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Microcos bifurcata, a New Species of Malvaceae from Thailand and Cambodia

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ABSTRACT. – A new species, *Microcos bifurcata*, is illustrated and described here. The species is recognized by having a bifid leaf apex which sharply caudate, 3–4 lateral veins per side, the proximal lateral vein appeared slightly below the midpoint of the leaf length and the distal lateral vein on the top is an opposite pair. The morphological characteristics of the new species are compared and discussed with its similar species. The vernacular name, provisional national IUCN conservation assessment and a distribution map of the new species are provided.

KEYWORDS: Chanthaburi, Grewioideae, Khao Soi Dao, Pursat

INTRODUCTION

Microcos L. is a tropical genus in the Malvaceae subfamily Grewioideae. It is mainly distributed in Africa, India, Southeast Asia and Fiji with ca 78 species (Tang et al., 2007; Mabberley, 2008; POWO, 2022). Some authors accepted the genus under the genus *Grewia* L. However, further research in the past three to five decades has led to widespread acceptance of *Microcos*. The genus *Microcos* differs from *Grewia* by pointed stigma and unlobed fruit. The diagnostic characteristics of the genus are a tree, rarely scandent shrub with alternate leaves, three basal veins, few lateral veins, and fruit is a globose, obovoid or pyriform drupe, without furrows or drupelet. Most species of *Microcos* in Thailand are found in evergreen, dry evergreen, mixed deciduous and deciduous forests up to 600 m above sea level (Phengklai, 1993).

The subfamily Grewioideae in Thailand has six genera, namely *Colona* Cav., *Corchorus* L., *Grewia*, *Microcos*, *Trichospermum* Blume and *Triumfetta* L. (Phengklai, 1993; Bayer & Kubitzki, 2003). The genus *Microcos* differs from the others by globose, obovoid or pyriform and wingless fruits, terminal or axillary inflorescence and the flower has glands at the base of the petal and curved anther (Phengklai, 1993). Craib (1925) made a list of the Thai *Grewia* with 17 species including the genus *Microcos*. Later, Phengklai (1993) reported five species in the Flora of Thailand account, namely *M. fibrocarpa* (Mast.) Burret, *M. laurifolia* (Hook. ex Mast.) Burret, *M. paniculata* L., *M. sinuata* (Wall. ex Mast.) Burret and *M. tomentosa* Sm.

During a field survey in late September 2020 to Chanthaburi province, south-eastern floristic region of Thailand. One plant species was found and collected from a degraded path between an orchard and an evergreen forest, the first glance it look-like *Microcos tomentosa* Sm. but the leaf apex is distinctive in having slightly unequal caudate apex, while the leaf of *M. tomentosa* has an acute and rarely emarginate apex. Careful examination, many different characteristics are found and the species, therefore, is described here as a new species, named *Microcos bifurcata*. Later, we also found 3 unknown collections at BKF which were collected, two from Thailand and one from Cambodia. These collections are the same as the new species.

MATERIALS AND METHODS

This research was based on living and dry specimens, collected from the Klong Kap Mak waterfall, Khao Soi Dao Tai, Khao Soi Dao Wildlife Sanctuary by the authors. The morphological comparisons included specimens from AAU, BK, BKF, KKU, PSU and QBG; additionally, images of herbarium specimens were examined on virtual herbaria of K and P and specimens available on JSTOR website. The specimens were examined and the types of the new species were deposited at BKF, KKU and QBG. The vernacular name is provided by the authors. Taxonomic literature on the genus is based on the works on plants in Thailand (Phengklai, 1986 & 1993), India (Masters, 1874), Bhutan (Long & Rae, 1991), Myanmar (Chung & Dorr, 2003), China (Tang et al., 2007), Indo-Chine (Gagnepain, 1910 & 1945), Laos (Newman et al., 2017–continuously updated), Peninsular Malaysia and Singapore (Ridley, 1922; Kochummen, 1983; Chung & Soepadmo, 2011) and Borneo (Chung et al., 2011) were also consulted. Descriptions, ecological information, photographs and line drawings were prepared based on our examination.

TABLE 1. Morphological comparison of *Microcos bifurcata*, *M. tomentosa* and *M. paniculata*.

Characters	*M. bifurcata*	*M. tomentosa*[a,b]	*M. paniculata*[a]
Leaves			
Shape	elliptic or oblong-obovate	oblong or obovate	elliptic to oblong
Size (cm)	(7–)12–20 × (2.4–)4–6.5	8–17 × 4–8	8–17 × 4–8
Base	obtuse or broadly cuneate	rounded	cuneate or rounded to cordate
Apex	bifid, caudate, rarely acute	acute, truncate, shortly or abruptly acuminate	acute
Adaxial surface	sparsely stellate hairy	glabrous or sparsely stellate hairy	glabrous
Abaxial surface	sparsely stellate hairy	densely stellate hairy	glabrous
Venation			
Number of lateral veins per side	3–4	4–6	6–8
Ratio of the length between basal pair reaching to apex and the lamina length	1/2–3/4	3/4	1/2
Ratio of the length between the length of originating proximal lateral veins from the lamina base and the lamina length	2/4	2/4	1/4
Arrangement of distal lateral veins of midrib	opposite, rarely subopposite	alternate	alternate
Inflorescence			
Length (cm)	(1.5–)3–5	(3–)5–10(–15)	5–10
Flower			
Floral bud	obovoid	obovoid	globose
Sepal shape	obovate	obovate, slightly spathulate	obovate
Petal shape	oblong	oblong	elliptic to oblong
Ovary surface	glabrous	sparsely stellate hairy	glabrous
Fruits			
Shape	obovoid or pyriform	subglobose or obovoid	globose or obovoid
Size (cm)	1–1.2 × 0.7–0.8	1–1.5 × 0.5–1	1.5 × 1
Surface	glabrous	sparsely stellate hairy	glabrous

a. Based on description of Phengklai (1993)
b. Based on description of Chung & Soepadmo (2011)

RESULTS

Microcos bifurcata Chantar., Kladwong & Kunasit, **sp. nov.**

In general, *Microcos bifurcata* resembles to *M. tomentosa* in having hairy leaves and obovoid floral bud but differs by having the leaf apex which split into bifid (vs acute, rarely emarginate), obtuse or broadly cuneate leaf base (vs rounded), basal vein reaching up to ¾ of leaf length or more (vs ½), the distal lateral veins opposite, rarely subopposite (vs alternate), glabrous ovary and fruit (vs hairy) and other characters as indicated in Table 1. The new species is also similar to *M. paniculata* but differs in having hairy leaves (vs glabrous), basal vein reaching up to ¾ of leaf length or more (vs ½), the distal lateral veins in pair (vs unpaired), obovoid floral bud (vs globose) and other characters as indicated in Table 1. Type: Thailand, Chanthaburi province, Pong Nam Ron, Khao Soi Dao Tai, along trail to Klong Kap Mak waterfall, in evergreen forest, ca 470 m alt, 26 Sept. 2020, *Chantaranothai, Kladwong & Kunasit 2020-140* (holotype **KKU!**; isotypes **BKF!**, **QBG!**). Figs. 1–3.

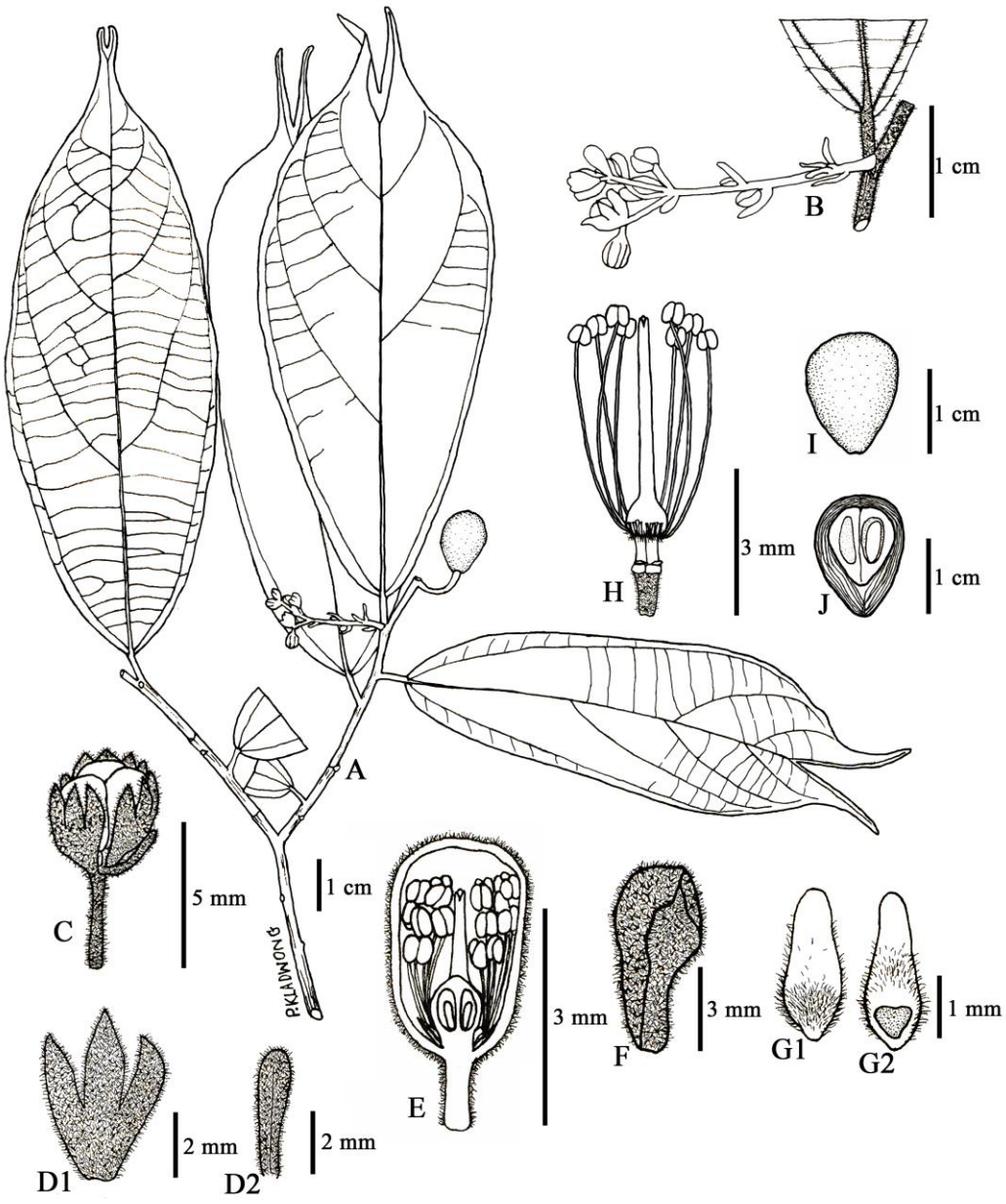

FIGURE 1. *Microcos bifurcata* Chantar., Kladwong & Kunasit: A. twig with inflorescence and fruit; B. detail of twig, petiole, adaxial surface of leaf base and inflorescence; C. floral bud surrounded by involucral bracts; D. bracts (D1 outer, D2 inner); E. longitudinal section of floral bud; F. sepal; G. petals (G1 abaxial surface, G2 adaxial surface); H. flower with sepals, petals and some anthers removed; I. fruit; J. longitudinal section of fruit. All from *Chantaranothai et al. 2020-140*. Drawn by P. Kladwong.

Tree up to 15 m tall; bark rough; branchlets hairy. *Stipules* lanceolate, 3.5–5 mm long, 2-lobed or unlobed, hairy on both sides, caducous. *Leaves* alternate, with petiole 0.4–1 cm long, densely hairy; lamina elliptic to oblong-obovate, (7–)12–20 × (2.4–)4–6.5 cm, chartaceous to thinly coriaceous, sparsely covered with stellate and glandular trichomes on both surfaces, apex bifid to 1/5–1/6 of lamina length with narrow or broad sinus, tip of lobes slightly unequal caudate, rarely the apex acute or slightly emarginate, 0.3–4.5 cm long, base obtuse or broadly cuneate, slightly unequal-sided, margin entire; venation raised above, with stellate hairs; basal veins 3, reaching up to more than 1/2 as long as lamina, with more densely stellate hairs on adaxial surface than abaxial surface; lateral veins alternate, 3–4 per side, the first proximal vein slightly below midpoint of the lamina length (ratio between from the leaf base and the leaf length 0.30–0.40), the distal lateral veins opposite, if the apex acute then subopposite, indistinct above; tertiary veins scalariform, indistinct on adaxial surface, distinct on abaxial surface. *Inflorescences* terminal or axillary near

FIGURE 2. *Microcos bifurcata* Chantar., Kladwong & Kunasit; A. young leafy branch; B. abaxial surface of leaves; C. inflorescence. D. adaxial surface of leaves and infructescence. Photographs taken on 26 Sept. 2020; A−B. by P. Kladwong; C−D. by B. Boonsuk.

the end of branches, cymose paniculate, (1.5–)3–5 cm long, stellate-hairy; bracts oblong, 3–6 mm long, 2-lobed; outer involucral bracts 3-parted, each one lanceolate or oblong-lanceolate, ca 5 mm long; inner involucral bracts oblong, ca 4 mm long. *Flowers* bisexual; pedicel short. *Sepals* 5, free, obovate, 5–7 mm long, hairy. *Petals* 5, free, oblong, 1–2 mm long, hairy on both sides, apex slightly 2-lobed; glandular at

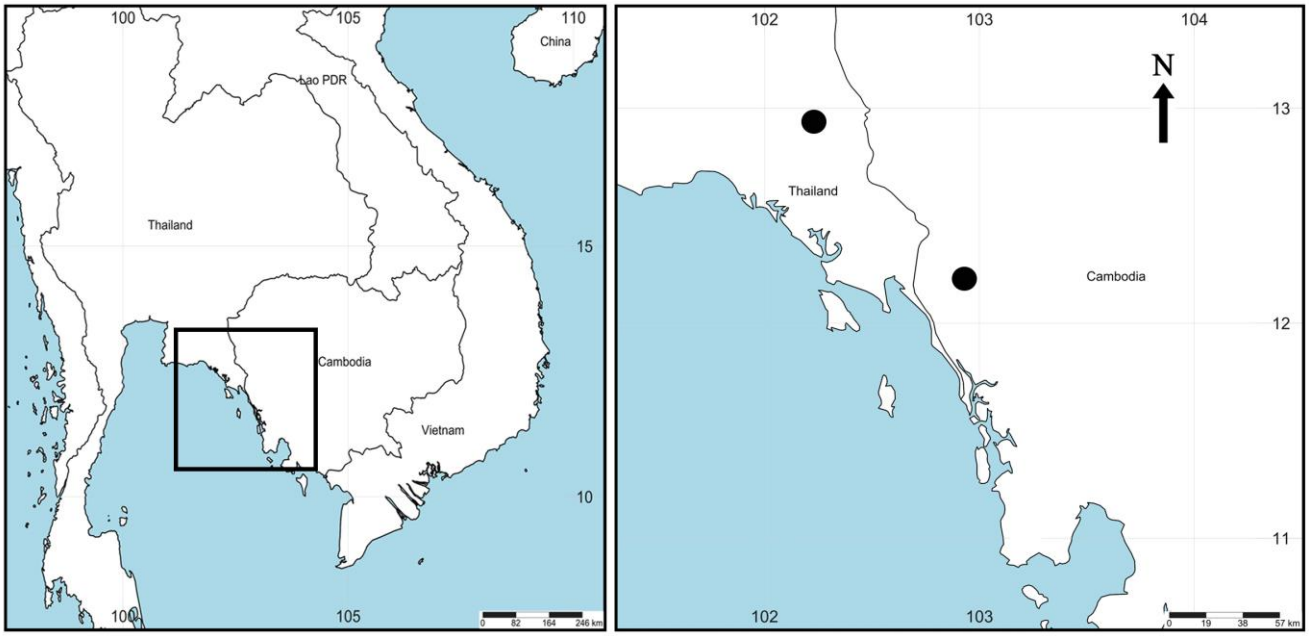

FIGURE 3. Distribution of *Microcos bifurcata* in Chanthaburi province, Thailand and Pursat province, Cambodia.

base adaxially; glands ca 0.5 mm in diameter. *Androgynophore* cylindrical in outline, ca 0.5 mm long, longitudinally grooved, glabrous, apical part expanded, hairy. *Stamens* many, free, borne distally on androgynophore, shorter than sepals, glabrous; filament 2.5–4 mm long; anther ca 0.5 mm in diameter. *Ovary* superior, globose, glabrous, usually 3-loculed; ovules 4–7 per locule; style simple, 1–3.5 mm long; stigma subulate, usually unlobed. *Infructescences* 7–16 cm long. *Fruit* a drupe, obovoid or pyriform, unlobed, 1–1.3 × 0.7–1 cm; stipe 3 mm long.

Thailand.— SOUTH-EASTERN: Chanthaburi (Pong Nam Ron, Khao Soi Dao, 400 m alt., 10 June 1963, *Thai-Danish Botanical Expedition 9966* (**BKF**!-2 sheets); ibid., Khao Soi Dao Tai, ca 500 m alt., 17 Feb. 1959, *Smitinand 518* (**BKF**!); ibid., rainforest, 500 m alt., 3 Aug. 2009, *Harwood 2063* (**BKF!**-2 sheets); ibid., along trail to Klong Kap Mak waterfall, ca 470 m alt., 26 Sept. 2020, *Chantaranothai et al. 2020-140* (**BKF!**, **KKU!**, **QBG!**)).

Distribution.— Cambodia (Pursat, Veal Veng district, Yury Sakor logging concession, along the road, lowland evergreen forest, 19 May 1999, *Bansok 61* (**BKF**!-SN162026)).

Ecology.— Common and widespread along trail to Klong Kap Mak waterfall in evergreen forest, 400–500 m alt. Flowering in July–Sept. & fruiting in Aug.–Oct.

Vernacular.— Phlap phla song hang (พลับพลาสองหาง).

Etymology.— The specific epithet refers to the leaf apex which is split or cleft into two parts.

Provisional National IUCN Conservation Assessment.— This species is only known from five collections, of which four are from Khao Soi Dao Tai, Pong Nam Ron district, Chanthaburi, Thailand, and one from Pursat province, Cambodia. The Area of Occupancy (AOO) based on user defined cell width of 2 km of around 8 km^2 assessed as Critically Endangered. However, the exact population size of the tree is unknown, the accurate locations of the collections from Thailand are difficult to determine their extent, and Khao Soi Dao Tai is a protected area. The species is provisionally evaluated as Least Concern (LC) here demanding more information to confirm its correct status.

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