



RESEARCH COMMUNICATION

Notes on distribution of *Acronema hookeri* (Apiaceae) and *Impatiens falcifera* (Balsaminaceae) in Arunachal Pradesh, India

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Abstract

In the present communication, the distribution of two species, *Acronema hookeri* (C.B.Clarke) H.Wolff and *Impatiens falcifera* Hook.f. has been discussed. The latter is recorded here as a new distributional record, whereas the former is reported as the first authentic record from Arunachal Pradesh. Short descriptions, notes, and field photographs are provided to identify the species easily.

Keywords

Acronema hookeri; *Impatiens falcifera*; New distribution; Tawang; India

Introduction

Arunachal Pradesh, a part of Himalayan biodiversity hotspots, is known for its rich floristic diversity. Due to its inaccessibility and difficult terrain, the flora of the state has resulted in limited documentation. Chowdhery *et al.* (1-3) provided a comprehensive account of the flora of Arunachal Pradesh; after that, many new taxonomic novelties and additions have been added during the past few decades. Recently, Singh *et al.* enumerated 4523 taxa of flowering plants from the state (4).

During the field survey in Tawang (Arunachal Pradesh), a few interesting taxa were collected. After a detailed examination of the flowering specimens, scrutiny of authentic literature (5-11), and examination of herbarium specimens at ARUN, ASSAM, BSD, BSHC, CAL, DD, and K, BM (online), the taxa have been identified as *Acronema hookeri* (C.B.Clarke) H.Wolff and *Impatiens falcifera* Hook.f. belonging to the family Apiaceae and Balsaminaceae, respectively. Short descriptions, along with the field photographs (Fig. 1) and locality map (Fig. 2) of the species are provided below for easy identification.

Materials and Methods

The photographs of habit were taken using a Nikon-D7500 DSLR camera. The dissected floral parts were studied using an Olympus SZ-61 stereo-zoom microscope. After identifying species, herbarium specimens were prepared as per the standard method (12), and the voucher specimens were deposited at CSIR-IHBT (PLP), Palampur. The locality map of the species has been made using ArcGIS software 10.4.



Fig. 1. a & b. Habit and inflorescence of *Acronema hookeri* (C.B.Clarke) H. Wolff; c & d. Habit and flower of *Impatiens falcifera* Hook.f.

Taxonomic Treatment

Acronema hookeri

(C.B.Clarke) H.Wolff in Engler, Pflanzenr. 90 (IV. 228): 323. 1927. *Pimpinella hookeri* C.B.Clarke in Hook.f., Fl. Brit. India 2: 686. 1879. *Carum hookeri* (C.B.Clarke) Franch., Bull. Annuel Soc. Philom. Paris sér. 8, 6: 122. 1894.

Perennial robust, erect herb, 25–85 cm high. Root tuberous, globose to oblong, 7–11 × 5–8 mm. Stem ribbed with elongated branched, slender, sparingly leafy. Basal leaves petiolate; petioles 5.5–12 cm long with narrowly sheathing at base; leaf blade ovate-triangular, bipinnate; pinnae shortly petiolulate; ultimate segments ovate-obliquely ovate, 1.0–2.2 × 6–12 mm, 3-lobed. Upper cauline leaves are often ternate with very narrow segments. Umbels subracemose upwards, 2–4 cm across; peduncles

4.5–7.5 cm; rays 3–5, 1.4–2.0 cm, slightly unequal; umbel-lule 0.8–1.5 cm across, 3–5-flowered; pedicel 0.4–1.5 cm; rays and pedicels divaricate, subequal. Calyx teeth are obsolete. Petals small, often elongate with a whip-like tail, oblong-lanceolate, ca. 4.0 × 0.6 mm, white to pink; apex, 2–3 mm long filiform projection, densely papillate. Fruits ovoid, 1.2–1.5 × 1.0–2.0 mm, narrow at the apex, laterally sub-compressed, yellow-brown, base subcordate; furrows 2–3 vittae; disc evanescent.

Flowering and fruiting

August–October.

Habitat

The species grow in temperate deciduous forests associated with the *Rhododendron arboreum* Sm., *Ainsliaea latifo-*

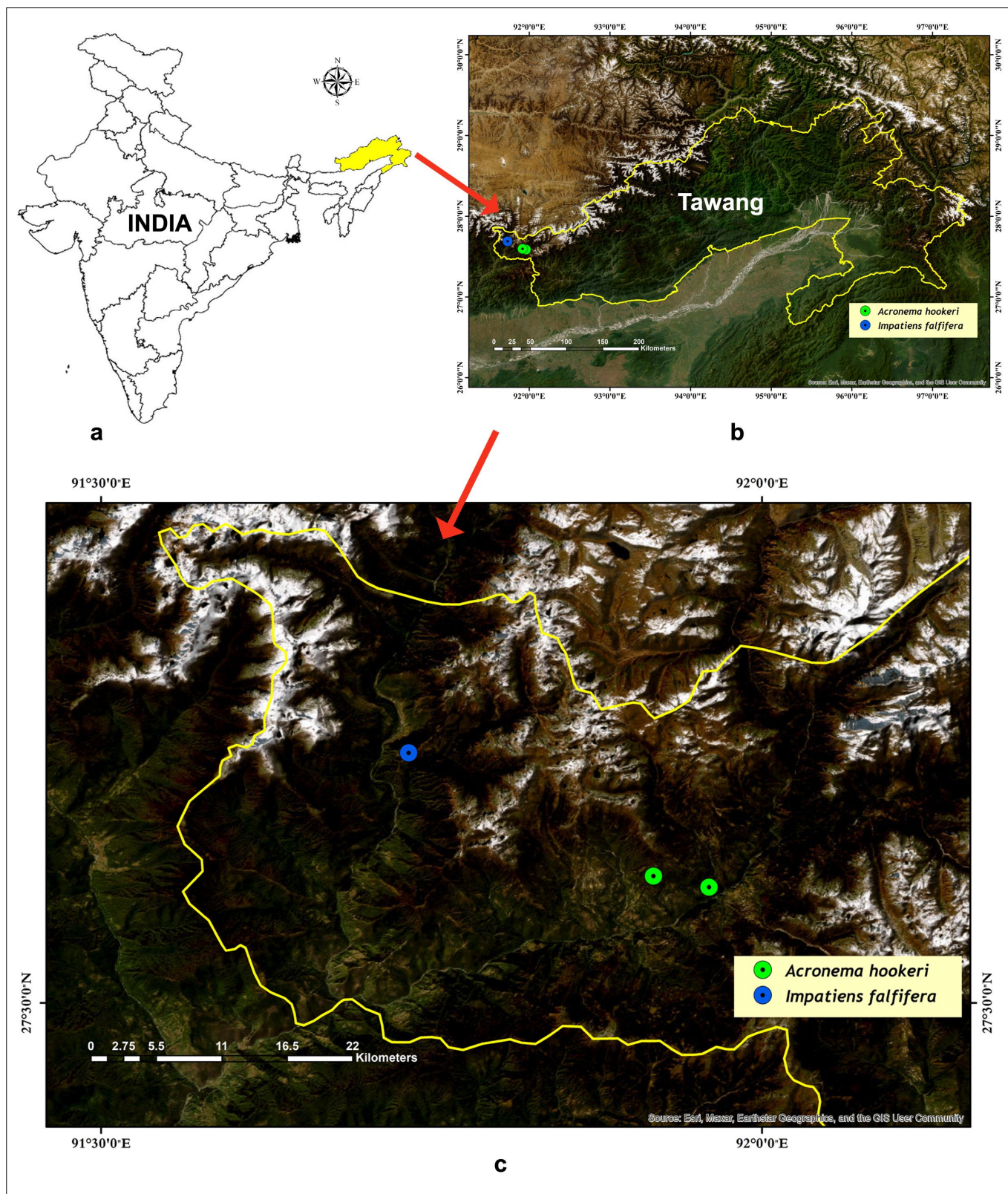


Fig. 2. a-c. Locality map of *Acronema hookeri* (C.B.Clarke) H. Wolff and *Impatiens falcifera* Hook.f. Tawang, Arunachal Pradesh, India.

lia (D.Don) Sch. Bip., *Pilea umbrosa* Blume, *Triplostegia glandulifera* Wall. ex DC., *Polystichum* sp., *Strobilanthes* sp. etc.,

Distribution

INDIA- Arunachal Pradesh (present report), Assam, Sikkim, and West Bengal; CHINA, BHUTAN, NEPAL.

Notes

C.B. Clarke described *Acronema hookeri* as *Pimpinella hookeri* in 1879 based on Sir J.D. Hooker's collections from

the Northern Valleys, Samdong, and Lachen valleys of Sikkim, Himalaya. Subsequently, it was recorded in West Bengal (5). Chowdhery *et al.*, Ambrish, Dash & Singh, Bharali *et al.* did not mention this species when discussing floristic diversity in Arunachal Pradesh (1, 9, 13, 14). However, Mukherjee *et al.*, Lidén & Bharali, and BSI (15-17) enumerated this species without citing any voucher specimens. During the present study, the herbarium of ARUN, ASSAM, BSD, BSHC, CAL, DD, and K, BM (online), were consulted, but no authentic specimen representing its distribution

from Arunachal Pradesh could be traced. Thus, the present collections from Tawang were reported here as the first authentic record of *A. hookeri* for Arunachal Pradesh.

Specimen examined

Arunachal Pradesh, Tawang, 27.587512° N, 91.960054° E, 2741m, 21-08-2021, V. Kumar 20944 (PLP); Tawang, on the way to Geshila, 27.59587° N, 91.91792° E, 3249 m, 03-08-2022, V. Kumar & R. Kumar 22141 (PLP).

Impatiens falcifera

Hook.f., Bot. Mag. 129: t. 7923. 1903.

Annual herb, 15–55 cm high. Stem erect with procumbent branches, sparsely hairy. Leaves alternate; petioles 0.6–1.5 cm long; leaf blade narrowly elliptic, 2.5–5.0 × 0.5–2.0 cm, weakly hairy on veins abaxially, margin sharply serrate, base cuneate, apex acute. Inflorescence 1–(2-flowered), peduncle short. Flowers are variable, usually yellow with red spots, sometimes greenish yellow. Lateral sepals two obliquely ovate, ca 0.4 × 0.3 cm. Lower sepals are funnel-shaped, with a long down-curved spur. Dorsal petal triangular ca 1 cm long; lateral united petals clawed, 2.2–2.5 cm long, 2-lobed; upper lobes ovate to oblong, ca 0.5 cm long; lower lobes oblong, falcate, 1.5–2.0 cm long. Capsule linear, 4.0–4.5 cm long.

Flowering and fruiting

July–October

Habitat

The species is found growing in temperate deciduous forests near water streams in association with the *Rhododendron* sp., *Impatiens radiata* Hook.f., *I. sulcata* Wall., etc.

Distribution

INDIA- Arunachal Pradesh (Present report), Sikkim and West Bengal; BHUTAN, CHINA, NEPAL.

Specimen examined

Arunachal Pradesh, Tawang, on the way to Zemithang, 27.68902° N, 91.73278° E, 3137 m, 21-08-2022, V. Kumar & R. Kumar 22155 (PLP).

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Authors contributions

RK & AK have identified the species. VK and RK collected the specimens and prepared the manuscript.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interest to declare.

Ethical issues: None.

References

- Chowdhery HJ, Giri GS, Pal GD, Pramanik A, Das SK. Ranunculaceae to Dipsacaceae. In: Hajra PK, Verma DM, Giri GS, editors. Materials for the flora of Arunachal Pradesh Vol. 1, Botanical Survey of India, Kolkata; 1996.
- Chowdhery HJ, Giri GS, Pal GD, Pramanik A, Das SK. Asteraceae to Ceratophyllaceae. In: Giri GS, Pramanik A, Chowdhery HJ, editors. Materials for the flora of Arunachal Pradesh Vol. 2, Botanical Survey of India, Kolkata; 2008.
- Chowdhery HJ, Giri GS, Pal GD, Pramanik A, Das SK. Hydrocharitaceae to Poaceae. In: Chowdhery HJ, Giri GS, Pramanik A, editors. Materials for the flora of Arunachal Pradesh Vol. 3, Botanical Survey of India, Kolkata; 2009.
- Singh P, Dash SS, Sinha BK. Plants of Indian Himalayan region (an annotated checklist and pictorial guide), (Part - I). Botanical Survey of India, Kolkata; 2019.
- Mukherjee PK, Constance L. Umbelliferae (Apiaceae) of India. New Delhi: Oxford and IBH Publishing Co.; 1993.
- Watson MF. Umbelliferae, In: Grierson AJC, Long DG, editors. Flora of Bhutan, Vol. 2. Royal Botanic Garden Edinburgh, UK and the Royal Government of Bhutan, Bhutan. 1991; p. 434-503.
- Pan ZH, Watson MF, Holmes-Smith I. *Acronema* Falconer ex Edgeworth. In: Wu ZY, Raven PH, editors. Flora of China 14. Science Press, Beijing and Missouri Botanical Garden Press, St. Louis. 2005; p. 105-10.
- Giri GS, Pramanik A, Chowdhery HJ, editors. Materials for the Flora of Arunachal Pradesh, Vol. 2 (Asteraceae-Ceratophyllaceae), Botanical Survey of India, Kolkata. 2008; pp.1-491.
- Bharali P, Das AK, Lidén M. Notes on the alpine flora of Arunachal Pradesh, including several species new to India. In: Dash AP, Bera S, editors. Plant Diversity in the Himalaya Hotspot Region. 2018; vol. I: p.163-94.
- Gogoi R, Borah S, Dash SS, Singh P. Balsams of eastern Himalaya-A regional revision. Botanical Survey of India, Kolkata; 2018.
- Gogoi R, Sherpa N, Rai S. Wild balsams of Darjeeling and Sikkim Himalaya-A pictorial handbook. Botanical Survey of India, Kolkata and Directorate of Cinchona and other Medicinal Plants, Mungpoo, West Bengal; 2021.
- Jain SK, Rao RR. A handbook of field and herbarium methods. Today and Tomorrow's Printers and Publishers, New Delhi. 1977; pp.1-157.
- Ambrish K. Floristic diversity of Arunachal Pradesh (Upper Subansiri District). Bishen Singh Mahendra Pal Singh, Dehradun. 2013; pp.1-531.
- Dash SS, Singh P. Flora of Kurung Kumey District, Arunachal Pradesh. Botanical Survey of India, Kolkata; 2017.
- Mukherjee PK, Manikandan R, Murugesan M. Apiaceae. In: Mao AA, Dash SS, editors. Flowering plants of India - An annotated checklist (Dicotyledons) vol.-1. The Director, Botanical Survey of India, Kolkata; 2020.
- Lidén M, Bharali P. Flowers of the Se La Alpine plants of NW Arunachal Pradesh. Symbolae Botanicae Upsalienses vol. 40. Sweden; 2020.
- BSI. "Apiaceae" on <https://floralindia.gov.in>. Botanical Survey of India, Kolkata; 2022 (10 October 2022).