

Sophora huamotensis, a new species of *Sophora* (Fabaceae-Papilionoideae-Sophoreae) from Thailand

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ABSTRACT

Sophora huamotensis Mattapha, Suddee & Rueangr. is illustrated and described here. This new species is recognised by having numerous leaflets, articulated pedicels and the wing petals with lunate sculpturing on the outer surface and without auricles at the base. The morphological characters of the species are compared and discussed with its closest species. Description, illustration, images and a distribution map of the new species are provided.

KEYWORDS: Doi Hua Mot, endemic, Leguminosae, Tak, Umphang district.

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INTRODUCTION

Sophora L. was described by Linnaeus (1753) based on six species, and now comprises 50–70 species distributed in tropical and temperate regions (Pennington, 2005). The genus is a member of tribe Sophoreae, and can be recognised by its imparipinnately compound leaves, lack of the bracteoles, free stamens or basally fused stamens, and pods dehisce that are moniliform, rarely markedly flattened or winged. Recent phytochemical and molecular studies have provided significant new insights into the taxonomic relationships within *Sophora* and its closely related genera, which are known to be non-monophyletic (Käss & Wink, 1996; Pena & Cassels, 1996; Crisp *et al.*, 2000; Pennington *et al.*, 2001).

Sophora has few species in Thailand. Five species, *Sophora exigua* Craib, *S. japonica* L.f., *S. tomentosa* L., *S. velutina* Lindl. and *S. wightii* Baker, were recognised in Thailand (Niyomdham, 1980; Thuân *et al.*, 1987). Recently, an unknown species was collected from a degraded limestone mountainous area of Doi Hua Mot, Umphang district, Tak province, Thailand, which appeared to be distinctive in having more leaflets than other South-East Asian species in the genus. The flower and fruit morphology of this unknown species were also

investigated and it became clear that it represents a new species of *Sophora*, distinguished from other species by possessing numerous leaflets (23–39), pedicels that are articulated near the apex and the absence of auricles on the wing petals. The key morphological characters of this new species are compared with closely allied species after examination of herbarium specimens and relevant literature (Table 1). We describe this species herein as new with the name *Sophora huamotensis*, referring to the mountain name where the species is found.

DESCRIPTION

***Sophora huamotensis* Mattapha, Suddee & Rueangr., sp. nov.**

The species is closely similar to *S. rubriflora* Tsoong from which it differs markedly in the shape of leaflets (oblong-elliptic to ovoid-obovate in *S. huamotensis* vs oblong-oval in *S. rubriflora*), more numerous leaflets (23–39 in *S. huamotensis* vs 19–21 in *S. rubriflora*) and wing petals not auriculate (with distinctly 2-sided auriculate in *S. rubriflora*). Type: Thailand, Tak, Umphang district, Doi Hua Mot, 15°49'37" N 98°53'34" E, 761 m, 26 July 2012, fl. & fr., Suddee *et al.* 4382 (holotype **BKF!**-SN204751; isotypes **BKF!**-SN204752). Figs. 1–2.

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Shrub 0.5–1 m high; young twigs densely hairy with strigose hairs. *Leaves* imparipinnate; petioles 2–4 cm long, densely hairy, grooved above; stipules lanceolate, ca 1 by 0.5 mm, outside densely hairy, caducous; rachis 14–20.5 cm long in flower, 25–31 cm long in fruit. *Leaflets* 23–39, opposite, sometimes alternate on the proximal half of the leaf; petiolules 2.5–3 mm long, densely hairy; lamina ovoid-oblong in flower, ovoid-oblong or elliptic in fruit, terminal leaflet obovate, 0.9–2.3 by 0.4–1.2 cm in flower, 1.9–3.7 by 1–2.1 cm in fruit, apex obtuse with apiculate, acute with minutely apiculate, base cuneate, margin entire, upper surface glabrous, lower surface densely hairy with adpressed hairs, glaucous; secondary veins 6–10-paired, raised above, anastomosing distinct; stipels absent. *Inflorescences* racemose, terminal, and axillary, 10–16 cm long, hairy.

Infructescences 17–25.5 cm long. *Flowers* pale purple to pink, standard with a dark purple blotch at base on the dorsal face, glabrous; bracts triangular, ca 1 by 0.5 cm, apex acuminate, margin hairy, outside hairy, inside glabrous, caducous; bracteoles absent. *Pedicels* including the articulate section 8–10.5 mm long, articulated near apex, hairy. *Calyx* tubular, pale purple; tube 8–9 mm long; lobes 5, broadly triangular, ca 2 by 2 mm, apex acute to rounded, margin hairy, outside hairy, inside glabrous. *Corolla*: standard petal spatulate, blade orbicular, curved upwards, 5–7 by 5–6 mm, apex emarginate, base without callosities, attenuate tapering to the claw, both sides glabrous, claw 8–9 mm long; wing petals oblong, blade 7–8 by ca 2 mm, base almost truncate, not auriculate, apex rounded, outside glabrous, with lunate sculpturing on the lower half, inside glabrous, claw 4–5 mm

Table 1. Morphological comparison of *Sophora exigua*, *S. huamotensis*, *S. rubriflora* (syn. *S. violacea* Thwaites) and *S. velutina* var. *multifoliolata*. Characters of *S. rubriflora* are modified from Baker (1878), Tsoong & Ma (1981), and *S. velutina* var. *multifoliolata* are modified from Tsoong (1980) and Bao & Vincent (2010).

Character	<i>S. exigua</i>	<i>S. huamotensis</i>	<i>S. rubriflora</i>	<i>S. velutina</i> var. <i>multifoliolata</i>
Number of leaflets	11–15	23–39	19–21	19–41
Leaflet shape	broadly elliptic, suborbicular to broadly ovate (when mature)	ovoid-oblong or elliptic	oblong-oval	elliptic-lanceolate
Leaflet size (cm)	2–3(–6) by 1.5–2.5(–5)	0.9–3.7 by 0.4–2.1	1.9–2.5 by 0.8–1.2	0.1–2.5 by 0.5–0.6
Secondary veins (pairs)	5–8	6–10	5–8	3–4
Inflorescence length (cm)	up to 35	10–16 (up to 25.5 in fruit)	7–10	15–30
Inflorescence position	terminal and leaf-opposed	terminal, axillary	axillary	terminal
Flower colour	purple	purple to pink	purple	purple to red
Pedicel articulation	absent or present	present	present	absent
Pedicel length (mm)	4–5	8–10.5	5–7	2–3
Calyx tube length (mm)	ca 8	8–9	6–7	ca 13
Flower length (mm)	ca 20	13–16	14–15	ca 16
Sculpturing on outer surface of wing petals	present on the lower half	present on the lower half	absent	present along the upper half
Auricles of wing petals	2-sided auriculate at base	absent	2-sided auriculate at base	2-sided auriculate at the middle
Style length (mm)	3–4	3	unknown	short
Distribution	Cambodia & Thailand	Thailand (only known from the type locality)	endemic to Sri Lanka (Indonesia: introduced for ornamental purposes)	China (Yunnan)

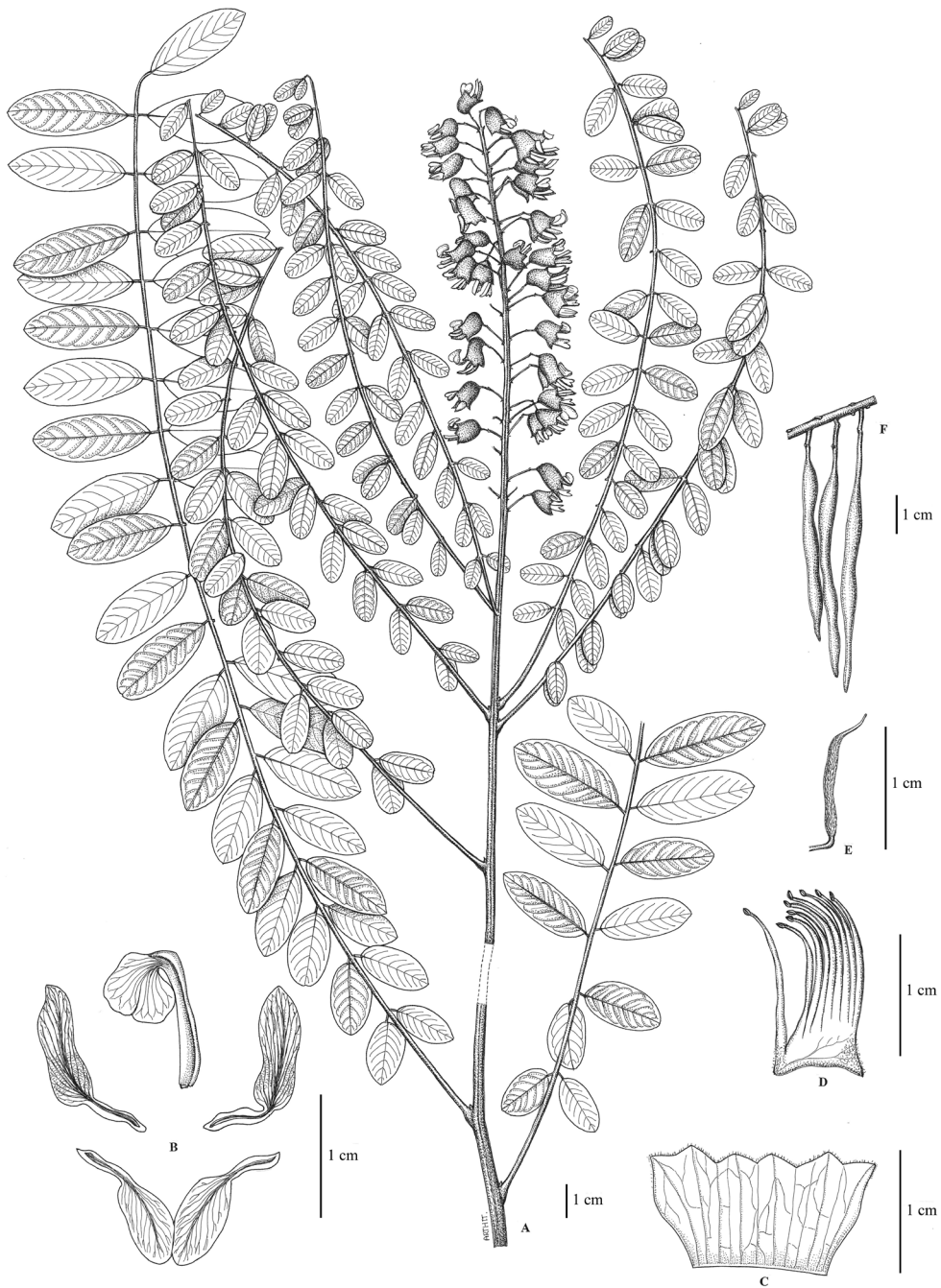


Figure 1. *Sophora huamotensis* Mattapha, Suddee & Rueangr.; A. Leaves and inflorescence; B. Petals: standard petal (upper), wing petals (lateral ones), keel petals (lower ones); C. Calyx (inside); D. Stamens with hairs at the basal part; E. Ovary; F. Pods. A–F from Suddee et al. 4382 (BKF). Drawn by A. Kamgamnerd.



Figure 2. Photos of *Sophora huamotensis* Mattapha, Suddee & Rueangr. A. Inflorescences; B. Habit; C. Pods. Photos by S. Chanhormhual (A) and S. Mattapha (B & C).

long, flattened; keel petals fused at upper part, blade 6–6.5 by ca 2 mm, apex rounded, both sides glabrous, claw ca 5 mm long, flattened. *Stamens* 10, shortly jointed at base, distally free; filaments 9–11 mm long, flattened, hairy at base; anthers oblong, ca 0.5 by 0.2 mm. *Ovary* densely hairy, 6–7 mm long; stipe ca 3.5 mm long; style ca 3 mm long, glabrous. *Pods* submoniliform, constricted between seeds or slightly septate, 8–10 by ca 0.5 cm, densely hairy, apex often beaked; stipe 3.5–4 mm long. *Seeds* 3–6 per pod, oblong, 3.1–3.8 by 6.7–7.4 mm, greenish-brown.

Thailand.—NORTHERN: Tak [Umphang district, Doi Hua Mot, along the road to Mae La Mung Khee village, 721 m, 26 July 2012, fr., *Suddee et al.* 4378 (**BKF!**); *ibid.*, 15°49'37" N 98°53'34" E, 761 m, 26 July, 2012, *Suddee et al.* 4382 (holotype **BKF!**; isotypes **BKF!**); *ibid.*, 776 m, 8 Oct. 2016, fl. & fr., *Suddee et al.* 5148 (**BKF!**)].

Distribution.— Endemic to Thailand, only known from the type locality (Fig. 3).

Ecology.— Dry deciduous dipterocarp forest on degraded limestone mountains, dominated by *Shorea obtusa* Wall. ex Blume, *S. siamensis* Miq., *Quercus helferiana* DC., *Buxus sirindhorniana* W.K.Soh, von Sternb., Hodk. & J.Parn. and *Phoenix loureiroi* Kunth; 760–780 m elevation.

Phenology.— Flowering June–August; fruiting August–September.

Etymology.— The specific epithet refers to the name of the mountain “Doi Hua Mot”.

Vernacular name.— Phit sanat doi hua mot (พืชหนาศนดอยหัวหมัด), the name is given by the authors.

Conservation status.— According to the IUCN threatened criteria (IUCN, 2012), the species has a small population size with few individuals found.

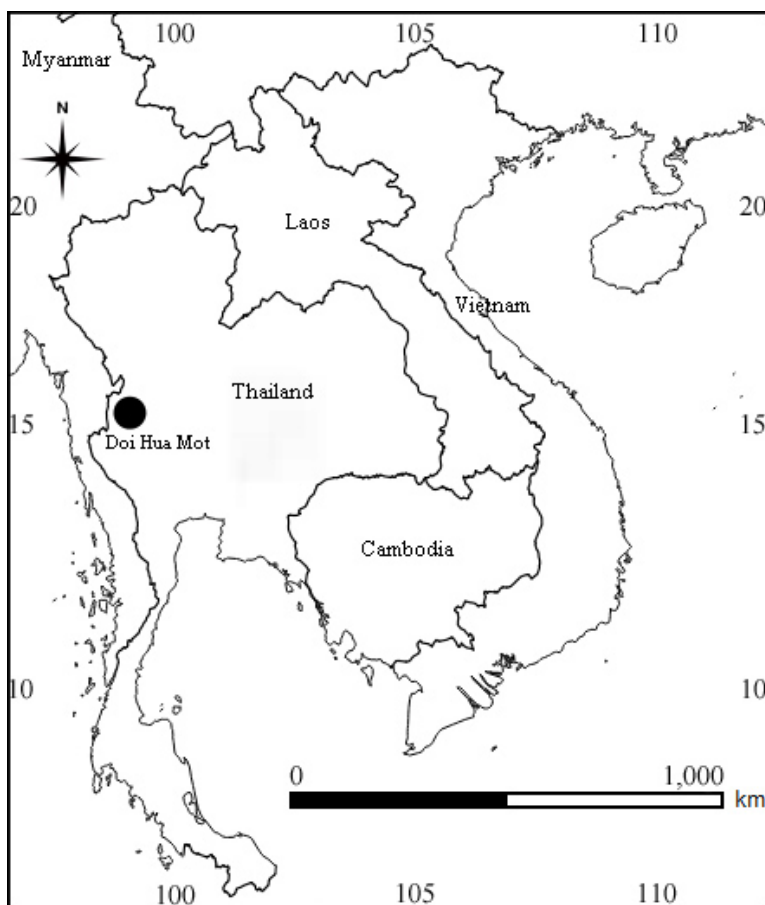


Figure 3. Known distribution of *Sophora huamotensis* Mattapha, Suddee & Rueangr. The map was created using QGIS version 2.14.1-Essen (QGIS Development Team, 2016).

We assess it here as Data Deficient (DD) due to inadequacy of the distribution information; a further assessment should be carried out when more data is available.

Notes.— *Sophora huamotensis* Mattapha, Suddee & Rueangr. was initially identified as *S. exigua* Craib because of the purple flowers. However, *S. huamotensis* differs significantly from *S. exigua* by having its higher number of leaflets, less distinct veins (distinctly anastomosing on the lower surface of the leaflets in *S. exigua*), shorter flowers (ca 20 mm long in *S. exigua*), less indumentum on inflorescences (densely hairy in *S. exigua*) and much longer pedicels (4–5 mm in *S. huamotensis* vs 8–10 in *S. exigua*).

In addition, we compared *Sophora huamotensis* with the morphologically similar taxon *S. velutina* Lindl var. *multifoliolata* Ma. The leaflets of *Sophora huamotensis* closely resemble that of *S. velutina* var. *multifoliolata* but are larger (2–3.5 by 1–1.5 cm in *S. huamotensis* vs 0.1–2.5 by 0.5–0.6 cm in *S. velutina* var. *multifoliolata*). Moreover, the latter taxon can be distinguished from the new species by the additional morphological characters: densely velutinous branches and inflorescences, shorter inflorescences, shorter pedicels and the wing petal with 2-sided auricles at the middle part.

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