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The First Record of the Genus *Tropidia* Lindl. (Orchidaceae) From Nepal

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ABSTRACT

Orchidaceae, the largest family of the angiosperms, comprises various attractive flowers, not only important for their beauty but also for their use in medicine and trade. The orchid tribe Tropidieae comprises three genera *Tropidia, Corymborkis* and *Kalimantanorchis*. This tribe Tropidieae is one of the earliest diverging clades in sub-family Epidendroideae (Orchidaceae). *Corymborkis* comprises eight species and has a pan tropical distribution. *Kalimantanorchis* is the most recently established genus in the tribe and consists of single species distributed in Indonesia. The genus *Tropidia* is composed of ca. 30 species distributed in southern Asia, South Pacific islands and northern Australia, and a single species occurring in America, from United States to Ecuador. Orchidaceae is one of the largest and most diverse families of flowering plants in Nepal, comprising of more than 450 species that span 107 genera (around 7% of total angiosperms in Nepal). They are distributed between 60 m to 5200 m. Since orchids are facing an extinction risk from various anthropogenic factors at the regional and global level. The paper aims to document the species of new record of Orchid in and around the Kaligandaki valley. *T. curculigoides* has not been reported before. Thus the first record of the genus *Tropidia* for Nepal is elaborated here. It consists of *Tropidia curculigoides*, a species found in the sub-tropical region, Central Nepal. Description, photos, key and distribution site of the species are provided.

Keywords: Young palm orchid, Terricolous habit, Sub-tropical region

1. INTRODUCTION

In the history of orchid exploration in Nepal, many plant collectors and naturalists collected and documented orchids. During 1820–1821, N. Wallich collected many orchid species around Kathmandu valley and other parts of Nepal. In 1825, D. Don published the description of 50 species of orchids collected from Nepal (Pant *et al.* 2018). A comprehensive documentation of the Nepalese orchids given by Hara et al. (1978) enumerated 90 genera & 315 species. Later on, Banerjee & Thapa (1978) reported 55 genera & 196 species of orchids from the eastern part of Nepal. Banerjee & Pradhan (1984) described and illustrated 247 species in the book 'The Orchids of Nepal Himalaya'. Press *et al.* (2000) reported 89 genera & 323 species of orchids in an annotated checklist of flowering plants of Nepal. Rajbhandari & Dahal (2004) enumerated 100 genera

& 377 species in a checklist of orchids in Nepal. Raskoti (2009) enumerated 302 species of orchid along with their detailed descriptions. Similarly, Rokaya *et al.* (2013) published an annotated checklist of orchid species in Nepal with a list of 104 genera & 437 species. Orchidaceae is considered to have the highest rate of speciation, but also the highest rate of extinction. The rapid speciation and high species diversity within Orchidaceae are linked to the family's specialized pollination syndromes, symbiotic associations with mycorrhizal fungi, and colonization of epiphytic habitats (Pant *et al.* 2018).

The habit and ecology of *Tropidia* consist of terrestrial and share a combination of features that include stiff and erect stems with a few relatively broad, thin-textured, pleated leaves. *Tropidia* comprises terricolous herbs, green or holomycotrophic; stem often branched; two or many plicate leaves; inflorescences axillary or terminal, racemose or paniculate, few- to many flowered; flowers resupinate or non-resupinate with the base of the lateral sepals and petals fused together and the basal margins of the labellum fused with the column. The labellum is unlobed, broadest at the base and may have a deep basal spur and column with prominent rostellum, and a dorsal and erect anther with two elongated sectile pollinia (Pridgeon *et al.* 2005, Koch *et al.* 2016, Chen *et al.*2009).

2. MATERIALS AND METHODS

The field survey was conducted at Kaligandaki valley, for the documentation of the flora in 2016. The habitat area occupies around 5 ha. semi-deciduous forest on the bank of Kaligandaki River. During sampling, biodiversity assessment methods and guidelines, as explained by various authors were reviewed to design the field study (Shah et al. 2018). During the documentation of the Kaligandaki valley flora, I have collected 105 specimens. Collected specimens were pressed and dried. All the measurements were taken from fresh and dried materials. General morphological terms were used to describe it based on Harris and Harris (1994), Radford *et al.* (1974) and Stearn (1983). The photographs used were taken during the field visit. Distribution details were prepared using the distribution points presented in genera Orchidacearum (Pridgeon *et al.* 2005) and data prepared in Govaerts *et al.* (2016).

Later while identification of those specimens, some are very rare and unique, grouped them separately and compared with preserved specimens in National Herbarium and Plant Laboratories of the Department of Plant Resources at Godawari, Lalitpur, Nepal. Further consulting standard literatures, peer reviewed and identified as *Tropidia curculigoides*. This has not already reported from Nepal by Hara *et al.* 1978, Press *et al.* 2000, Singh 2001, Banerjii and Pradhan 1984, Raskoti 2009, Rokaya *et al.* 2013 and Shrestha *et al.* 2018.

Thus, it is reported as the first record to the flora of Nepal. The herbarium specimen of this species was collected by H. R. Paudel from Baglung, Central Nepal at an altitude of 1015 m in 2016 A.D. and deposited in KATH Herbarium (acronym according to Thiers 2020).

3. RESULTS AND DISCUSSION

3.1. Taxonomic treatment

Tropidia Lindley, Edwards's Bot. Reg. 19: ad t. 1618. 1833.

Tropidia curculigoides Lindley, Gen. Sp. Orchid. Pl. 497. 1840.

Tropidia assamica Blume; *T. formosana* Rolfe; *T. graminea* Blume; *T. hongkongensis* Rolfe; *T. squamata* Blume.

Fig 1. Flowering plant with habitat.

Plants 30–70 cm or more. Rhizome short, rigid; roots 2–3 mm in diam., fleshy. Stem erect, unbranched or occasionally with branches, proximally often naked, distally enclosed in leaf sheaths, internodes 2–4 cm. Leaves many, often more than 10, distichous and well spaced along stem, narrowly elliptic-lanceolate to narrowly lanceolate, (10–)15–25 × (1–)2–4 cm, papery, base contracted into amplexicaul sheath, apex long acuminate-caudate. Inflorescence racemose, terminal or axillary, with several to 10 crowded flowers, 1–2.5 cm; floral bracts imbricate, lanceolate, 4–7(–10) mm, conspicuously with longitudinal veins. Flowers not resupinate, greenish white; pedicel and ovary 5–6 mm. Sepals lanceolate or oblong-lanceolate, 7–10 × 1.5–1.7 mm, apex long acuminate; lateral sepals connate only at base, apex recurved. Petals oblong-lanceolate, 6–8 × ca. 1.3 mm; lip ovate-lanceolate or oblong-lanceolate, cymbiform, 6–8 mm, concave-saccate at base, with 2 inconspicuous lamellae on disk, apex acuminate. Column ca. 3 mm; anther ovoid, ca. 1.5 mm; rostellum erect, obovate, ca. 2 mm, apex 2-lobed-apiculate. Capsule suboblong, ca. 2 cm × 5 mm (Fig: 1-3).

Flowering: Jun–Aug,

Fruiting: Oct.

Chromosome: 2n = 40, 60.

Ecology: Shaded places, along valleys in forests

Distribution: 1015 m. Central Nepal. SW Guangxi, Hainan, Hong Kong, Taiwan, SE Xizang, S and SE Yunnan [Cambodia, India, Indonesia, Malaysia, Myanmar, Thailand, Vietnam](fig-4).

Types: India? Mt. Sylhet, Coll. F. De Silva &W. Gomez Wall.Cat.7386A (Syn: K-LINDL!)

3.2. Specimens Examined

Central Nepal: Baglung, 1015 m. 10. 06. 2016, H. R. Paudel, B-102 (KATH).

Key Characters of the Genus: Terricolous herbs,

Fig 2. Fruiting plant with habitat

green or holomycotrophic; with erect stem, often branched; two or many plicate leaves; inflorescences axillary or terminal, raceme or paniculate, few to many flowered; sometimes with a spur; and column with prominent rostellum, dorsal and erect anther with two elongated sectile pollinia.

3.3. Phylogenetic Classification

Early classifications (Dressler 1981) placed *Tropidia* as related to spiranthoid orchids, especially due to its erect dorsal anther and soft sectile pollinia. However, cladistic analysis based on anatomical and morphological characters positioned the genus within Epidendroideae (Stern *et al.* 1993, Freudenstein & Rasmussen 1999). Later phylogenetic study on the subfamily based on mitocondrial, nuclear and plastid regions (Freudenstein & Chase 2015) placed *Tropidia* as sister to *Corymborkis* Thouars, with strong support, among the other early branching epidendroids.

Tropidia stand as separate genus from morphology as well as phyllogeny. Recently Kikuchi *et al.* 2020, analysed the phyllogenetic relationship among the tribe tropidieae and stated that *Corymborkis* and *Tropidia* were each inferred as monophyletic in their study. They further elaborated that *Kalimantanorchis* is nested within the Asian *Tropidia* clade.

4. CONCLUSION

During recent field studies in Nepal, one species of *Tropidia* Lindl. viz. *T. curculigoides* Lindl. is reported and described as new record. After this publication, the total number of orchids genera increase to 109 belonging to the flora of Nepal.

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NA

6. CONFLICT OF INTEREST

The author have declared that there is no conflict of interest.

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