



Ensete nepalense, a new combination, lectotypification and recognition as a distinct species endemic to Nepal

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Summary. Field and herbarium-based studies have revealed that *Musa nepalensis* Wall. should be recognised as a species distinct from *Musa glauca* Roxb. (= *Ensete glaucum* (Roxb.) Cheesman), rather than a synonym as it has usually been assumed since the 1890s. *Musa nepalensis* is lectotypified, and a new combination *Ensete nepalense* (Wall.) G.Parmar & Trias-Blasi is made. Diagnostic characters, distribution, a key to related species, habitat and phenological data are provided for *E. nepalense*.

Key Words. *Ensete*, Himalaya, lectotype, *Musa nepalensis*, taxonomy.

Introduction

The Musaceae family consists of three genera: *Ensete* Horan., *Musa* L. and *Musella* (Franch.) C.Y.Wu ex H.W.Li (Delin & Kress 2000; Borrell *et al.* 2019). In Nepal, the family is represented by *Ensete glaucum* (Roxb.) Cheesman and *Musa balbisiana* Colla (Hara *et al.* 1978). *Musa × paradisiaca* L. is the most common species of the family in Nepal, however, it is only found under cultivation. Previous studies have also reported *Musa nepalensis* Wall. from Nepal (Roxburgh 1824; Baker 1893). Nevertheless, in the absence of a complete investigation of this family in Nepal, and inadequate evidence of *M. nepalensis*, it has been treated as a synonym of *E. glaucum* (Hara *et al.* 1978; Joe *et al.* 2016).

The genus *Ensete* is characterised by being a non-stoloniferous, monocarpic, unbranched herb, with a pseudostem often swollen at the base, and proximal bracts always green (Cheesman 1947; Delin & Kress 2000; Joe *et al.* 2016). During the study of Musaceae for the *Flora of Nepal*, the first author observed 11 individuals of *Ensete* in their natural habitat from the Godawari area, Lalitpur District, Kathmandu Valley, Nepal in Aug. 2016, but then thought to be *E. glaucum*. In 2021, the author thoroughly investigated the morphology and distribution of this taxon in its natural habitat in the Kathmandu and Lalitpur Districts, particularly around the Godawari area and found that the plant differed from that of *E. glaucum* and from other *Ensete* species reported from neighbouring countries. Consulting the protologues of Musaceae described from this region, the morphology of these plants seemed to match with the description of *Musa nepalensis*. Roxburgh (1824) treated *M. nepalensis* as a distinct taxon in *Flora Indica*. However, in the absence of its specimens at any regional or national herbaria, it has been assumed

as a synonym of *E. glaucum* since 1894, and all recent studies treated it as a synonym of *E. glaucum* since 1978 (Watson 1894; Hara *et al.* 1978; Joe *et al.* 2016).

The status of *Musa nepalensis* has been problematic ever since Wallich described this plant from Nepal in Roxburgh's (1824) *Flora Indica*. According to Baker (1893), this species was described by Wallich from two large unpublished drawings prepared for him by an Indian artist whilst in Nepal, and now deposited at the Royal Botanic Gardens, Kew. Watson (1894) cited a letter from Dr King dated 22 Aug. 1893; where he mentioned that he did not believe in the existence of *M. nepalensis* in the absence of any specimens on the lower slopes of the Himalaya of Nepal where Wallich believed it to grow, and considered it to be *M. glauca* Roxb. In a review of the genus *Ensete*, Cheesman (1947) stated that if the taxon *M. nepalensis* exists, it belongs to *Ensete*, but Simmonds (1960) erroneously quoted '*Ensete nepalensis* (N. Wallich) E.E.Cheesman' in his paper. However, that was a mistake by Simmonds because no such combination was made by Cheesman, as he considered it to be *nomen dubium* in the absence of any specimens for study. In a recent study of the genus *Ensete* from India, Joe *et al.* (2016) could not locate any specimens or illustrations of *M. nepalensis* at K or CAL, and therefore, they treated *M. nepalensis* and *E. glaucum* as conspecific.

The name, *Musa nepalensis*, was deemed to be illegitimate by Väre & Häkkinen (2011) since Wallich believed it to be either doubtfully distinct from *M. superba* Roxb. or intermediate between *M. superba* and *M. glauca*. However, names are not invalidated by statements of scepticism. *Ensete nepalense* differs from *E. glaucum* and *E. superbum* (Roxb.) Cheesman in the stature and apex of bracts respectively, as mentioned in the protologues (Figs 1 – 3; Roxburgh 1811, 1824; Table 1).

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Fig. 1. Lectotype of *Ensete nepalense* (K). © The Board of Trustees, Royal Botanic Gardens, Kew.



Fig. 2. Species of *Ensete* found in Nepal. *E. glaucum*. **A** habit. *E. nepalense*; **B**, **C** habit; **D** infructescence with proximal green bracts and distal purplish bracts; **E** distal bracts deep purple on adaxial surface; **F** yellowish flowers with spathe; **G** longitudinally dissected fruit; **H** seeds. PHOTOS: **A** MITRA LAL PATHAK; **B** – **H** GAURAV PARMAR.



Fig. 3. An illustration of *Ensete superbum*. From William Roxburgh's *Plants of the Coast of Coromandel*, Vol. 3 (1811).

Table 1. Comparative morphological characters of related *Ensete* species.

Character	<i>E. glaucum</i>	<i>E. nepalense</i>	<i>E. superbum</i>
Pseudostem stature and height	tall; 1.5 – 5 m	short; 0.15 – 1.2 (– 1.5) m	medium to tall; 1 – 4 m
Outer leaf sheaths when old	green and tinged with reddish-black spots	green and tinged with reddish-black spots, rarely dry and brown	dry and brown
Petiole	sheathing	sheathing	not sheathing
Distal bracts colour	green	purplish	purplish
Distal bract apex	not revolute	revolute	not revolute
Seed size	large; 11.5 – 15 × 11 – 13 mm	small; 4 – 8 (–9) × 3 – 8 mm	medium; 8 – 13 × 7.5 – 12 mm

Materials and Methods

Ensete species were observed in their natural habitat in three different localities in Lalitpur District (two from nearby localities of Godawari and one from adjacent Badikhel), as well as one from Thankot in the Kathmandu District. Specimens, including the flowering and fruiting parts, were collected from two nearby localities of Godawari, Lalitpur District, Nepal. However, the specimens collected in Aug. 2016 from the Godawari area and deposited in the National Herbarium (KATH) could not be found in the KATH. Only observations of specimens from Badikhel and Thankot were made in Dec. and Jan. of 2021, respectively; no collections were made at those sites. In the investigation, morphology of the *Ensete* specimens was found to bear a resemblance to the protologue description of *Musa nepalensis*, establishing it as a distinct taxon. However, none of the herbaria, including CAL, E, and K, had any specimens of *M. nepalensis*. Therefore, following the trail of previous literature, drawings of *M. nepalensis* were extensively searched in archives at Kew, and a large drawing was discovered in its archives, most likely drawn by one of Wallich's two Indian artists, Gorachand or Vishnu Prasad.

The species' Extent of Occurrence (EOO) and Area of Occupancy (AOO) were determined using the online tool GeoCAT (Bachman *et al.* 2011) and its conservation status based on the Categories and Criteria of IUCN (2012).

Taxonomic Treatment

***Ensete nepalense* (Wall.) G.Parmar & Trias-Blasi, comb. nov.**

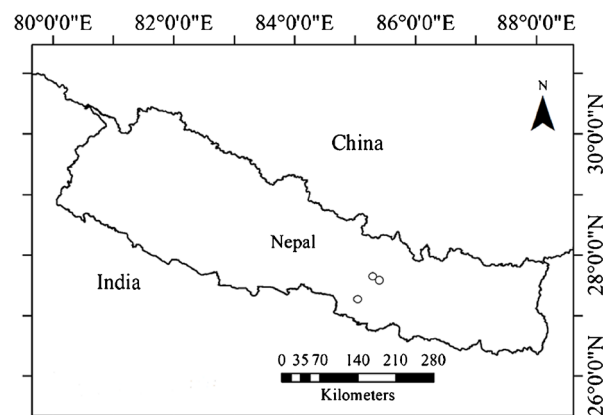
<http://www.ipni.org/urn:lsid:ipni.org:names:77316755-1>

≡ *Musa nepalensis* Wall. in Roxb., *Fl. Ind.* (Carey & Wall. ed.), 2: 492 (Roxburgh 1824). Type: Nepal, Becheaco (= Amlekhganj) to Kathmandu Valley, Nathaniel Wallich s.n. (lectotype, image K!, selected here) (Fig. 1).

Non-stoloniferous, monocarpic, unbranched *herb*. *Pseudostems* short, 0.15 – 1.2 (– 1.5) m, 0.6 – 1.25 m in diam. at base, sheathed, covered with the withered bases of the old petioles, swollen at base and tapering gradually towards the apex giving conical appearance, green and tinged with reddish-black spots. *Leaves* spreading in all directions, *petiole* short and sheathing. *Inflorescence* large and nodding, proximal bracts green, distal bracts purplish with abaxial surface purplish yellow and adaxial surface deep purple and furfuraceous at the base, apex revolute. *Flowers* yellowish, arranged in two rows within each spathe, 7 – 9 in a row. *Fruit* obovoid-oblong, green when young and yellowish when ripe, having numerous seeds. *Seeds* black except hilum, surface smooth, 4 – 8 (– 9) × 3 – 8 mm (Fig. 2).

DISTRIBUTION. Nepal. Kathmandu and Lalitpur Districts within the Kathmandu Valley (Map 1).

SPECIMENS EXAMINED. NEPAL. Bagmati, Lalitpur Distr., Godawari, National Botanical Garden, naturally growing in an open plain area, 27°35'50"N, 85°22'55"E, 1500 m, 25 Nov. 2021, *Gaurav Parmar* GP2 (KATH, 3 sheets); Bagmati, Lalitpur Distr., Godawari, National Botanical Garden, on the slope in an open area, 27°35'53"N, 85°22'52"E, 1510 m, 25 Nov. 2021, *Gaurav Parmar* GP1 (KATH, 6 sheets).



Map 1. Distribution of *Ensete nepalense* (O) in Nepal.

HABITAT. On small mountains in an open area, sometimes in the shade; c. 1400 – 1650 m asl.

CONSERVATION STATUS. In the protologue (Roxburgh 1824), the species is claimed to be present from Amlekhganj to the Kathmandu Valley. We discovered the species in the type locality in Thankot, Kathmandu District, central Nepal, from the route Wallich entered the Kathmandu Valley. But in our prior investigation, we were unable to find any *Ensete* species in the vicinity of Amlekhganj. Interestingly, this species has also been discovered in three localities, two of which are relatively close together, in the Lalitpur District, central Nepal. Because the two nearby localities of Lalitpur are only roughly 150 m apart, they are each depicted by one dot on the map, which has three dots, representing one from Kathmandu District and two from Lalitpur District. The species' population appears to have declined since its discovery about 200 years ago, and it is now mostly restricted to the Kathmandu Valley. Previous studies had questioned its existence due to its limited distribution. In our recent investigation, we only found 81 individuals from four different localities. Its Extent of Occupancy (EOO) and Area of Occupancy (AOO) are found to be 479.871 km² and 16.000 km², respectively. Therefore, the species is considered here as Endangered (EN B1B2ab(iii); C2a(i,ii); D) due to its narrow extent of occupancy (< 5,000 km²), restricted area of occupancy (< 500 km²), low number of locations known (≤ five locations) and very small population size (< 250 mature individuals), based on IUCN Red List Categories and Criteria (2012).

PHENOLOGY. Flowering proceeds with the rainy season and fruiting immediately after the rainy season ends, from May to Jan.

VERNACULAR NAME. Ban kera (वन केरा) or Bhuin kera (भुई केरा) in Nepali language, while Gompoo kula (गोम्पू कुला) or Paaslaati maa (पासलाति मा) in Newari language.

USES. Its fruits are rarely consumed by the local people because of its numerous seeds, but its leaves are traditionally preferred as a plate in religious events by the Nagarkotis, a local Newari community. The plant is attractive, making it suitable for use as an ornamental plant.

NOTES. Baker (1893) stated that *Musa nepalensis* was described by Wallich from two large unpublished drawings deposited at Kew. However, only one drawing of *M. nepalensis* was discovered in the archives at the Royal Botanic Gardens, Kew, the other could not be located. The original material of this taxon, which is the only illustration of *M. nepalensis* in the archives at Kew, is chosen as the lectotype and it best represents the species.

Previous studies included specimens of this newly made combination, *Ensete nepalense*, under *E. glaucum*. However, *E. nepalense* is not the only *Ensete* taxon found in Nepal. During the course of this study, herbarium specimens of *E. glaucum* from eastern Nepal were discovered in the Herbarium of the University of Tokyo (TI), whereas live *E. glaucum* plants from western Nepal appeared to have been planted or to have escaped from backyard gardens. According to this study, *E. nepalense* is found in central Nepal while *E. glaucum* is found in eastern Nepal in the wild, with no overlap in distribution. Thus, Nepal is home to two *Ensete* species.

Key to *Ensete* species in Nepal

Pseudostem more than 1.5 m tall; distal bracts green, apex not revolute; seeds 11.5 – 15 × 11 – 13 mm.....	<i>E. glaucum</i>
Pseudostem up to 1.2 (– 1.5) m tall; distal bracts purplish, apex revolute; seeds 4 – 8 (– 9) × 3 – 8 mm.....	<i>E. nepalense</i>

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Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

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