiana* Nampy *et al*. (Manudev *et al.*, 2012), *H. sivagiriensis* (Rajakumar, Selvak., S. Murug. & Chellap.) E.S.S. Kumar (Kumar, 2014), and *H. bracteata* Janeesha & Nampy (Janeesha & Nampy, 2015) and *H. wijesundarae* Ranasinghe & Mich. Möller from Sri Lanka (Ranasinghe *et al.*, 2016) have been described, thus totaling 60 species in the world (Möller *et al.*, 2017).

In India, there are basically two groups of species in *Henckelia*, corresponding to species previously belonging to *Chirita* sect. *Chirita* (predominantly with caulescent habit with internodes and leaves in whorls of 2 or 3 and orthocarpic capsules, dehiscing along both upper and lower sutures) distributed in the northeastern India and Sri Lanka and those of *Henckelia* sect. *Henckelia* (predominantly with leaves in a basal rosette and plagiocarpic capsules opening along the upper suture only in southern India) (Möller *et al.*, 2017). At present, there are 32 species in India (Möller *et al.*, 2017), of which 15 are confined to northeastern states (Sinha & Datta, 2016).

During the botanical explorations in Upper Siang district, Arunachal Pradesh, a localized population of about 20 individuals of *Henckelia* Spreng. was found. These plants appeared different from all the known species of *Henckelia* Spreng. and upon scrutiny of literature with fresh and herbarium specimens described as a new species.

TAXANOMIC TREATMENT

Henckelia pathakii G. Krishna & Lakshmin., ***sp. nov.***
Figs. 1 & 2.

The new species can easily be distinguished from *H. adenocalyx* in glabrous nature of calyx (vs. hairy outside and sessile glands often on both surfaces); corolla glabrous (vs. puberulous corolla); leaves variegated, sparsely adaxially hairy to glabrescent, glabrous beneath except midvein and lateral veins (vs. non-variegated, hairy on both sides) and bracts 2, red-greenish, fused forming a cup, coriaceous, glabrous (vs. bracts 2, greenish, free or adnate at the base, chartaceous, hairy). It differs from its another closely related ally, *H. grandifolia* by having cupular, glabrous bracts and glabrous corolla (vs. externally pubescent corolla). Comparison of diagnostic characters between the allied species is provided in detail in Table 1.

Type: INDIA. Arunachal Pradesh: Upper Siang district, On the way Tuting to Yingkiong, 28°52'39" N, 94°58'95" E, 1870–2000 m, 19 September 2011, *M.K. Pathak & Gopal Krishna* 134270 (holotype: CAL; isotypes: CAL, ARUN)

Table 1: Distinguishing characters between ***H. pathakii***, *sp. nov.*, ***H. adenocalyx*** (Chatterjee) D.J. Middleton & Mich. Möller and ***H. grandifolia*** A. Dietr.

Characters	***H. pathakii***	***H. adenocalyx***	***H. grandifolia***
Leaves	Variegated, sparsely adaxially hairy to glabrescent, glabrous beneath except hairy mid and lateral veins	Non-variegated, densely pubescent on both surfaces of midrib and lateral veins of the lower surface with red-brown hairs	Non-variegated, hairy to sparsely hairy, hairs evenly dispersed on the upper surface, midrib and lateral veins of the lower surface
Bracts	Reddish green, glabrous, usually margins of opposing bracts fused to form a cup, broadly obovate, *c.* 2.5 × 2.8 cm, acute at apex, coriaceous	Green, opposite, densely hairy to hairy, free, connate at the base, broadly ovate, *c.* 2.8 × 1.8 cm, acuminate at apex, chartaceous	Green, sparsely pubescent, free, orbicular, *c.* 1 cm across, chartaceous
Inflorescence	Usually 3-flowered, rarely 1 or 2; peduncles *c.* 5 cm long, densely pubescent	Usually 2 or 3-flowered, rarely solitary; peduncles (1–)2–4 cm long (rarely up to 8 cm), densely pubescent	Usually 6-flowered, rarely 1 or 2; peduncles usually above 8 cm long (up to 14 cm), sparsely hairy
Calyx	Reddish green, coriaceous, 2.2–3 cm long; lobes triangular-ovate, 1.3–1.5 × 0.4–0.6 cm, acute at apex, tips not recurved, glabrous on both sides, eglandular	Greenish, chartaceous, 2.4–2.6 cm long; lobes narrowly triangular, 1.1–1.3 × *c.* 0.4 cm, acuminate, tip often recurved, densely hairy on outer surface, glabrous in, white or red-brown sessile glands often visible on both surfaces	Greenish, 1.5–2.5 cm long, glabrous; lobes narrowly triangular, *c.* 1 × 0.4 cm, glabrous, eglandular
Corolla	Bright yellow with dark yellow and purple marking in throat; lobes yellow with purple marking 3.5–4 cm long, glabrous throughout	Yellow or purple, pink, red or yellow markings in the throat; lobes white, 4–5 cm long, sparsely hairy outside, glandular in the throat	Yellow without any marking in throat, narrowly funnel-shaped; lobes yellow, 4.5–6 cm long, slightly hairy outside, glabrous inside
Stamens	Filaments 6–8 mm long, glanduliferous	Filaments *c.* 10 mm long with sessile glands	Filaments c. 7 mm long, glabrous
Staminodes	2, densely hairy	2, hairy with long and fine hairs	3(2), slightly hairy distally
Disk	Annular, *c.* 0.5 mm high	Annular, *c.* 2·5 mm high	Annular, *c.* 0.5 mm high
Ovary	Glabrous	Glabrescent	Sparsely hairy

Herbs or undershrubs, caulescent, 30–40 cm high, branched. Mature stems terete, *c.* 5 mm across, rusty pubescent throughout; young stems cylindric, *c.* 3 mm across, fleshy, with fine hairs scattered throughout. Leaves opposite, whorled at nodes, rarely decussate, oblong to oblong-ovate, 9–17 × 3.5–8.5 cm, acute to shortly acuminate at apex, serrate-hirsute at margins (faintly serrate in immature leaves), oblique to cordate at base, auricled on one side in matured leaves, coriaceous, variegated on upper side, sparsely hairy to glabrescent above, glaucescent beneath, glabrous except veins; midvein prominent beneath, hirsute; secondary veins 6 or 7 pairs, densely hairy beneath; petioles cylindric, slightly ridged at base, 1.5–4 cm long, fleshy, densely brown-hairy throughout, dull green. Cymes terminal and axillary, (1)–(2) or 3-flowered; peduncles 3–5 cm long, densely brown-pubescent; bracts 2, reddish green, usually margins of opposing bracts fused to form a cup, *c.* 3 cm across, rarely free almost up to base, broadly obovate, *c.* 2.5 × 2.8 cm, acute at apex, coriaceous, concealing the pedicels and the flower buds; pedicels 2–2.9 cm long, rusty pubescent. Calyx reddish green, glabrous, coriaceous, 5-lobed, 2.2–3.1 cm long; lobes free up to half of calyx, triangular-ovate, 1.3–1.5 × 0.4–0.6 cm, acute at apex; tube *c.* 1.2 cm long. Corolla bright yellow with dark yellow and purple marking in throat, more prominent on upper lip, glabrous, chartaceous, 3.5–4 cm long, distinctly 2-lipped, lips divergent; upper lip 2-lobed, lobes broadly ovate, *c.* 1 × 1 cm, acute at apex; lower lip 3-lobed, lobes subequal, oblong-ovate, 1.1–1.2 × *c.* 1 cm, obtuse at apex; tube *c.* 3 cm long; faintly veined. Stamens 2, filaments 6–8 mm long, geniculate at base, inserted above 1.5 cm to corolla base, bright yellow, glanduliferous; anthers *c.* 4 mm long, adaxially fused, maroon, glabrous. Staminodes 2, divergent, *c.* 6 mm long, hirsute. Disk present at base of ovary, annular, *c.* 0.5 mm high. Pistil *c.* 3 cm long; ovary *c.* 1.8 cm long, glabrous; style glandular-hairy; stigma bifid, *c.* 2 mm long.

***Phenology*:** Flowering during August–September.

***Etymology*:** The specific epithet is named in honour of late Dr. M.K. Pathak (Botanist), Botanical Survey of India, for his significant contribution to the Flora of Arunachal Pradesh, India, who passed away suddenly on 7 Feb. 2013.

Distribution and habitat: *Henckelia pathakii* is known only from the type locality, Upper Siang district of Arunachal Pradesh, India growing at an elevation of 1980 m, on outcrops of shaded moist hillslopes in subtropical evergreen forests. (Fig. 3)

***Conservation Status*:** During the study, about 20 mature individuals were recorded from single locality in Upper Siang district of Arunachal Pradesh. It is provisionally assessed here as "Critically Endangered" following the IUCN Red List Categories and Criteria version 3.1 (2012). Grazing and forest fires are two plausible threats to this species.

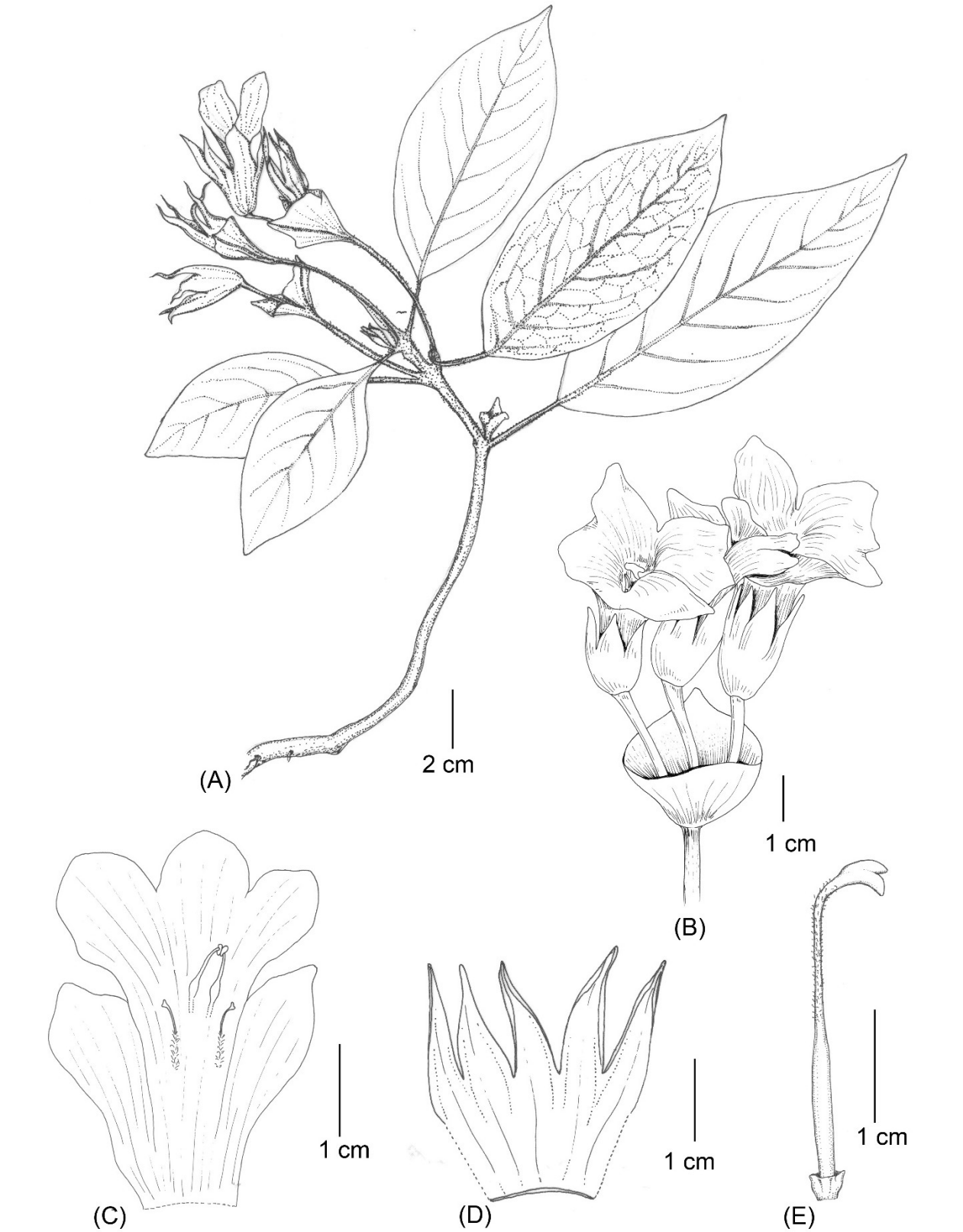

Fig. 1. ***Henckelia pathakii*** G. Krishna & Lakshmin. sp. nov. (**A**) Flowering twig, (**B**) Inflorescence with cupular bract, (**C**) Corolla split open (showing stamens and staminodes), (**D**) Calyx splitted, (**E**) Pistil with disk [Drawn by Dineshwar Kumar Sah, (**A**–**E**) from holotype M.K. Pathak & Gopal Krishna 134270]

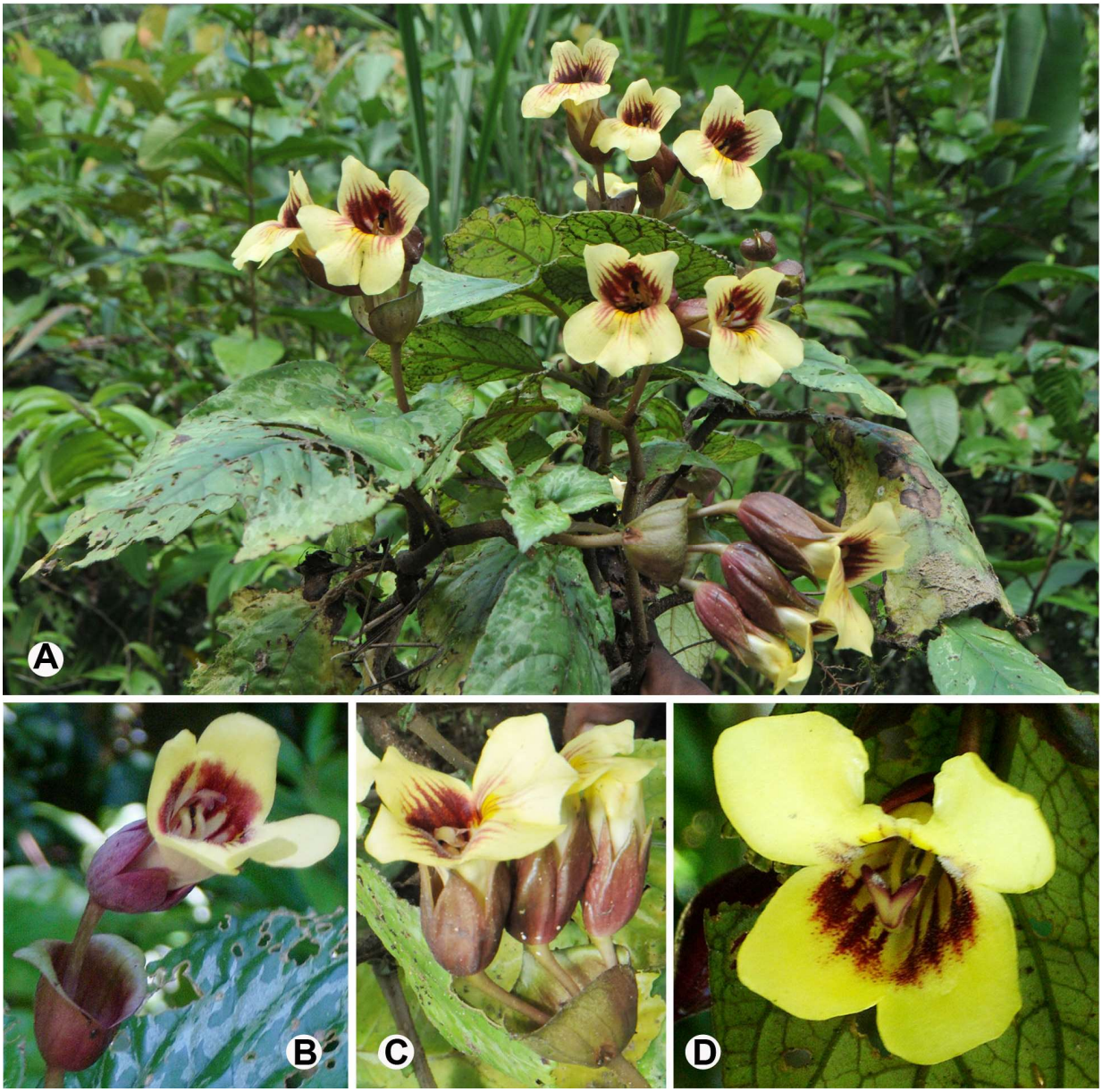

Fig. 2. ***Henckelia pathakii*** G. Krishna & Lakshmin. sp. nov. (**A**) Habit, (**B**) Solitary flower with cupular bract, (**C**) Inflorescence with cupular bract, (**D**) Corolla front view (stigma visible) Photographed by Gopal Krishna]

ACKNOWLEDGEMENTS

The authors are grateful to Director, Botanical Survey of India and Dr. P.V. Prasanna, Scientist-in-Charge, Central National Herbarium, BSI, Howrah (CAL), for facilities and encouragement. They thank the Principal Chief Conservator of Forests, Arunachal Pradesh, for permission. They are also thankful to the Curators of K, for providing the virtual images of type specimen(s) and BM for permitting us to consult specimens. Our thanks are also due to Dr. Kanchi N. Gandhi, Senior Nomenclatural Registrar, HUH, USA, for his suggestion on the specific epithet ending, Prof. Michael Möller, Molecular Systematist/Cytologist, Royal Botanic Garden Edinburgh, Edinburgh, UK, for his valuable suggestions on the species, Dr. D.J. Middleton, Director, Singapore Botanical Garden, for his help in providing the literature, Dr. Avishek Bhattacharjee, Scientist, CNH, BSI, Howrah for help in preparing the distribution map and Mr. D.K. Sah, Artist, CNH, BSI, for illustration. We thank Dr. S. Karthikeyan, former Deputy Director, BSI Pune and Dr. W. Arisdason, Scientist, CNH, for critically going through the paper and for their valuable comments.

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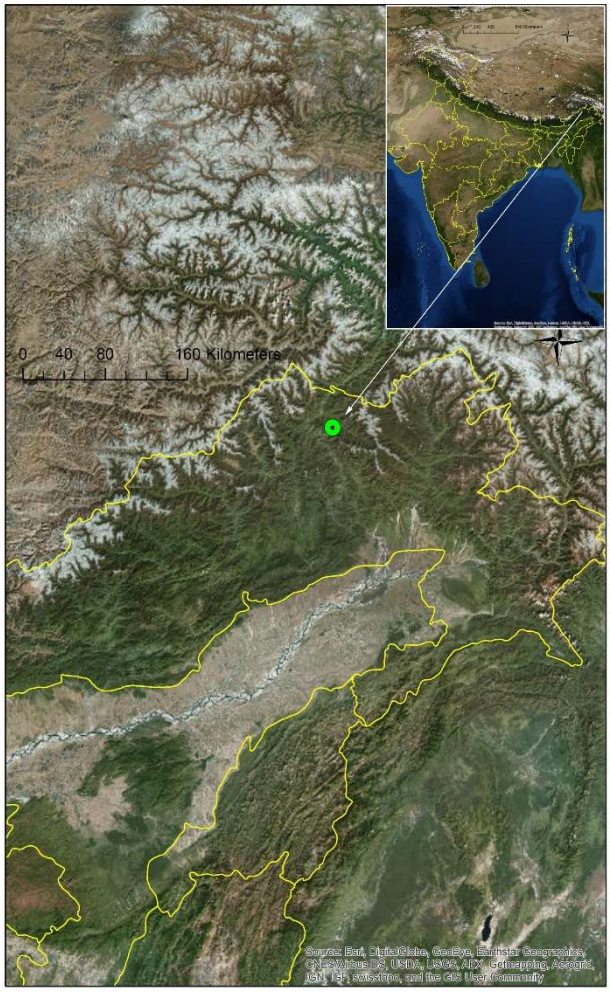

Fig 3. Distribution of ***Henckelia pathakii*** G. Krishna & Lakshmin., sp. nov.