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.


**Taxonomic Treatment**

**Acronema hookeri**


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-

**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, 2741 m, 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**


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**