

New Distributional Records of *Acronema gracile* S.L. Liou & R.H. Shan and *A. yadongense* S. L. Liou (Apiaceae), in India

Priyanka Bhandari¹
Santanu Paul²

Manas Bhaumik¹
Moaakum³

Jayanta Ghosh¹

¹Botanical Survey of India,
Kolkata, India

²Maligaon Hill Side Colony, Gate
No.1, Guwahati,
Assam, India

³Department of Botany, Kohima
Science College
(Autonomous), Jotsoma, Phezu,
Nagaland, India

E-mail: priyankaabhandari01@
gmail.com, mbhaumik@bsi.gov.
in, jayantaghosh243 @gmail.
com, santanugrass @gmail.com,
moaakumkichu@gmail.com
ORCID: 0009-0002-3636-
5098 (PB), 0000-0002-1630-7432
(MB), 0000-0001-6131-8504 (JG)

Author for correspondence:

Priyanka Bhandari

Botanical Survey of India,
Kolkata, India

E-mail: priyankaabhandari01@
gmail.com

Abstract

Acronema gracile S.L. Liou & R.H. Shan and *A. yadongense* S. L. Liou both belongs to the family Apiaceae are first time reported from India from Mount Saramati, Nagaland and Sikkim respectively. A detail morphological description, habitat preferences, distribution map, illustrations are provided to validate this new distributional record for the Flora of India and facilitate its field identification.

Keywords: *Acronema*, Apiaceae, India, Nagaland, New record, Mount Saramati, Sikkim.

Introduction

The genus *Acronema* Falc. ex Edgew. is known to be distributed mainly in sub-alpine and alpine regions of South-West China, Nepal, Bhutan, Myanmar and India, and consists of 25 species (Chen et al., 2024). In India, it is chiefly distributed in Himalayan regions from Jammu & Kashmir, Himachal Pradesh, Uttarakhand to Sikkim, and Arunachal Pradesh. After consultation of checklist (Mukherjee et al., 2020) and subsequent publications, the genus *Acronema* is

known to be represented by 11 species in India. Few species of *Acronema* such as *A. tenerum* Edgew., and *A. muscicola* (Hand. -Mazz.) Hand. -Mazz., found in Western as well as Eastern Himalaya but others are restricted to Eastern Himalaya in India. This genus is taxonomically complex due to indistinct species boundaries and problematic generic delimitation with *Sinocarum* H. Wolff ex R.H. Shan & F.T. Pu. However, it can be easily be recognized among all the members of Apiaceae due to some combination of characters such as glabrous plant body, globose rootstock,

narrow leaf sheath, long-acuminate papillose petal apex, globose fruit with 1–2 vittae. The species of the genus generally prefers to grow on the moist mossy rock bed and forest understory.

During this study, it has been found that two sheets of *Acronema yadogense* S. L. Liou were previously collected by Kings's collector (1888) from Sikkim, which are submitted in general collection of CAL and were wrongly identified as *Sinocarum pulchellum* C. Norman ex M.F. Watson [Barcode: CAL0000026129 & CAL0000026130]. During field exploration fresh collection was done and after detailed characterization this species has been identified as *Acronema yadogense* S. L. Liou. Until now, *A. yadogense* and *A. gracile* has been known to be reported from Xizang (Sheh et al., 2005). This recent

observation on these species leads to the extended distribution in India, Sikkim and Nagaland, respectively. After detailed characterization and extensive literature survey, it has been recorded as the first report of its extended distribution from China to India. Under such circumstances, this present article highlights the new distributional records of these two species in India from Sikkim and Nagaland

Material and methods

The authors have conducted several botanical explorations at Eastern Himalaya, north east India, such as Sikkim, Arunachal Pradesh, Nagaland etc., during the flowering season July and August to study the local vegetation. During the exploration work, we collected

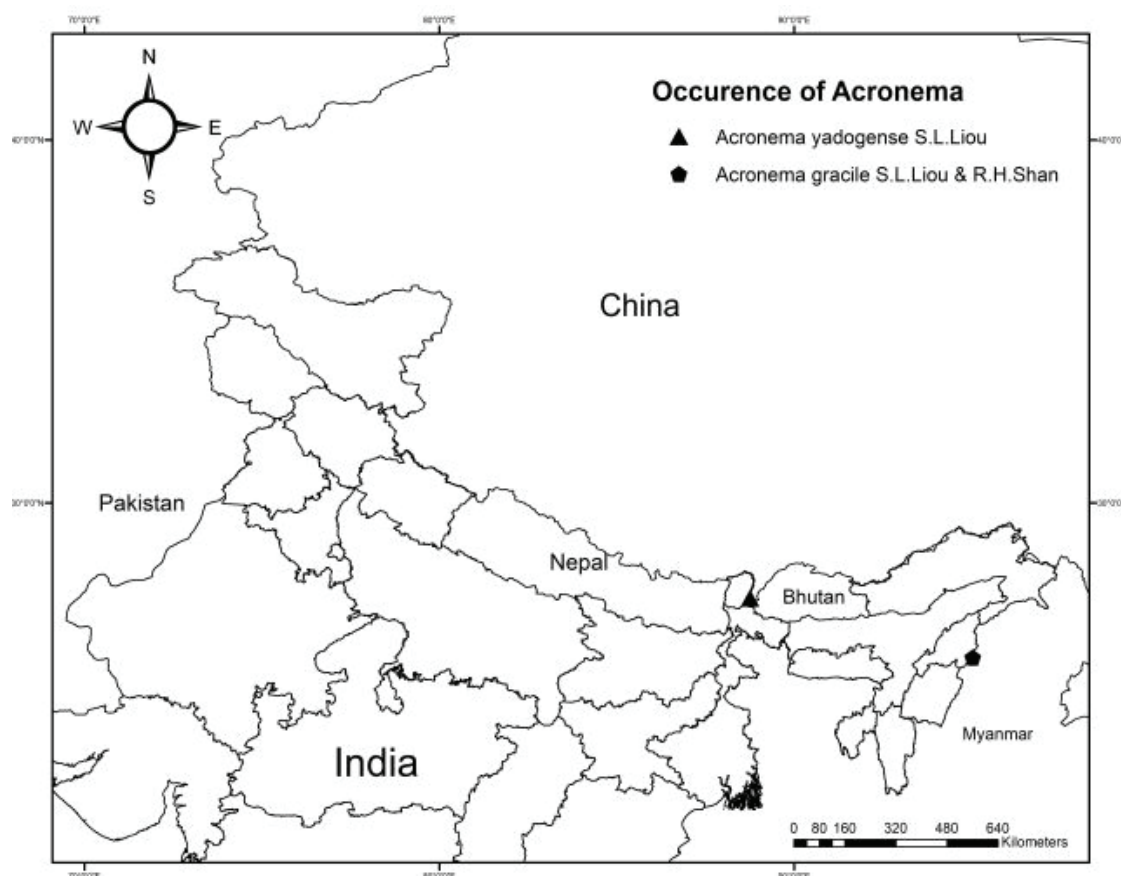


Figure 1. Location of specimen collection

several specimens of Apiaceae (Fig. 1). We identified one of our collections as *Acronema gracile* and *Acronema yadongense* S.L. Liou., following pertinent literature (Clarke, 1879; Mukherjee & Constance, 1993; Sheh et al., 2005; Watson, 1999). Besides, the identity of the species were also cross examined with their types and general collections deposited at different digital herbaria of the World including, BM, E, K, and online resources like CVH & GBIF. Additionally, the Indian repositories like, CAL, BSHC, BSD, DD are also consulted physically to document the species deposited there. A detailed descriptions provided and illustrations were prepared using a dissecting stereo zoom microscope (Olympus SZ 61, equipped with EP 40 camera).

Taxonomic enumeration

Acronema gracile S.L. Liou & R.H. Shan, Acta Phytotax. Sin. 18: 202.1980 (Fig. 1).

Description: Perennial, slender, erect herb, 5–20 cm high. Root tuberous or globose 7 × 5 mm. Stem ribbed, reddish, slender, glabrous. Leaves 7–10, bipinnate, ternate, mostly basal, few cauline. Petioles 4–7 cm long, narrowly sheathing at base; sheath red, 1 × 0.5 cm; leaflets shortly petiolulate, ovate-triangular, 0.5–4 × 2–4 cm; ultimate segments ovate, 0.5–2.5 × 0.6–2 cm, apex 3-lobed, base cuneate-attenuate. Upper cauline leaves are often very narrow segments. Inflorescence compound umbel, 2–3 cm across; lateral umbels from each leaf nodes. Bract 0-1, linear, acicular. Rays 3–6, 5–10 mm long, subequal, spreading, glabrous. Peduncles 2–2.5 cm long, glabrous. Bracteoles green, linear, acicular, 3 × 0.1 mm, base broad. Umbellets 5–7 mm across, 3–5-flowered; pedicel divaricate, subequal 6 mm long. Calyx teeth obsolete. Petals 5, equal,

purple, lanceolate, 3 × 0.5 mm, apex long acuminate, papillate. Stamen 5, 0.5 mm, anther white. Ovary glabrous, 0.5 mm. Fruit not seen.

Specimen examined: INDIA: Nagaland, way to Mount Saramati peak, 3400 m, 30.07.2024, M. Bhaumik, S. Dey & Moaakum 2653 & 2656 (CAL & BSIS).

Phenology: August–September.

Habitat & ecology: This species found to grow in mixed *Rhododendron* forests understory on moist moss bed or along narrow water channel, generally associated with *Dicranum* sp., *Polytrichum* sp. and others. About 10–50 mature individuals are found in two spots, about 1 km stretch forming scattered colony.

Acronema yadongense S. L. Liou., Acta Phytotax. Sin. 28: 147. 1990 (Fig. 2).

Description: Perennial, slender, erect herb, 10–30 cm high; root globose or bulbous, 6 × 4 mm. Stem weak, solitary, fistulous, glabrous, dark-purple. Leaves basal and cauline, 3–4, bipinnate, leaflets pinnatifid; blade triangular in outline, 2–3 cm long; ultimate segments linear-lanceolate, 1–2 × c. 0.25 mm, upper surface green, lower surface purplish. Petioles 6–10 cm, glabrous, with narrow membranous sheath; sheath clasping, purple c. 1 × 0.5 cm. Peduncles 4–5 cm long, purple, fistulous, glabrous. Inflorescence compound umbel; umbels terminal and lateral, 3–5 cm across. Rays 7–9, 1.5–3 cm long, sub-equal, lax, angular, glabrous, dark-purple. Bracts absent. Bracteoles 3–5, purplish, linear-acicular, 2 mm long. Umbellets 5–7 mm across, 8–15-flowered; pedicels glabrous, reddish white, angular, unequal, 1–3 mm. Calyx teeth obsolete. Petal 5, white, unequal, one larger and rest are smaller, obovate, 1–1.5 × c. 1 mm, apex obtuse, base clawed. Filament c. 0.5 mm, white; anther purple. Ovary less than 1 mm, glabrous.

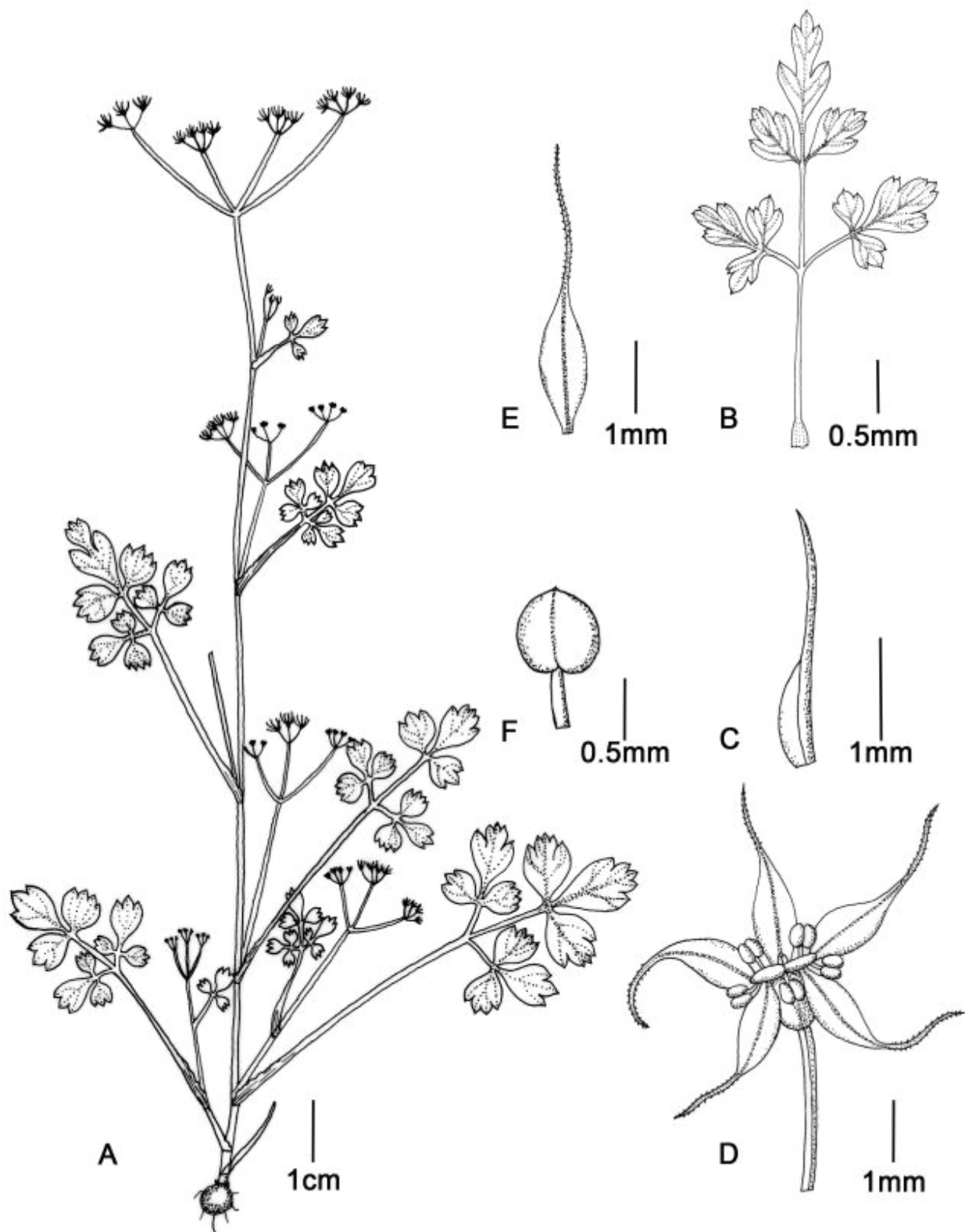


Figure 2. *Acronema gracile* S.L. Liou & R.H. Shan; (A) Habit, (B) Leaf, (C) Bracteole, (D) Flower, (E) Petal, (F) Stamen. Field No. 2656 (BSIS),

Drawn by Priyanka Bhandari

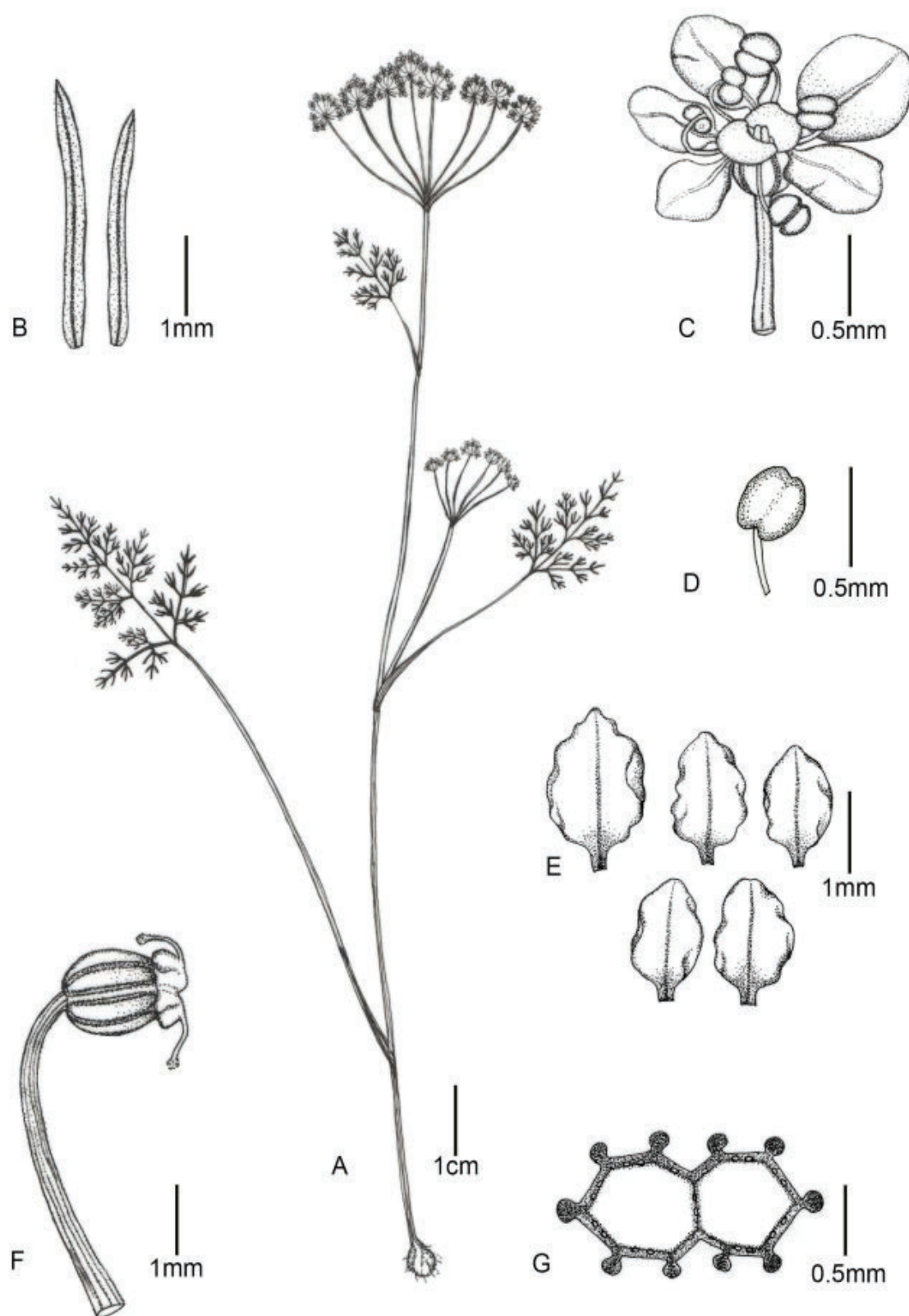


Figure 3. *Acronema yodogense* S.L. Liou; (A) Habit, (B) Flower, (C) Petal, (D) Stamen, (E) Bracteole, (F) Fruit, (G) T.S. of both mericarp

Stylopodium depressed or flat, purple; styles longer than stylopodium, reflexed in fruit; stigma papillate. Fruit purplish, ovoid, c. 1×0.5 mm, base rounded, 5-ribbed, slightly winged, glabrous. Vittae large, 1 in each furrow, 2 on commissure.

Phenology: August–September.

Specimens examined: INDIA: Sikkim, Sept. 1888, 12000ft, Dr. King's collector, CAL0000026130!; Sikkim, Sept. 1888, 12000ft, Dr. King's collector, CAL0000026129!; Sikkim, Gnathang Valley ($27^{\circ}17'55.10''\text{N}$, $88^{\circ}49'2.27''\text{E}$), 4092 m, 18 Aug. 2024, Priyanka Bhandari & J. Ghosh 1203, BSIS000020314!; Sikkim, Gnathang Valley, 4112 m, 10 Sept. 2023, Priyanka Bhandari 1130; Sikkim, Gnathang Valley, (27.3190°N , 88.8280°E), 4092 m, 18 Aug. 2024, Priyanka Bhandari & J. Ghosh 1204 (all at CAL).

Notes: The genus *Acronema* characterised by long acuminate, papillate petal apex. But, in *Acronema yadongense*, petal apex acute, unlike other *Acronema* species. This species is apparently similar to *Sinocarum pulchellum* but differentiated by linear-acicular (vs 3-lobed leaflets), narrow leaf sheath 1×0.5 cm (vs broad leaf sheath $0.8\text{--}2.3 \times 0.8\text{--}1.4$ cm), absence of bracts (vs bract 2-3).

Habitat and ecology: The plants were found to grow in alpine region on rocky slopes, at an elevation of about 4100 m in association with herbaceous species like, *Anaphalis* spp., *Pedicularis* spp., *Potentilla* spp., *Saxifraga* spp., *Juncus* spp. and other Poaceae members. The field exploration revealed that this species is abundant but restricted into one particular area. The occurrence of the species is very rare and the population is confined to single locality in the surveyed area. More field survey is needed for population data and IUCN threat assessment.

Conservation status: Both the plants are

far away from human habitation, so no immediate threat of its survival.

Conclusions

Two new distributional record of *Acronema gracile* and *Acronema yadongense* have been reported for the first time from India, from Sikkim and Mount Saramati, Nagaland, respectively. These two species are predominantly distributed in China. This article represents the extended distribution in India.

Acknowledgements

We are grateful to the Department of Environment, Forest & Climate Change, Government of Nagaland, and Sikkim for granting permission to carry out floristic exploration on Mt. Saramati and Sikkim. We are also thankful to the Chairman, Thanamir village council, field guides and porters for all the support extended to us during our fieldwork. Authors are grateful to Dr. Kanad Das, Director, Botanical Survey of India, Kolkata for providing the necessary facilities to conduct the work.

Authors' contributions: All authors contributed equally.

Conflict of interest: Authors declare no conflict of interest.

References

- Chen, L., Song, B.N., Yang, L., Wang, Y., Wang, Y.Y., Aou, X., He, X.J. & Zhou, S.D. 2024. Phylogeny, adaptive evolution, and taxonomy of *Acronema* (Apiaceae): evidence from plastid phylogenomics and morphological data. *Frontiers in Plant Science*, 15: 1425158. <https://doi.org/10.3389/fpls.2024.1425158>
- Clarke, C.B. 1879. Umbelliferae. Pp. 665-720. In: Hooker, J.D. (Ed.), *Flora of British India*. L. Reeve & Co. London.

-
- Mukherjee, P.K. & Constance, L. 1993. Umbelliferae (Apiaceae) of India. Oxford and IBH Publishing, New Delhi.
- Mukherjee, P.K., Manikandan, R. & Murugesan, M. 2020. Apiaceae. Pp. 610-639. In: Mao, A.A. & Dash, S.S. (Eds.), Flowering Plants of India: An Annotated Checklist. Botanical Survey of India, Kolkata, India.
- Sheh, M.L., Pu, F.T., Zehui P, Watson, M.F., Cannon, J.F.M., Holmes-Smith, I., Kljuykov, E.V., Phillippe, L.R. & Pimenov, M.G. 2005. Apiaceae (Umbelliferae). 205 pages. In: Wu, Z.Y. & Raven, R.H. (Eds.), Flora of China (Apiaceae through Ericaceae). Science Press Beijing & Missouri Botanical Garden Press, St. Louis.
- Watson, M.F. 1999. Umbelliferae. Pp. 434–504. In: Long, D.G. (Ed.), Flora of Bhutan. Royal Botanic Garden Edinburgh & Royal Govt. of Bhutan, UK.