



# *Nyctocalos tunjuharii* (Bignoniaceae), a new species from Sabah, Malaysian Borneo

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## Key words

Bignoniaceae  
Borneo  
Malesia  
morphology  
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*Nyctocalos*  
Sabah

**Abstract** *Nyctocalos tunjuharii* (Bignoniaceae) is described and illustrated as a new species from Mt Kallang, Tenom, Sabah, Malaysian Borneo. It is distinguished from *N. cuspidatus* by its longer, linear calyx teeth, shorter corolla tube and included stamens that reach less than half the length of the upper dilated part of the corolla tube. This species is restricted to an area near Mt Kallang, Tenom, Sabah. A preliminary conservation status assessment is presented and a key to the Malesian taxa is provided.

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## INTRODUCTION

During a field trip to the Mt Kallang waterfall in the interior of Sabah, Malaysia, in October 1993, the author discovered a probable new species of *Nyctocalos* Teijsm. & Binn., occurring as a liana in secondary forest. The Kallang waterfall was revisited in May 2017, to collect more fertile material and, on a more recent visit to the Mantailang Forest Reserve in November 2018, a further population was discovered.

The genus *Nyctocalos* was established by Teijsmann & Binnendijk (1861) and can be distinguished by its liana habit and flowers salver-shaped with a narrow, cylindrical tube. Species names in this genus have been assigned in all three genders by various botanists but the original gender, masculine, given by Teijsmann & Binnendijk, is adopted here for all species. Thus far, there are only five currently accepted species names in *Nyctocalos*, viz., *N. brunfelsiiflorus* Teijsm. & Binn. from Java (Teijsmann & Binnendijk 1861), *N. cuspidatus* (Blume) Miq. from the Philippines, Borneo and Moluccas (Miquel 1867), *N. thomsonii* Hook.f. from Assam in India (Hooker 1867), *N. shanicus* R.W.MacGregor & W.W.Sm. from Burma, Thailand and Borneo (MacGregor & Smith 1911, Santisuk 1973, 1987), and *N. pinnatus* Steenis from south China (Van Steenis 1953). The first four were accepted as distinct species in the first account of the genus by Van Steenis (1927). The last, *N. pinnatus*, was described later (Van Steenis 1953) and is pinnate-leaved, in contrast to the other four, which have trifoliolate leaves. However, Van Steenis (1977), in his treatment of the genus for the Flora Malesiana, revised his original species concepts, reducing the four original names to only two. He now considered that *N. shanicus* and *N. thomsonii* were no longer distinct from *N. brunfelsiiflorus*

and *N. cuspidatus*, respectively. The available information on the morphology of the taxa was understandably very scanty in earlier times due to a lack of material, possibly because the species are rather rare and localized in distribution. Before our collection of 1993, there were only two collections from Borneo, one from Niah in Sarawak and the other from Kudat in Sabah, both belong to *N. cuspidatus*. Santisuk (1973) and Van Steenis (1977) cited these same two collections from Borneo and listed them under *N. brunfelsiiflorus*, but both specimens are referable to *N. cuspidatus*. In an attempt to understand the genus better, the author has made further collections in Sabah and studied herbarium material to determine the validity of the various species in Malesia. This was important because the conclusions of Van Steenis (1927, 1977) were not consistent.

The present study has found *N. shanicus* to be distinct from *N. brunfelsiiflorus*, supported by morphological differences in the corolla and a non-overlapping distribution (see key as well as notes below), and differs from Van Steenis (1977) in accepting *N. thomsonii* as a distinct species, but that taxon does not occur in Malesia. I have found that all four Malesian species with trifoliolate leaves, including the new species reported here, are distinct. The key below is provided to clarify their characteristics.

## KEY TO THE MALESIAN SPECIES OF NYCTOCALOS

1. Total corolla tube length (not including lobes) less than 6.5 cm long . . . . . 2
1. Total corolla tube length (not including lobes) more than 6.5 cm long . . . . . 3
2. Corolla tube salverform, upper dilated part less than 1 cm long. — Java . . . . . *N. brunfelsiiflorus*
2. Corolla tube short-infundibular, upper dilated part more than 2.5 cm long. — Distributed from Burma and Thailand to northern Borneo . . . . . *N. shanicus*

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**Fig. 1** *Nyctocalos tunjuharii* Berhaman. a. General morphology and inflorescence; b. inside view of corolla after slitting on one side showing the stamen insertion (note that the stamens do not reach more than two-thirds of the upper dilated part of the corolla); c. calyx cup and linear calyx teeth; d. gynoecium; e. anther (Berhaman, Leopold & Sulaiman SAN 134785, SAN). — Illustration by Mr. Zainal Mustapa.

3. Calyx teeth short-triangular, 1–2 mm long. Corolla tube long-infundibular, total length (not including corolla lobes) 13–21 cm long; stamens protruding slightly from the corolla mouth. — Distributed from northeast India to the Philippines, Borneo and Sulawesi . . . . . *N. cuspidatus*
3. Calyx teeth linear, 3–4 mm long. Corolla tube short-infundibular, total length (not including corolla lobes) less than 10 cm; stamens included within the corolla tube and reaching less than half the length of its upper dilated part. — Restricted to Borneo . . . . . *N. tunjuharii*

***Nyctocalos tunjuharii* Berhaman, sp. nov.** — Fig. 1

This species is morphologically most similar to *N. cuspidatus* (Blume) Miq. but differs by its linear calyx teeth of  $\geq 3$  mm long, its corolla tube of  $< 10$  mm long and included stamens that reach less than half the length of the upper dilated part of the corolla tube. — Type: Berhaman, Leopold & Sulaiman SAN 134785 (holo SAN; iso K, L), Malaysia, Sabah, Tenom, Kallang, N5°9'32" E115°55'40", 21 Oct. 1993.

**Etymology.** I have named this species in honour of Tun (Dr.) Juhar Bin Datuk Hj. Mahirudin, the present Sabah Governor and Chancellor of Universiti Malaysia Sabah, who loves plants and gardening, and is also very

supportive of conservation work in Sabah. It is hoped that his support will bring conservation efforts to a greater level.

Liana, without tendrils, stems to 1.5 cm thick, climbing by twining. *Leaves* trifoliate, subcoriaceous to coriaceous; petiole 4.5–5.5 cm long; terminal leaflet with petiolule 4–4.5 cm long, blade broad-ovate to elliptic, 13.5–15 by 7–7.5 cm, base slightly rounded, apex acute, lateral veins 6–8 pairs, tertiary veins reticulate, with many dark dot-glands scattered on lower surface, mostly just below the apex; lateral leaflets with petiolules 1.2–1.4 cm long, blade ovate to elliptic, 11.5–13.4 by 5.8–6.2 cm, base slightly rounded, apex acute, lateral veins 5–7 pairs, tertiary veins reticulate, with many dark dot-glands scattered on the lower surface mostly just below the apex. *Inflorescence* a raceme, terminal to short axillary shoots bearing 2–3 leaf pairs, c. 16 cm long; rachis c. 4 mm thick, bearing 32 flowers. *Flowers* on short pedicels 5–6 mm long; calyx cup c. 5 by 4 mm, glabrous; lobes 5, teeth-like, linear, 3–4 by c. 0.5 mm, with tiny round glands at their base; corolla short-infundibular, white, glabrous on both surfaces, c. 8.2 cm long (excluding lobes), basal tubular part c. 4 cm long and 0.4–0.5 cm wide, upper dilated part c. 4.2 by 2.6 cm; corolla lobes 5, broadly

obovate, c. 17 by 21 mm, papillate on both surfaces, recurved in the open flower, with tiny round glands on the outer surface on the median part of the corolla lobes and just below, as well as a few just below the region between adjacent lobes; stamens 5, filaments c. 1.8 cm long, inserted at the base of the upper dilated part of the corolla tubes, sparsely hairy at the very base (insertion), anthers yellow, glabrous, widely divergent, c. 6 by 1 mm, included within the corolla tube and reaching less than half the length of the upper dilated part, appendage 1–1.5 mm long; disk a slight swelling around the base of the ovary; ovary subcylindric to subellipsoid, 2–3 by c. 1 mm wide, style filiform, 2.7–3 cm long, slightly exerted from the corolla mouth, glabrous, stigma glabrous, 1.5–2 by c. 1 mm, lobes 2, spreading just before the flower opens. *Fruit* pods not known. *Seeds* not known.

**Distribution** — So far, the new species *N. tunjuharui*, is known from a few collections from the type locality in the Tenom district of Sabah (N5°9'32" E115°55'40"). Recent collections from nearby Mantailang, not far from Kallang Waterfall, have increased the number of collections.

**Habitat & Ecology** — Lower montane forest on ultramafic soil, at 300–500 m above sea level. The liana was growing on trees or climbing on rock surfaces along a small stream, light 60–80 % below and in the canopy.

**Conservation status** — There is no detailed information on the population size of *N. tunjuharui* at the type locality or at the new locality in Mantailang. The latter site is in a gazetted Forest Reserve, affording the species a level of protection because the reserve is inside the Sabah Parks system. Material from a recent, March 2022, collection from the type locality is now being cultivated at the nursery of the Faculty of Tropical Forestry, Universiti Malaysia Sabah for *ex situ* conservation. So, the conservation status of this newly recognised species has not been formally evaluated. Accordingly, IUCN criteria (IUCN 2019) suggest that it should be listed as 'Not Evaluated' (NE).

*Additional specimens* (Paratypes): *Berhaman & Maycock AB1568* (K, L, SAN), Malaysia, Sabah, Tenom, Kallang, 24 Oct. 2017; *Berhaman & Godoong AB1618* (K, L, SAN), Malaysia, Sabah, Tenom, Mantailang Forest Reserve, 13 Nov. 2018.

**Note** — The new species has trifoliolate leaves but is well distinguished from the other described species of this group by its corolla and calyx characters. It has an infundibuliform corolla and so is different from *N. brunfelsiiflorus* (which has a salverform corolla), confirming that it belongs to the same group as the other two species (*N. shanicus* and *N. cuspidatus*). Its corolla tube is much longer, c. 8 cm, than that of *N. shanicus* (corolla tube 4.8–6.2 cm long), but much shorter than that of *N. cuspidatus* (13.3–20.5 cm long). In contrast to the stamens of *N. cuspidatus*, which protrude slightly from the corolla mouth, the stamens of the new species are well included within the corolla tube and reach only less than half the length of the upper dilated part (Fig. 1b). Furthermore, the long linear calyx lobes of this new species distinguish it from all the other species, in which the calyx lobes are short-triangular.

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