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NOTE

Rediscovery of *Epilobium trichophyllum* Hausskn.: a rare and endemic plant from Sikkim Himalaya, India

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Epilobium trichophyllum Hausskn. was described in 1879 based on J.D. Hooker & Thomson collection from Lachung Valley, Sikkim in July 1849. Simultaneously, in the same year C.B. Clarke (1879) had described *Epilobium origanifolium* var. *villosum* based on another specimen from the same collection housed at K. Haussknecht (1884); later Raven (1962) treated both the names as conspecific. The species is characterized by the presence of densely villous hairs throughout the plant. Since its original collection in 1849, this species has never been recollected until Aswal & Mehrotra (1994) reported it from Lahaul-Spiti, Himachal Pradesh based on their collection [Aswal 6780 (CDRI- Central Drug Research Institute, Lucknow)]. Later, Srivastava & Shukla (2015) reported this species from the cold desert area of western Himalaya based on the same collection of Aswal. During the present study, in order to confirm the identity of the specimen reported as *Epilobium trichophyllum* by Aswal & Mehrotra (1994), image of [Aswal 6780 (CDRI) was examined. Closer examination revealed that the specimen has morphological characteristics similar to *Epilobum amurense* Hausskn., and not *E. trichophyllum* as identified by them. The image was compared with the type specimen image of *E. trichophyllum* and observed as remarkably different (Image 1–2, Table 1). The dense villous hairs were not found throughout the cold desert specimen to determine this as *E. trichophyllum*. Thus, its occurrence report from western Himalaya can be excluded. Despite its report from Lahul-Spiti in 1994, the species was mentioned as presumably extinct and endemic to Sikkim in the treatment of family Onagraceae by Paul (1998).

During the revisionary studies on the family Onagraceae for Flora of Sikkim, the authors came across few unidentified specimens of *Epilobium* collected from Sikkim and housed at herbarium of Botanical Survey of India, Sikkim Himalayan Regional Centre (BSHC). The specimen Pradhan & Giri 29191 collected in 2006 from Zema-1 (Lachen to Thangu) composed of two specimens representing two species of *Epilobium*. Upon critical study and comparison with type images, one of them [29191A (Image 3)] was identified as *E. trichophyllum* by virtue of the presence of villous hairs throughout the plant. The other specimen (29191B) could be identified as *Epilobium sikkimense* Hausskn. (Table 1). Both the species are quite similar in appearance and can easily be mistaken for each other. Thus, the specimen (29191A) represents the second report of the species after a gap of 157 years. The locality of the present collection is not too far away from the type locality and also shares

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Table 1. Comparative morphology of *Epilobium trichophyllum*, *E. sikkimense*, and *E. amurense*.

Species	*E. trichophyllum*	*E. sikkimense* [D.L.Biate & S.K. Rai 39431 (BSHC)]	*E. amurense* [D.L. Biate & S.K. Rai 39421 (BSHC)]
Habit	Small herbs, with short leafy soboles	Herbs erect, often clumped, with thick fleshy soboles that leave brown basal scales	Herbs erect, with short leafy soboles or rosettes
Stem	Stem approximately 10 cm tall, densely villous throughout	Stems 7–25 cm tall, simple to moderately branched, subglabrous except for 2(–4) raised strigillose lines decurrent from petioles, or sometimes appressed stiffly hairy and glandular all around	Stem 18–45 cm tall, simple or sparsely branched, upper stem with appressed stiff hairs, often with glandular hairs, with two raised lines decurrent from margin of petioles below, or rarely subglabrous
Leaves	Leaves opposite, ovate, 1–1.8 x 0.5–1 cm, crowded at base, villous on both sides, margin serrulate, base rounded, apex subacute, lower leaves oblong-ovate, entire	Leaves opposite, ovate to elliptic or oblong-lanceolate, 1.5–3 x 0.5–1.5 cm, sessile and clasping above or petiolate below, glabrous except for sparsely appressed stiffly hairy on midvein and margins, margin serrulate, base cuneate or rounded, apex sub-obtuse to acute	Leaves ovate to lanceolate, 3–6 x 1–1.6 cm, subsessile to shortly petiolate below, sparsely appressed stiffly hairy on veins and margins, margin serrulate, base rounded to attenuate, apex acute
Flowers	Flowers suberect. Petals pink. Stigma clavate/ capitate	Flowers nodding to suberect. Petals pink to rose-purple. Stigma capitate, entire	Flowers suberect. Petals white to rose purple. Stigma subcapitate
Fruit	Capsule ca. 3cm, densely villous	Capsules 5–9 cm, sparsely appressed stiffly hairs and glandular	Capsules 3.5–7 cm, appressed stiffly hairy.

similar phyto-climatic conditions. Both these localities are subjected to thorough floristic survey by Botanical Survey of India and other institutes during last five decades, but this species was not reported in any of these surveys indicating its rarity. One could argue that its short life span, small plant size and high similarity with *E. sikkimense* might be the reason for it being excluded from earlier reports. Thus, the present report carries lots of significance and will definitely change the approach of the field botanists while going for a floristic trip to these localities in future.

A brief description, taxonomic history, distribution map (prepared in Arc-GIS) and photograph of the specimens have been provided to facilitate easy identification. Its threat status has been assessed as per IUCN criteria.

Taxonomy

Epilobium trichophyllum Hausskn. in Oesterr. Bot. Z. 29:53. 1879; P.H. Raven in Bull. Brit. Mus. (Nat.Hist.), Bot. 2(2): 374. 1962; P. Hoch in Fl. Bhutan 2(1):320. 1991; T.K. Paul in Bull. Bot. Surv. India 40 (1-4): 15. 1998. *Epilobium origanifolium* var. *villosum* C.B. Clarke in Hook, f., Fl. Brit. India 2: 586. 1879.

Small herbs, with short leafy soboles, stem approximately 10cm tall, densely villous throughout. Leaves ovate, 1–1.8 x 0.5–1 cm, crowded at base, opposite above, villous on both sides, margin serrulate, base rounded, apex subacute, lower leaves oblong-ovate, entire. Flowers suberect, petals pink, stigma clavate/ capitate. Capsule *ca*. 3cm, densely villous. Seeds not seen (Image 3).

Flowering and Fruiting: July.

Image 1. Herbarium specimen Aswal 6780 (CDRI)

Distribution: India, Sikkim (3,000–3,600 m), endemic.

Specimen examined: 29191A (BSHC!), 15.vii.2006, Sikkim, North District, Lachen to Thangu (Zema-1), 27.774^{0}N & 88.713^{0}E, 3,536m, coll. Pradhan & Giri.

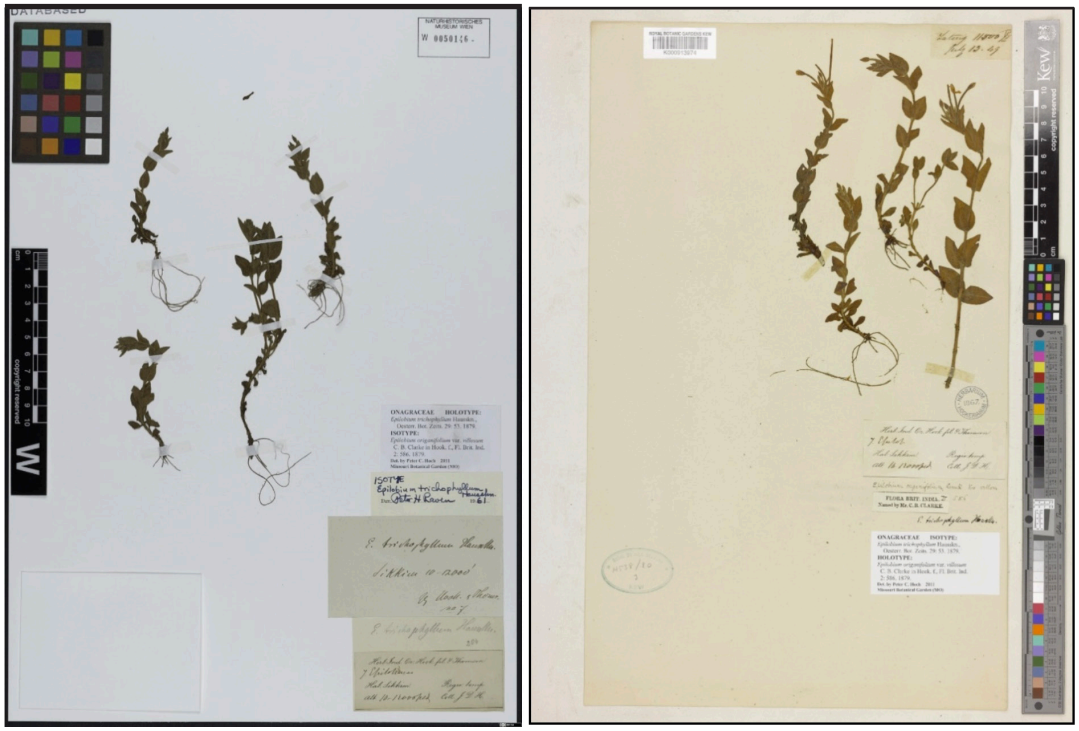

Image 2. The holotype and isotype of *Epilobium trichophyllum*.

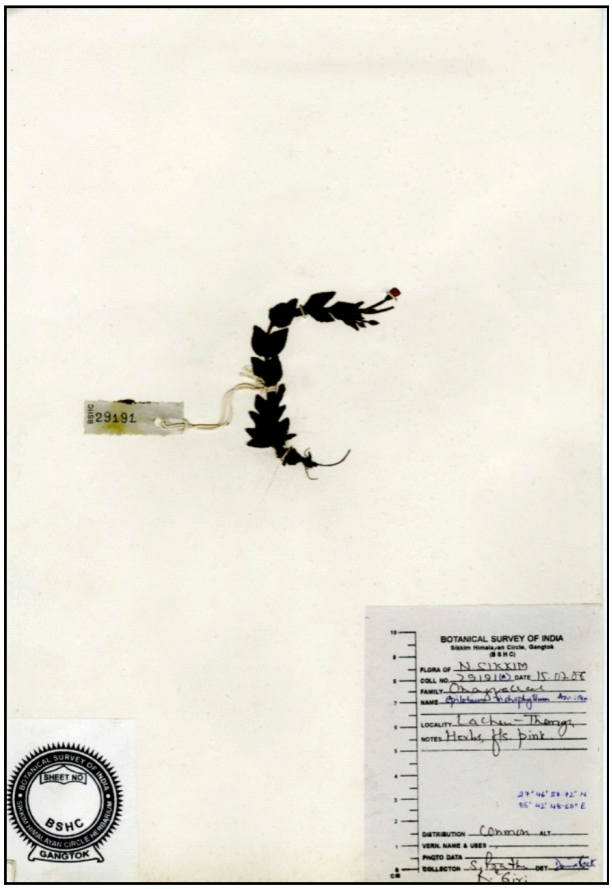

Image 3. *Epilobium trichophyllum* [Pradhan & Giri 29191A (BSHC)].

Threat status assessment: The species is so far known only from two localities of alpine forest in Sikkim. One of these is based on a 170 year old historical report and none of these records provide any information on the population size. Being an annual herb, its generation length can be estimated as one year. The collectors of the present specimen revealed (pers. comm.) the sub population is nearly 30–40 matured individuals. The extent of occurrence (EOO) can be calculated as 50km^2 and the area of occupancy (AOO) can be estimated as 8km^2 (Criterion B) by taking the minimum grid size of 2 × 2 km (Image 4). Although this species is not known for its economic potential or trade, the habitat was subjected to severe natural calamities (landslides, avalanches) in the past causing damage to many indigenous species. Quality of habitat is currently degrading due to intense tourism and developmental activities. Further, the species being highly confined in its distribution at higher elevation of Sikkim is also under threat as such species are known to be more vulnerable to the effect of climate change. Therefore, the threat status of this species as per IUCN (2013) guidelines can be assessed as 'Critically Endangered' [CRB1ab(iii)+2ab(iii); C2a(i); D]. Habitat management and more intense survey is recommended for conservation of this species.

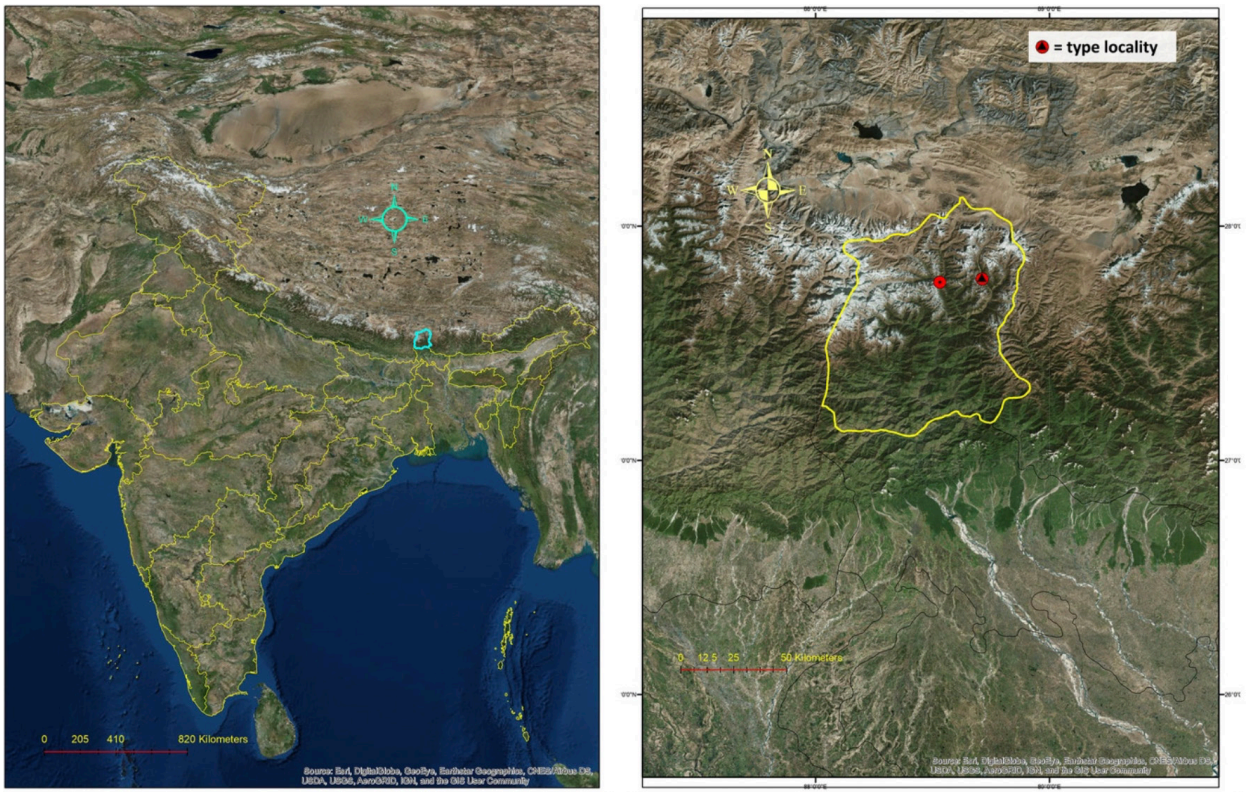

Image 4. Distribution map of *Epilobium trichophyllum*.

References

Aswal, B.S. & B.N. Mehrotra (1994). *Flora of Lahaul-Spiti*(*A Cold Desert in North-West Himalaya*). Bishen Singh and Mahendra Pal Singh, Dehradun, 268pp.

Clarke, C.B. (1879). Onagraceae, pp. 582–590. In: Hooker, J.D. (eds.). *The Flora of British India*. Vol.2. L. Reev & Co., London, 586pp.

Hoch, P.C. (1991). Family Onagraceae, pp. 309–323.In: Grierson, A.J. C. & D.G. Long (eds.) *Flora of Bhutan* 2(1): 309–323. Royal Botanic Garden, Edinburgh, 320pp.

Haussknecht, H.C. (1884). *Monographie der Gattung Epilobium*. Jena, viii+318pp.

IUCN (2013). Guidelines for Using the IUCN Red List Categories and Criteria. Version 10. Prepared by the Standards and Petitions Subcommittee. Accessed on: 09/01/2019. Downloadable from http://www.iucnredlist.org/documents/RedListGuidelines.pdf

Paul, T.K. (1998). A conspectus of the family Onagraceae in India. *Bulletin of the Botanical Survey of India* 40(1–4): 1–22.

Raven, P.H. (1962). The genus *Epilobium* in the Himalayan region. *Bulletin of the British Museum (Natural History)* 2(12): 327

Srivastava, S.K., & A.N. Shukla (2015). *Flora of Cold Desert: Western Himalaya, India*. Botanical Survey of India, Kolkata, 264pp.

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