

Mappianthus kachinensis (Icacinaceae), a new woody climber from Kachin State, Myanmar

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ABSTRACT

Mappianthus kachinensis, a new species currently only known from Kachin State, Putao District, northern Myanmar, is described and illustrated. A detailed description along with etymology, conservation status, and a line illustration are provided for a new species. The genus is still poorly known, and this discovery increases the number of species in *Mappianthus* to at least three. Problems with species delimitation in the genus are also briefly discussed.

KEYWORDS: Icacinaceae, *Iodes*, *Mappia*, China, Borneo, new taxon, taxonomy.

Accepted for publication: 27 March 2025. Published online: 13 May 2025

INTRODUCTION

The Icacinaceae is a pantropical family of trees, shrubs and lianas with 23 genera and at least 155 species worldwide (POWO, 2024). The family limits have recently been more clearly defined with several genera previously included in this family now placed in the Cardiopteridaceae (Cardiopteridales), Metteniusaceae (Metteniusales), Pennantiaceae (Apiales) and Stemonuraceae (Cardiopteridales; see Utteridge & Schori, 2011 and Stull *et al.*, 2015). In Asia, the family in the traditional, broad sense was treated by Sleumer (1969), with relatively recent Flora accounts available for Malesia (Sleumer, 1971), Thailand (Sleumer, 1970) and China (Peng & Howard, 2008).

Mappianthus Hand.-Mazz. is a small genus of subtropical climbers from India and southern China into Peninsular Malaysia and Borneo, unique in the family with opposite leaves, tendrils and distinct

floral characters. The genus was first described by Handel-Mazzetti (1921) based on *M. iodoides* Hand.-Mazz. to accommodate specimens from Hunan Province in China, which were similar to members of *Iodes* Blume and *Mappia* Jacq. but differed in floral morphology, specifically the hairier petals and longer filaments. The genus has been used in Traditional Chinese Medicine, with roots of *M. iodoides* utilized as a treatment for jaundice hepatitis, rheumatic arthralgia, snakebite and traumatic injury (Cai *et al.*, 2011). In his review of the family across Asia, Sleumer (1969) kept *Mappianthus* distinct, but in the subsequent Flora Malesiana account he included *Mappianthus* within a larger *Iodes* (Sleumer, 1971); this was followed by Utteridge & Schori (2011) in their checklist of the genera placed within the new family limits. However, *Mappianthus* was retained in the Flora of China account (Peng & Howard 2008), and recent classifications, including those based on DNA data,

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recognise *Mappianthus* as distinct from *Iodes* (Byng *et al.*, 2014; Stull *et al.*, 2015, 2020; Potgieter & Duno, 2016). In their survey of Icacinaceae fruit types, Del Rio *et al.* (2020), maintain *Iodes* and *Mappianthus* as distinct genera with several differences in endocarp morphology. We follow these recent studies and accept *Mappianthus* as a distinct genus. Characters useful to identify *Mappianthus* from *Iodes* include the degree of fusion of the petals (*Mappianthus* petals coherent vs *Iodes*: petals coherent only at the base) and the relative length of the filaments (*Mappianthus* filaments slender and longer than the anthers vs *Iodes*: filaments much shorter than the anthers), as well as more technical fruit characters (see key to genera based on fruits in Del Rio *et al.* (2020)), including *Mappianthus* having the primary vascular bundle outside the endocarp wall or in a channel (*Iodes* pro parte with the bundle embedded within endocarp wall) and the outer endocarp surface ridged or rugose in *Mappianthus* (compared to the outer endocarp surface completely smooth in *Iodes*).

In Myanmar, no species of *Mappianthus* were documented from the country by Kress *et al.* (2003), but the genus is recorded from Myanmar in POWO (2024) based on *M. hookerianus* (Baill.) Sleumer; the genus is currently not known from Thailand (Sleumer, 1971; Utteridge, pers. obs.). The New York Botanical Garden carried out a botanical inventory programme in Hkakaborazi National Park and adjacent Hponganrazi Wildlife Sanctuary during 2015–2019. All three specimens of this new *Mappianthus* species were collected during the first expedition in 2015, which focused on the south-eastern border of Hkakaborazi National Park. This species was not found elsewhere in the region during the remainder of the inventory programme.

The species is placed as a member of *Mappianthus* based on the climbing habit, presence of tendrils, opposite leaves with entire margins, and the flowers with coherent petals and slender filaments much longer relative to the anthers.

MATERIAL AND METHODS

This study is based on physical or digital examination of material deposited in A, K, L, NY, P, SING and TNS. Keys and descriptions in the relevant taxonomic literature were studied for comparative purposes (Sleumer, 1969, 1970, 1971). Terminology

follows Beentje (2016), Systematics Association Committee (1962) and Hewson (2019). The conservation metrics were calculated using GeoCAT (Bachman *et al.*, 2011) and the assessment carried out following IUCN guidelines (IUCN Standards and Petitions Subcommittee, 2022).

NEW SPECIES

Mappianthus kachinensis Utteridge & K. Armstr., **sp. nov.**

Recognised in the genus *Mappianthus* by the combination of the following characters: glabrous to sparsely hairy on the vegetative parts, chartaceous, ovate leaves with relatively long petioles to 2.5 cm long, the staminate inflorescence with a peduncle to 6.5 cm long, and the glabrous oblongoid fruits.

Type: Myanmar, Kachin State, Putao District, Naungmung Township, buffer zone of Hkakaborazi National Park, between Shingsankhu rest house and YP peak [Wai Pi Razi], 27°41'30.6"N, 97°53'9.8"E, 1,507 m, 8 Nov. 2015 (staminate fl.), *K.E. Armstrong, D.P. Little, M.M. San, Z.N. Tun, P.S. Aung, A. Syn & A. Bai 1318* (holotype NY!; isotypes E, K!, RAF, TNS!). Fig. 1.

Woody climber to 12 m tall. *Young branches* pale green-yellow, glabrous or very sparsely strigose, angular; mature branchlets gray, c. 1.5 cm in diam., glabrescent, with conspicuous orbicular, raised lenticels. *Tendrils* slender, to 14 cm long. *Indumentum* of colourless to yellow-brown appressed hairs, 0.1–0.2 mm long ('strigose' following Hewson 2019), becoming glabrous on petioles and tendrils. *Petiole* 1.5–2.5 cm, articulated at base 1.5–3 mm from base of the petiole (proximal to the axil/node), adaxially narrowly grooved, sparsely strigose becoming densely strigose along the adaxial groove, eventually glabrous. *Leaf blade* adaxially olive-green, abaxially pale green or yellow-green, midvein and venation stramineous (very pale dull yellow), ovate to elliptic or elliptic-oblong, (6–)11–16 × (2.5–)5–9 cm, chartaceous, ad- and abaxially glabrous or very sparsely strigose hairy; midvein prominent ad- and abaxially; secondary veins (6–)9–10 pairs, brochidodromous, curved ascending, prominent ad- and abaxially, tertiary veins percurrent, prominent ad- and abaxially, higher order venation random to orthogonal reticulate, prominent ad- and abaxially at maturity; base rounded to cordate, apex acuminate.

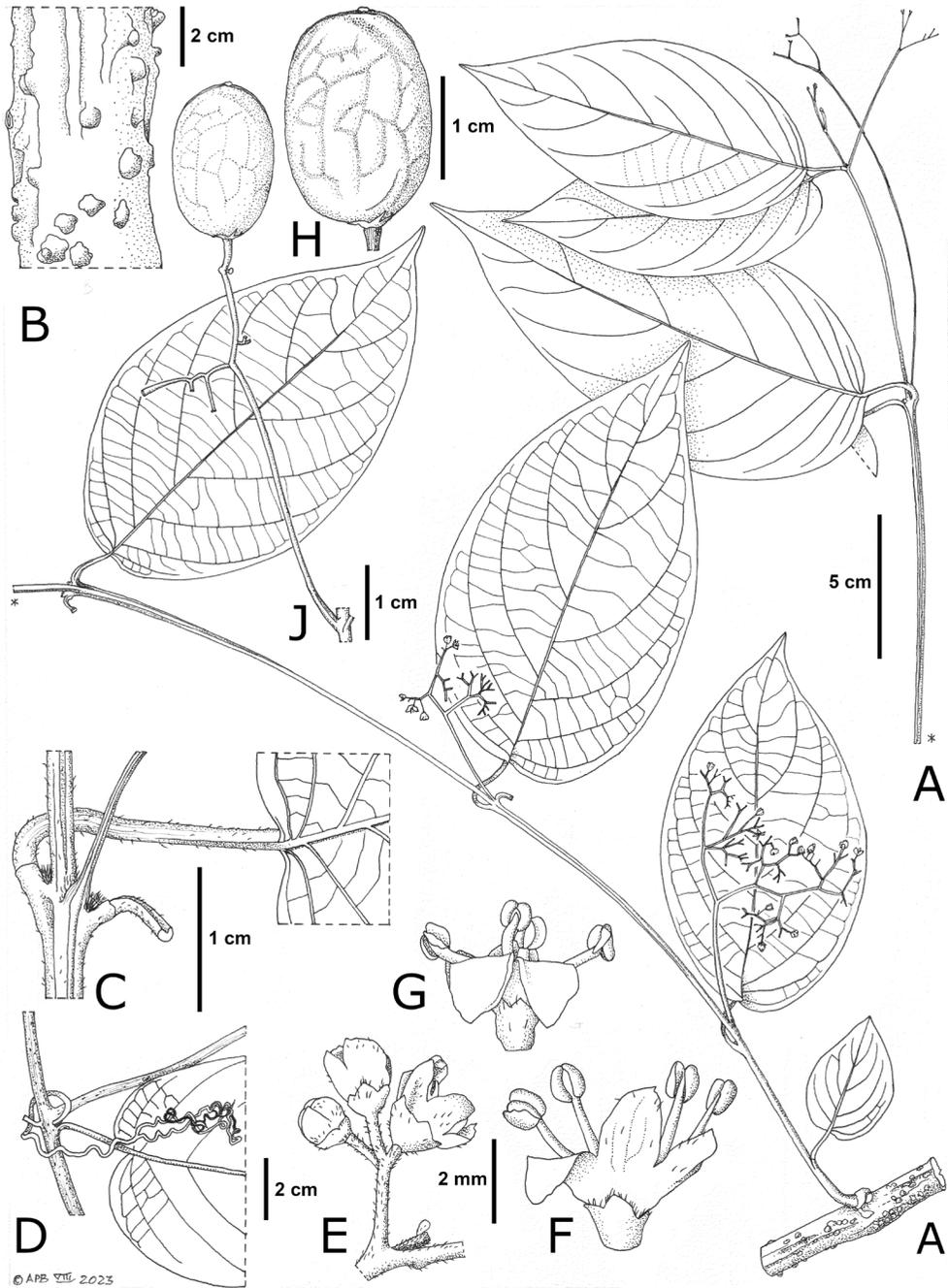


Figure 1. *Mappianthus kachinensis* Utteridge & K. Armstr.: A. Habit of flowering stem; B. Detail of main stem showing warty lenticels; C. Leaf node with one peduncle; D. Node with branched tendril; E. Branch of inflorescence showing denser indumentum below flowers; F & G. Hydrated flowers; H. Fruit, side view; J. Fruit on inflorescence. A–C, F & G from *Armstrong et al. 1318*; D & E: from *Armstrong et al. 1142*; H & J from *Armstrong et al. 1034*. Drawn by Andrew Brown.

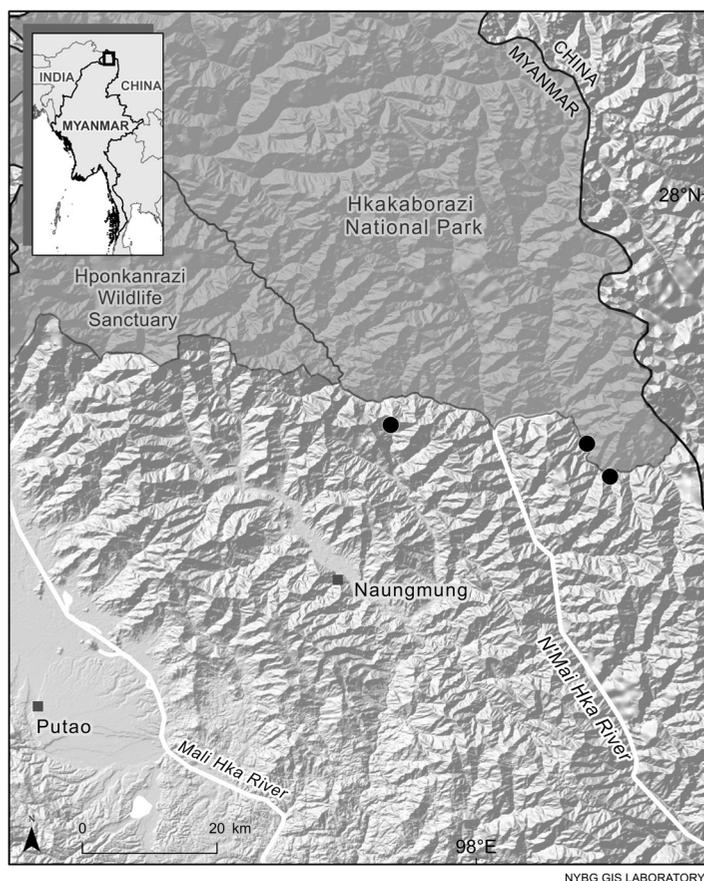


Figure 2. Distribution of *Mappianthus kachinensis* Utteridge & K. Armstr.

Inflorescences pedunculate cymose panicles, initially dichasial with ultimate branches becoming monochasial, axillary. *Staminate inflorescences* to 9.5 (–14.8) cm long, peduncle 2.5–4 (–11.6) cm long, sparsely to densely strigose. *Staminate flowers* green, globose in bud; pedicel 1–2.5 mm long, strigose to sparsely strigose; calyx 4 or 5-lobed, 0.5–1 mm long, shortly triangular lobed, outside glabrous to sparsely strigose hairy, margins sparsely strigose ciliate; corolla 2.25–3 mm long, fused halfway, 4 or 5-lobed, lobes ovate-triangular, outside very sparsely strigose hairy, inside glabrous, apices incurved; filaments 1–1.5 mm long, glabrous; anthers ca 0.8 mm long; ovary vestigial. *Pistillate inflorescences* in fruit as staminate but peduncle 4–5 cm long. *Pistillate flowers* not seen. *Fruit* drupaceous, green, oblongoid and slightly keeled toward the apex, 2.2–3 × 1.5–2 cm, glabrous, endocarp reticulate with a network of shallow furrows visible on drying.

Distribution.— Myanmar, currently only known from Putao District in Kachin State. Fig. 2.

Ecology.— *Mappianthus kachinensis* has been collected only three times within the vicinity of Hkakaborazi National Park and is likely to be endemic to this region of northern Myanmar, and potentially neighbouring Dulong Jiang of Yunnan, China, given the similar geography and flora. This species grows between 1,150–1,550 m in the Kachin Hills subtropical rainforest, a closed-canopy humid lower montane forest type occurring between 700–1,500 m in northern Myanmar (Armstrong *et al.*, 2020; Murray *et al.*, 2020).

Additional specimens examined.— Myanmar, Kachin State, Putao District, Naungmung Township, buffer zone of Hkakaborazi National Park, between Tup Kwan rest house and Gushin village, 27°37'22.2"N, 98°10'44.6"E, 1,219 m, 26 Oct. 2015

(fr.), *Armstrong et al. 1034* (E, K!, MBK, NY! 02648880, RAF, TNS!); *ibid.*, Naungmung Township, buffer zone of Hkakaborazi National Park, Ta Pai rest house and Aliaung village, 27°40'0.5"N, 98°8'53.6"E, 1,176 m, 30 Oct. 2015 (staminate fl.), *Armstrong et al. 1142* (E, K!, NY! 02649179, RAF, TNS!).

Etymology.— Named for Kachin State in Myanmar.

Conservation status.— Endangered (EN). This species is only known from three herbarium specimens collected along a footpath in Hkakaborazi National Park, in far north-eastern Myanmar. The Extent Of Occurrence (EOO) of 59 km², is below the Critically Endangered threshold under criterion B1. The Area Of Occupancy (AOO) of 12 km², is below the Endangered threshold under criterion B2. The population size and trend are unknown, although it is suspected to be rare and restricted due to the small number of collections during extensive botanical inventory, both in this locality and in similar bordering habitats. The entire footpath is at risk of being cleared for transportation due to Chinese gold mining concessions that have been approved nearby. This is thought to be the main future threat to this species, as a nearby road cut in 2017 caused large landslides. Furthermore, extensive slash and burn agriculture is ongoing across the hillsides, leading to habitat loss and degradation, and it is therefore suspected that the species occurs in two locations. Based on currently available data, this species is preliminarily assessed as Endangered under criterion B1ab(iii)+2ab(iii).

Field Notes.— ‘Fruit green, smells of green beans’ (*Armstrong et al. 1034*); ‘flowers light green’ (*Armstrong et al. 1142*); ‘flowers green’ (*Armstrong et al. 1318*).

Notes.— *Mappianthus* is distinct within the Icacinaceae on account of the opposite leaves and tendrils, together with the unisexual flowers with connate petals and elongate filaments, and the drupaceous fruit with a rugose endocarp. *Mappianthus kachinensis* differs from all other members of the genus in being more or less glabrous throughout the vegetative parts and on the drupe. Prior to the description of the new species described here, only two species of *Mappianthus* were accepted (POWO 2024; but see below), and both of

them are quite different in leaf morphology and the indumentum, being hairy throughout, sometimes densely so. *Mappianthus iodoides*, from southern China (Yunnan to Hai Nan and Hong Kong), has elliptic to oblong, coriaceous leaves with shorter petioles (to 1.5 cm long), shorter inflorescences (peduncle to 1 cm long) and an ovoid to ellipsoid drupe which is strigose throughout. The leaves of *M. hookerianus* are similar in shape, the drupe is ovoid and larger (ca 3 × 2.2 cm) and strigose throughout; further differences are listed in Table 1.

In *Mappianthus*, the species (and genus) limits adopted by Sleumer (1969, 1970), and still followed in herbaria and online checklists, appear rather heterogeneous and broad. For example, at the species level, Sleumer’s (1969) concept of *M. hookerianus* includes *Iodes thomsoniana* Baill. and *M. borneensis* Merr. Whilst at the genus level, Sleumer (1969, 1970), moved species back and forth between the two genera. Sleumer (1969) transferred *Iodes hookeriana* Baill. to *Mappianthus*, but subsequently returned the species to *Iodes* in his Flora Malesiana account, noting the taxon was ‘closely related to and possibly conspecific with *Mappianthus iodoides*’ (Sleumer, 1970: 73). As previously stated, following various Flora accounts and especially DNA studies, *Iodes* and *Mappianthus* are currently best kept as distinct groups.

The inclusion of the Bornean taxon, *Mappianthus borneensis*, within a variable *M. hookerianus* is difficult to reconcile with the disjunct distribution and morphological differences, though material from Borneo is scanty. Climbing Icacinaceae are still relatively poorly known, and a new genus was relatively recently described from northern Borneo, *Sleumeria* Utteridge, Nagam. & Teo, based on collections from undisturbed primary forest (Utteridge *et al.*, 2005).

Mappianthus borneensis was described by Merrill (1950) based on Clemens material collected from Mt. Kinabalu, Sabah - approximately 3,300 km away from the type locality of *M. hookerianus*. The smaller leaf size (6.8–7.2 cm long) and fruit size and shape (only 2–2.2 cm long and ovoid) of the *M. borneensis* material were noted by Merrill as being different (e.g., see annotations on the *M. borneensis* type sheet at A). *Mappianthus* from

Borneo appears more morphologically similar to *M. iodoides*. More material is needed from northern Borneo, especially around the Kinabalu area, to better understand morphological variation, but combining these two populations with some morphological variation and a very disjunct distribution, into a very broad *M. hookerianus* is worthy of further investigation.

Such broad concepts are reflected in other groups revised by Sleumer, including, for example, the genus *Maesa* (Primulaceae, previously Myrsinaceae) revised in New Guinea by Sleumer (1987). With increased collections, more field observations and an improved understanding of morphological variation, several species limits in the genus have been demonstrated to be overly broad (Utteridge, 2013; Sumanon *et al.*, 2020, 2021), resulting in an increase from 26 species recognised by Sleumer (1987) on New Guinea to at least 39 in a contemporary revision (Sumanon *et al.*, *ined.*). These new species circumscriptions are supported by a well sampled recent phylogenomic study (Sumanon *et al.*, 2023).

Further collections of all *Mappianthus* species are needed, especially in Bangladesh, Assam and northern Myanmar, as well as Borneo (and with consideration of the potential distribution in Thailand, Cambodia and Peninsular Malaysia). A future phylogenomic study based on sampling of specimens across the entire range of the genus is needed to clarify relationships within *Mappianthus*, as well as its placement and relationships within the Icacinaceae.

ACKNOWLEDGEMENTS

The authors thank the Myanmar Forest Department and the Forest Research Institute for permission to carry out fieldwork and for their support of this research. Fieldwork was funded by grants from the National Science Foundation (DEB-1457702) and the Helmsley Charitable Trust. We thank Andrew Brown for the line illustration and Elizabeth Gjeli, NYBG's Geographical Information Manager, for creating the distribution map in Figure 2. The authors would like to thank the reviewers for their helpful comments and suggestions.

Table 1. Morphological comparison between *Mappianthus kachinensis*, *M. iodoides*, and *M. hookerianus*.

Characters	<i>M. kachinensis</i>	<i>M. iodoides</i>	<i>M. hookerianus</i>
Vegetative indumentum	glabrous to strigose, glabrescent	strigose, glabrescent	strigose
Leaf shape	ovate to elliptic or elliptic-oblong	narrowly elliptic to oblong	elliptic to oblong
Leaf size	(6–)11–16 × (2.5–)5–9 cm	8–17 × 3–7 cm	9.5–19 × 3–10 cm
Pairs of secondary veins	(6–)9–10	(3–)5(–6)	7–9
Leaf texture	chartaceous	coriaceous	coriaceous
Petioles	1.5–2.5 cm long	to 1.5 cm long	to 1.1 cm long
Inflorescence	2.5–4(–6.5) cm long	1–2.5 cm long	ca 1 cm long
Fruit shape	oblongoid and keeled toward apex	ovoid	ovoid to ellipsoid
Fruit size	2.5–3 × 1.5–2 cm	2–3.7 × 1–1.7 cm	3–3.3 × 1.8–2.2 cm
Fruit indumentum	glabrous	strigose	strigose
Distribution	Kachin State, Myanmar	southern China and northern Vietnam	north-east India

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