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Begonia dioica Buch. Ham. Ex d. Don, Prodr. (Begoniaceae): A new angiospermic record for the flora of Jammu and Kashmir, India

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Abstract
A shade loving herb *Begonia dioica* Buch. Ham. Ex. D. Don, Prodr. is collected for the first time from the Union Territory of Jammu and Kashmir. The taxa is reported from the deep forests of Koteranka tehsil of Rajouri district, found attached with a big rock located away from direct sunlight facing South at 1861m above mean sea level. The plant is properly analyzed in the field, aftermath it is collected mounted on standardized herbarium sheet and submitted at the herbarium of Dept. of Botany, KLDAV PG College Roorkee 247667, Uttarakhand India. The taxonomic details, description and photograph plate are provided in the manuscript.

Keywords: Begoniaceae, *Begonia dioica*, Jammu and Kashmir, taxa, biodiversity

Introduction
Begonia L. is a large genus of tropical and subtropical regions consisting of 2001 species, Hughes *et al*. (2015) [1]. In Asia there are about nine hundred species of *Begonia*, with Southeast Asia parts and *Begonia* flora of China being reasonably adequate understanding Gu *et al*. (2007) [2]. Hughes (2008) [3]. Kiew 2010) [4]. Rajbhandary *et al*. (2010) [5] described the focus of the recent research in the Himalayan region. The Begonia flora in India is known from the historic work of Clarke (1879) [6] in the Flora of Bristish India. There has been 57 species of Begonia reported from India, having distribution confined to Himalayan regions mostly besides Eastern and Western Ghats (Uddin & Phukan (2007) [7]. From Northeast India excluding Sikkim there has been 38 species reported by Camifield and Hughes (2018) [8]. The largest plant group in J&K is angiosperms consist of 5056 taxa described by (Dar and Khuroo (2020) [9], that are recorded from the state. However this number is increased to 5058 with addition of two new angiospermic additions to the J&K flora by Ahmed & Dhiman (2021) [10, 11]. They reported a new member of primulaceae family i.e *Samolus valerandi* L. and a new orchid from the orchidaceae family namely *Brachycorthis obcordata* (Buch. Ham. ex. D. Don.) Summerah.

Material and methods
During filed exploration in forests of Koteranka tehsil in Rajouri, Jammu and Kashmir, The plant was collected from Kalyian forests of Koteranka (Fig. 1). Kalyian forests are located just about 2km away from the main town of Koternaka towards Badhal. The forest located at an altitude of about 1850m asl, and 33°2' 06.35" N latitude and 74°32' 07.45" E longitude. The plants were collected systematically for herbarium prepration after proper morphological analysis; photographs were collected using Nikon DSLR. The collected specimen was mounted on standardized herbarium sheet in the herbarium of Botany dept of KLDAV PG College Roorkee, Haridwar 247667, Uttarakhand. For identification detailed description, photograph plate (Fig. 2) and Illustration (Fig. 3) were mentioned.

Taxonomic treatment
Prodromus Florae Nepalensis: 223 (Don 1825). – Type: Nepal, Kathmandu, Naraianhetty, 8 Aug. 1802, *Buchanan-Hamilton* (lecto-: BM000043986, here designated). *Begonia tenella* D. Don, *Prodromus Florae Nepalensis*: 223 (Don 1825). – Type: Nepal, Gosain Than, 3000–4830 m, 1821, *Wallich Cat. No. 3681B* (lecto-: K-W, barcode K001110783, here designated). *Begonia amoena* Wall. Ex A. DC., *Prodromus Systematis Naturalis Regni Vegetabilis* 15 (1): 327 (de Candolle 1864). – Type: Nepal, 1821, *Wallich Cat. No. 3682A* (lecto-: K-W, barcode K000761417, here designated). *Begonia erosa* Wall, *A* numerical list of dried specimens of plants in the East India Company's Museum: 129, 3688 (Wallich 1831), nom. nud.

Taxonomic description
Plant creeping, tuberous, stoloniferous and dioecious herb, dioecious herb, 5–15 cm high (Fig.2,3). Tubers small, hairy, having size of 0.5- 1.5× 0.5 -1cm (Fig. 2 j). Stolons: glabrous, red, slender, 5- 15 cm in length (Fig.2 a). Stipules: lanceolate, caduceus, glabrous, 2.5–4× 1.5 –2.5 mm. Leaves: petiole, glabrous, 1–5 cm long; lamina

base shallowly cordate, basifixed, deltate-ovate, 3–13 × 1.5–6 cm, upper surface green having red veins, symmetric, underside red, venation palmate, glabrous, midrib 3–12 cm long; margin crenate to dentate, glabrous; apex acuminate. Inflorescence: terminal, cymose, few; peduncle glabrous, bracts caduceus, glabrous, lanceolate 3–6 × 2 mm. Male flower: pedicel 10.5 –25 mm long, glabrous; tepals 4; with outer tepals, ovate- orbicular, 6–16 × 5.5–11 mm, glabrous, white to pink, having entire margin(Fig.2 c,d,e,f); inner elliptic, glabrous, tepals smaller in size, 4.5–9 × 2.5–4.5 mm, white to pale pink; androecium with symmetric, 15–20 stamens (Fig.2 h); filaments: unequal, fused at the base into a column, 1–2.5 mm long; having obovate anther, dehiscing via short slits at the tip, 1mm long, without extension in connective. Female flower: pedicel, glabrous; bracteoles absent, 16–21 mm long; tepals 3, unequal, outer two oelliptic-ovate outer, third, lanceolate inner, 7–14 × 3–11 mm, glabrous, white to pink, glabrous; ovary: bifid placentae, ellipsoid capsule, 3-locular, having three equal triangular rounded wings; styles 3, deeply forked once and twisted once, persistent. Fruit: capsule ellipsoid, glabrous, rounded triangular, pendulous, with equal wings; 9 × 5.5 mm.

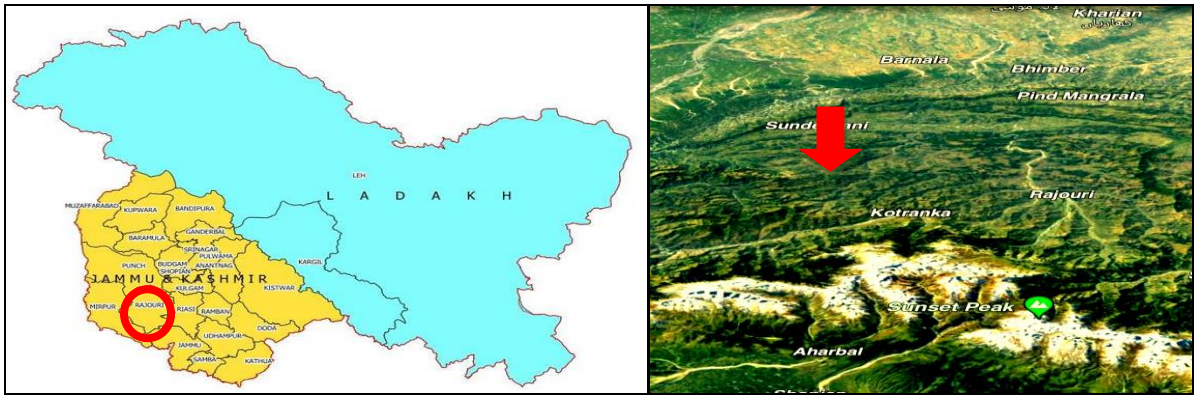

Fig 1: A. Showing the Map location of *Begonia dioica*, collection point from Rajouri of Jammu and Kashmir B. Google Earth image showing the exact location of plant in Koteranka Kalyain forests.

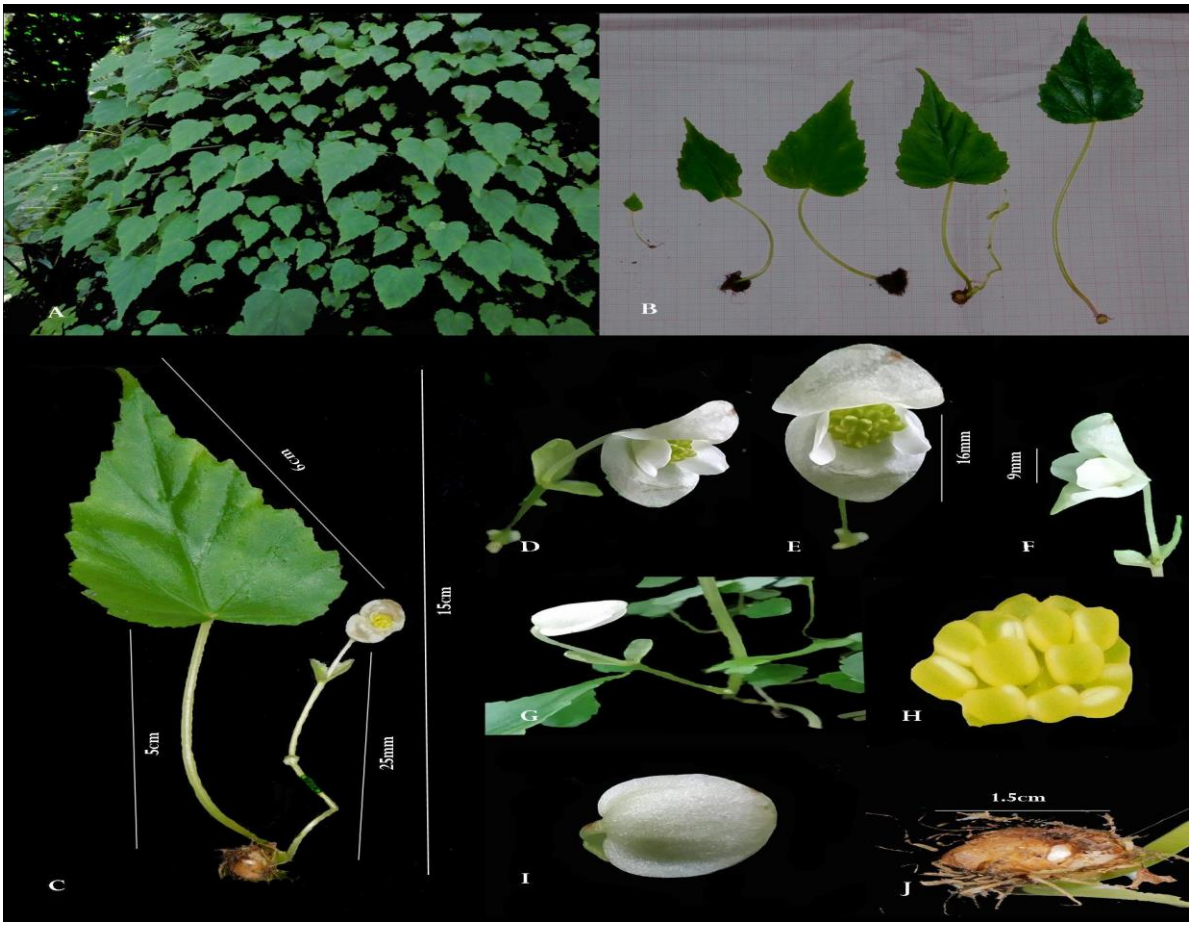

Fig 2: *Begonia dioica* A. Habit and Habitat; B. Collected specimens on graph sheet; C. Full Plant; D, E, F. Different views of male flowers; G. stem with flower; H. Anthers; I. Flower bud; J. Tuber.

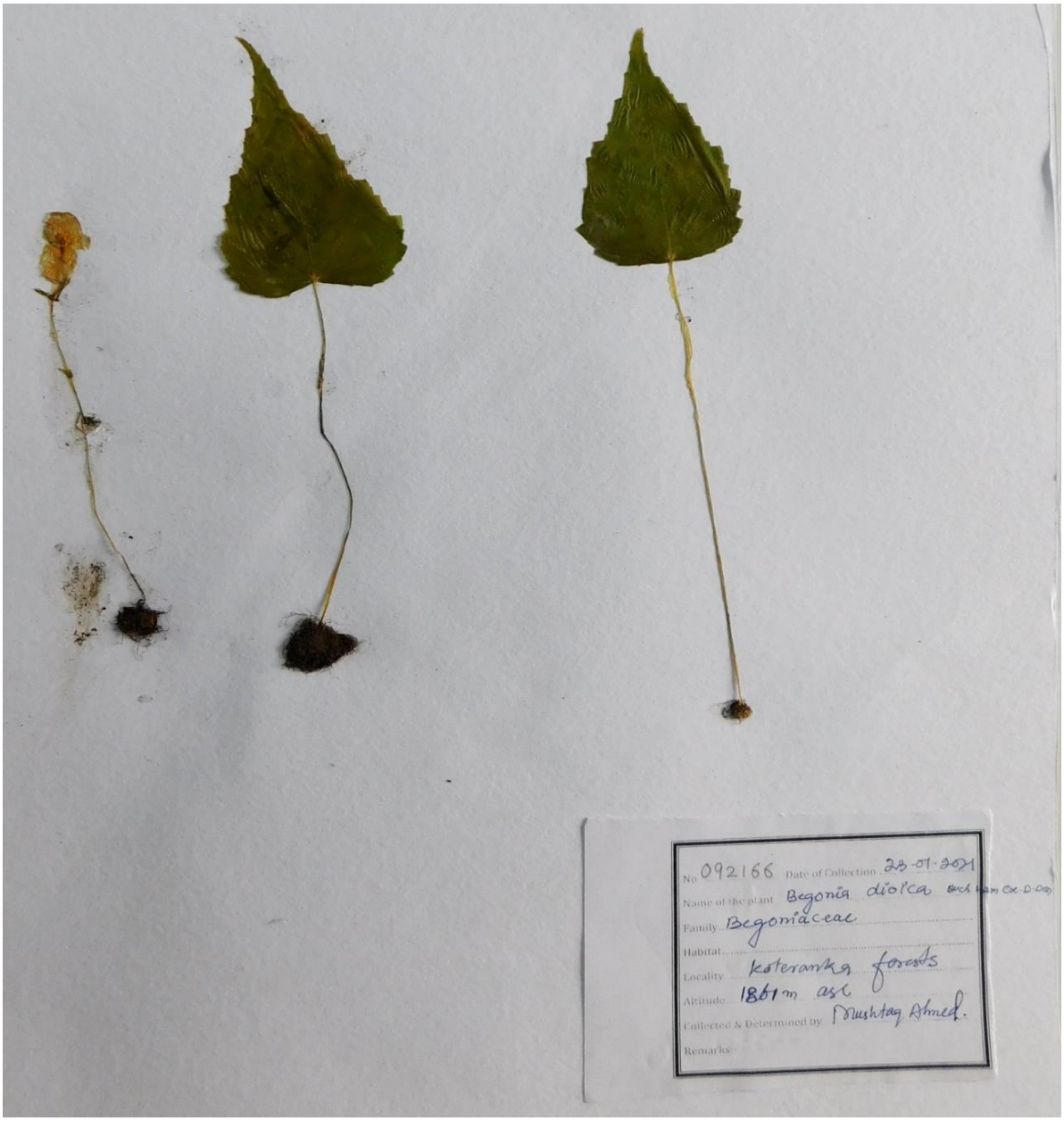

Fig 3: The herbarium sheet of *Begonia dioica*

Flowering
July to September;

Fruiting
August to October.

Habitat and Ecology
The species prefers shady areas, away from sunlight or partial sunlight facing southwest found attached with rocks or tree trunks.

Distribution
Arunachal-Pradesh; also in northern Pakistan, northern India, Nepal, Sikkim and Bhutan; 1350–1850 m.

Specimen examined
INDIA; Jammu and Kashmir (present finding), Koteranka forests of district Rajouri at 33°2' 06. 35" N 74°32' 07.45" E; 1861msl, 10th August 2021, M Ahmed & M Dhiman 092166. Arunachal-PradeshDirang Dzong, 8 Aug. 1938, *Ward 14055* (BM); Senge Dzong, 18 Aug. 1938, *Ward 14091* (BM). Mizoram Hmuifang, Jul. 1926, *Parry 45* (K); ibid, Jul. 1926, *Parry 46* (K); ibid, Jul. 1926, *Parry 47* (K); Lungleh, 1 Sep. 1931, *Wenger 320* (K).

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