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SHORT COMMUNICATION

REDISCOVERY OF *CALANTHE DAVIDII* (ORCHIDACEAE) AFTER 11 DECADES IN THE WESTERN HIMALAYA, INDIA

Ashutosh Sharma, Nidhan Singh & Pankaj Kumar

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REDISCOVERY OF *CALANTHE DAVIDII* (ORCHIDACEAE) AFTER 11 DECADES IN THE WESTERN HIMALAYA, INDIA

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Abstract: *Calanthe davidii*, a rare orchid species was rediscovered after a gap of 119 years in the western Himalaya and it is also a new distribution record for the flora of Himachal Pradesh State. Detailed morphological description, distribution, ecology and conservation status along with colour photographs of the species are provided.

Keywords: Conservation status, distribution, ecology, Kullu, morphological description, orchid.

The western Himalaya, is the western stretch of the Himalayan biodiversity hotspot that starts from the western boundary of Nepal along Kali Ganga River and runs towards the northwest covering three states of India (Uttarakhand, Himachal Pradesh and Jammu & Kashmir), parts of northern Pakistan and small parts of northern Afghanistan (CEPF 2015). The area has been of botanical interest since 1796, when Thomas Hardwicke collected plants from the region for the first time, followed by J.F. Royle in 1839 and many other botanists including William Griffith, Richard Strachey, Sir George King, C.B. Clarke, Henry Collett etc. (Burkill 1965). Vij et al. (1982) documented 54 species of orchids from Shimla and the adjoining hills, whereas Chowdhery

& Wadhwa (1984) listed 53 species from the whole of Himachal Pradesh, followed by 16 species from Kullu by Dhaliwal & Sharma (1999). Based on all the previously known collections and their additional collections, Deva & Naithani (1986) compiled a list of 239 orchid species belonging to 74 genera from the entire northwestern Himalaya. Jalal et al. (2008) reported 237 orchid species from the state of Uttarakhand and Vij et al. (2013) reported 85 species belonging to 44 genera from Himachal Pradesh. Based on a comprehensive survey for over 10 years, Jalal & Jayanthi (2015) reported 239 taxa of orchids belonging to 72 genera from the Indian side of western Himalaya. They reported eight species of *Calanthe*, namely, *C. alismifolia* Lindl., *C. alpina* Hook. f. ex Lindl., *C. brevicornu* Lindl., *C. davidii* Franch., *C. mannii* Hook. f., *C. plantaginea* Lindl., *C. puberula* Lindl. and *C. tricarinata* Lindl., of which *C. davidii* was added to the list based on Mackinnon's old collection (Mackinnon 21742 from DD), and there is one more collection by Falconer (1054 (K000810907)) from an unknown locality (but most likely in the western Himalaya).

During a recent survey in August 2018 in the state

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of Himachal Pradesh, the first author came across a small population of an unknown orchid. After detailed morphological studies, consultation of herbaria, and going through a monographic study on the genus *Calanthe* by Clayton & Cribb (2013), along with other regional treatises (Duthie 1906, 1903–1929; Seidenfaden & Arora 1982; Chowdhery & Wadhwa 1984; Deva & Naithani 1986; Jalal 2005, 2011; Jalal et al. 2008; Jalal & Jayanthi 2015), this species was identified as *Calanthe davidii* Franch. This proved to be the first record from the state of Himachal Pradesh, as well as a rediscovery after 119 years from the western Himalaya, because this species was first collected from western Himalaya, near Mussoorie (Uttarakhand) in July 1899, and for unknown reasons, this species was not reported during all these years. The current authors also assumed that, due to leaves resembling grasses and due to green-coloured flowers, this species would have been easily overlooked. Hence, it has been enumerated in detail with description, updated global distribution and photographic illustration. A detailed list of specimens examined are listed, which may aid future researchers who might be interested in studying this species or group.

TAXONOMIC ENUMERATION

Calanthe davidii Franch.

Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 85 (1887 publ. 1888).

Type: China, Sichuan, Moupin (Baoping), July 1869, A. David s.n. (P00378879) (PI-holotype).

Calanthe pachystalix Rchb. f. ex Hook. f., Fl. Brit. India 5: 850 (1890). *Alismorkis pachystalix* (Rchb. f. ex Hook. f.) Kuntze, Revis. Gen. Pl. 2: 650 (1891). *Calanthe ensifolia* Rolfe, Bull. Misc. Inform. Kew 1896: 197 (1896). *Calanthe matsudae* Hayata, Icon. Pl. Formosan. 9: 112 (1920). *Calanthe bungoana* Ohwi, Acta Phytotax. Geobot. 5: 56 (1936). *Calanthe furcata* f. *matsudae* (Hayata) M. Hiroe, Orchid Flowers 2: 88 (1971). *Calanthe davidii* var. *bungoana* (Ohwi) T. Hashim., Proc. World Orchid Conf. 12: 124 (1987).

Terrestrial herbs, generally growing in clusters, 35–90 cm tall in vegetative phase, corms covered with leaf sheaths. Leaves 3–6, ensiform, 20–75 cm long, up to 5 cm wide, acute, glabrous, plicate, 3-nerved. Inflorescence erect, scape up to 140 cm long, arising from the side or base of the corm, minutely pubescent, rachis 10–35 cm long, about 30 to 55 flowered, floral bracts minutely pubescent, 1.0–1.5 cm long. Flowers pale yellow to green, 1.4–1.8 × 1.0–1.3 cm, spurred. Sepals similar, sub-elliptic, reflexed, 0.6–0.8 cm long and 0.4–0.5 cm wide, acute, nearly glabrous, 5-veined.

Petals oblanceolate, reflexed, 0.6–0.8 cm long and 2.0–2.5 mm wide, obtuse, 3-veined glabrous, with clawed base. Labellum adnate to entire length of column wings, broadly triangular, 0.7–1.0 cm long and 0.6–0.9 cm wide, 3-lobed. Lateral lobes oblong to ovate-triangular, 0.4–0.5 cm long and ca. 2.5 mm wide, obtuse, mid lobe divided into 2 lobules by a deep sinus, lobules divergent, sub-oblong and narrower than lateral lobes; ca. 5.0 mm long and ca. 1.5 mm wide, disc with three clusters of wart-like calli, extending a little lower to sinus of mid lobe; spur cylindrical, puberulent, curved, 8–14 mm long. Column ca. 4.0 mm long and ca. 4.5 mm wide, glabrous, thick and dilated towards apex; rostellum bilobed; pollinia pear-shaped to obovoid, ca. 1 mm with short caudicle; viscidium small. Capsule ovoid, 1.3–1.8 cm long and 0.6–0.9 cm wide (Image 1).

Phenology: Flowers from early July to August, fruiting from September to October.

Habitat: *Calanthe davidii* is a terrestrial herb growing in evergreen coniferous forests from 1,600–1,800 m in the state of Himachal Pradesh. It is generally found growing in clusters along rocks in shady conditions under *Cedrus deodara* canopy. Associated species include *Crepidium acuminatum*, *Onychium japonicum*, *Pteris cretica*, *Valeriana jatamansi*, *Sarcococca saligna*, *Drepanostachyum falcatum* etc.

Conservation status: *Calanthe davidii* was first collected from western Himalaya, near Mussoorie (Uttarakhand) in July 1899, since then, after various attempts by Deva & Naithani (1986) and Jalal (2011), it has never been collected from this region. Third author and Jalal have surveyed the area for over eight years in vain till 2011. The mention of this species by Jalal et al. (2008) was also based on the same specimen (Mackinnon 21742 at DD), but later Jalal (2011) didn't include this species in his enumeration of orchids of western Himalaya. We were unable to find this specimen at DD after many efforts and visits, however, we found two sheets of the same collection, P.W. Mackinnon 22714 at E (E0069089) and P (P00379000). It seems that the number mentioned earlier (21742) on the references were wrong. Teoh (2016) considered this species to be endangered or extinct in the Himalaya. It has now been rediscovered by the present authors from Kullu District of Himachal Pradesh in western Himalaya after a gap of 119 years.

Due to a very small population this species may be rare in western Himalaya but at a global scale, it is distributed across the Himalaya to China, Indochina, Taiwan, and Japan (Govaerts et al. 2019). As such, no known threat has been recorded across its distribution range except

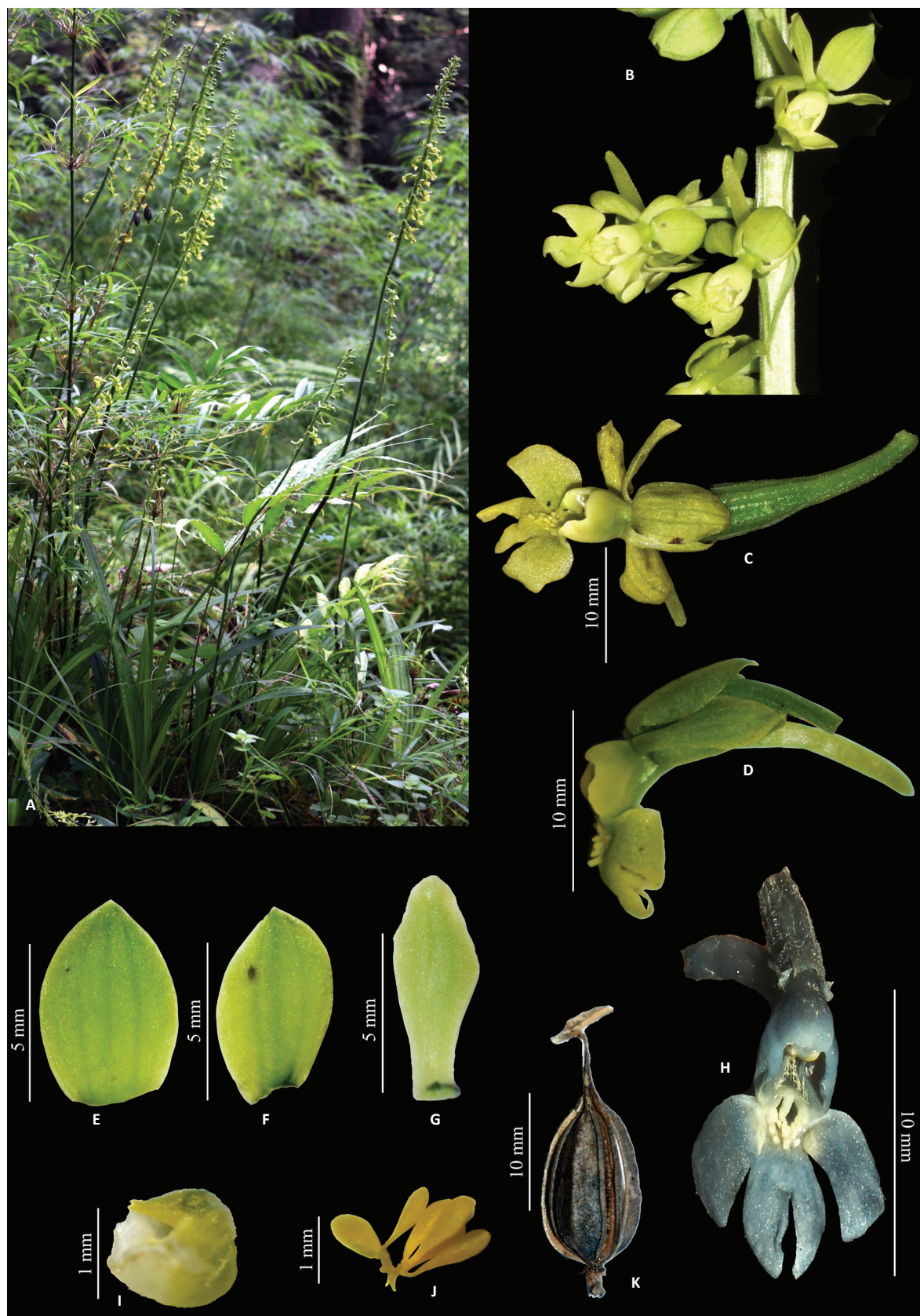


Image 1. *Calanthe davidii* Franch: A—plant in habitat | B—close up of inflorescence | C—top view of flower | D—side view of flower | E—dorsal sepal | F—lateral sepal | G—petal | H—labellum (spirit sample) | I—operculum with pollinarium | J—pollinarium | K—fruit (All photographs by Ashutosh Sharma except H which is by Nidhan Singh).

for habitat loss. Until a thorough assessment is done throughout its geographic range, this species can be assessed as Data Deficient based on IUCN criteria (2019). At a regional level, however, this species is known from two authentic collections from Mussoorie (Uttarakhand) and Kullu (Himachal Pradesh) with no recent report from the former location, and less than 50 mature individuals from the latter population. It can be assumed that the population has been extirpated from Mussoorie due to unknown threats or due the developmental activity of this area of tourist interest. Kullu, where the new population was discovered also falls in a tourist area. This population is known to set fruits, hence the pollinator is present and there is a chance of new recruitment and so there is also a chance of finding more populations in adjacent areas. The closest population is supposedly in central Nepal which is over 600km away from the current location in Himachal Pradesh, hence there is no possibility of gene flow. Based on these facts, *Calanthe davidii* can be assessed at regional level as Endangered (C2a(i, ii); D)

Global distribution: China, India, Japan, Nepal, Taiwan and Vietnam.

Specimens examined

India: s.n. (DD172697) (DD), 07.vi.2018, Kasol, 32.001°N & 77.190°E, 1,800m, Kullu, Himachal Pradesh, India, coll. Ashutosh Sharma; s.n. (DD172698) (DD), 07.vi.2018, Kasol, 32.001°N & 77.190°E, 1,800m, Kullu, Himachal Pradesh, India, coll. Ashutosh Sharma; 1054 (K), western Himalaya, coll. Falconer; 22714 (E00694089) (E), Mussoorie, Uttarakhand, 5000–6000 ft., July 1899, coll. P.W. Mackinnon; 22714 (P00379000) (P), Mussoorie, Uttarakhand, 5000–6000 ft., July 1899, coll. P.W. Mackinnon.

China: s.n. (P00378880) (P), Tibet oriental, province de Moupin, coll. A. David; (P00378885) (P), Province du Kouy-Tcheou, environs de Kouei Yangfan, montagne de K'ien ling Chan, coll. J. Beauvais s.n.; 2322 (P00378886) (P), Province du Kouy-Tcheou, environs de Gan-pin, montagne près de la ville, Coll. Bodinier & Martin; 2369 (P00378887) (P), Province du Kouy-Tcheou, Pin-fa et Na-jo, Coll. J. Cavalerie; 2369 (P00378888) (P), Province du Kouy-Tcheou, Pin-fa et Na-jo, Coll. J. Cavalerie; 2362 (P00378889) (P), Province du Kouy-Tcheou, Pin-fa, Coll. J. Cavalerie; 396 (P00378890) (P), Yunnan, Coll. F. Ducloux; 396 (P00378891) (P), Yunnan, Coll. F. Ducloux; 2557 (P00378892) (P), Yunnan: environs de Yunnan-sen, ravines boisées, Coll. F. Ducloux; 3825 (P00378893) (P), Yunnan, Tchung-chan, Coll. F. Ducloux; 3825 (P00378894) (P), Yunnan, Tchung-chan, Coll. F.

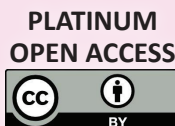
Ducloux; 3825 (P00378895) (P), Yunnan, Tchung-chan, Coll. F. Ducloux; 315 (P00378896) (P), Su-tchuen oriental, Tchen-Keou-Tin, Coll. P.G. Farges; 315 (P00378897) (P), Su-tchuen oriental, Tchen-Keou-Tin, Coll. P.G. Farges; 856 (P00378898) (P), Su-tchuen oriental, Tchen-Keou-Tin, Moungmoung Ky, près Tchen-Kéou, Coll. P.G. Farges; 856 (P00378899) (P), Su-tchuen oriental, Tchen-Keou-Tin, Moungmoung Ky, près Tchen-Kéou, Coll. P.G. Farges; 856 (P00378900) (P), Su-tchuen oriental, Tchen-Keou-Tin, Moungmoung Ky, près Tchen-Kéou, Coll. P.G. Farges; 856 (P00378901) (P), Su-tchuen oriental, Tchen-Keou-Tin, Moungmoung Ky, près Tchen-Kéou, Coll. P.G. Farges; 856 (P00378902) (P), Su-tchuen oriental, district de Tchen-Keou-Tin, Coll. P.G. Farges; s.n. (P00378905) (P), Yunnan, Coll. E.E. Maire; 2322 (P00378906) (P), Kouy-Tcheou, Coll. L. Martin; 2322 (P00378907) (P), Kouy-Tcheou, Coll. L. Martin; 1259 (P00378909) (P), West Hupeh, Coll. E.H. Wilson; 4597 (P00378910) (P), Western China, Coll. E.H. Wilson; 46 (P00378903) (P-syntype), 08.xix.1908, Su-tchuen (Sichuan), Massif des Oua Pao Shan, Coll. A.F. Legendre; 090602026 (326560) (TAIF), 06.ii.2009, Hubei, Enshi Tujia and Miao Autonomous Prefecture, Enshi Tujia and Miao Autonomous Prefecture, 517 m, Bing Zhang, Coll. Zhi-Rong Gu & Xin Xiang; s.n. (382914) (TAIF), 06.xviii.2009, Hubei, Lichuan City, Maoba Township, 770 m; s.n. (382957) (TAIF), 06.xxii.2009, Hubei, Xianfeng County, Huolongping Township, 1100 m; s.n. (382958) (TAIF), 06.xxii.2009, Hubei, Xianfeng County, Huolongping Township, 1100 m; 1969 (443700) (TAIF), 04.xx.2012, Hunan, Longshan County, Daan Township, 1135 m, Coll. Zhi-Jiang Zhang & Wen-Qi Liu; 2528 (450241) (TAIF), 05.xvii.2012, Hubei, Enshi City, Enshi City, 700 m, Coll. Zhi-Jiang Zhang & Wen-Qi Liu; 3488 (457990) (TAIF), 07.xxv.2012, Sichuan, Hongya County, Fanjiaoping, 1300 m, Coll. Xiao-Jie Li; 5762 (391423) (TAIF), 05.xxiv.2012, Taiwan, Hsinchu County, Ssumakussu Ancient Trail, 1500–1700 m, Coll. Tian-Chuan Hsu; 3995 (392497) (TAIF), 05.xi.2011, Taiwan, Hualien County, Tienchang Cliff, 1300–1500 m, Coll. Tian-Chuan Hsu.

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