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Five new species of *Platostoma* (Lamiaceae) from North-Eastern Thailand

SOMRAN SUDDEE[1,*], ALAN J. PATON[2], JOHN A. N. PARNELL[3], PACHOK PUUDJAA[1], WITTAWAT KIEWBANG[1] & SUKID RUEANGRUEA[1]

ABSTRACT

Platostoma albiflorum, *P. busbanianum*, *P. hemratianum*, *P. ovatum* and *P. parnellianum*, five new species from North-Eastern Thailand are described and illustrated. A key to the 23 species of *Platostoma* found in Thailand is also provided.

KEYWORDS: *Platostoma*, new species, Lamiaceae, Phu Wua, Phu Langka, Thailand.

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INTRODUCTION

Platostoma P.Beauv. is a genus of erect or ascending annual or perennial herbs or undershrubs in the tribe Ocimeae, subtribe Ociminae of the Lamiaceae. A revision of tribe Ocimeae in continental South-East Asia (Myanmar, Thailand, Laos, Cambodia and Vietnam) was completed by Suddee *et al.* (2004a, 2004b, 2005), in which 77 taxa were recorded. Twenty-four taxa were recognized for the genus *Platostoma* which has a centre of distribution in Indochina around the Bolaven plateau in southern Laos. Suddee (2010) later discovered a new species of *Platostoma* from Phu Wua Wildlife Sanctuary, upper north-eastern Thailand which brought the number of taxa to 25 in continental South-East Asia.

Phu Wua Wildlife Sanctuary (Bueng Kan), Phu Langka National Park (Nakhon Phanom, Bueng Kan) and the adjacent sandstone outcrop areas are located in the north-eastern parts of Thailand along the Mekong River and the Thai-Laos boundary. The areas are botanically unique, with many range-restricted taxa having been reported, many of which have only recently been discovered. See Table 1.

A few more new taxa from these areas are known to be in preparation for publication in various families, e.g. Malvaceae, Fabaceae, Ebenaceae, Burmanniaceae and Convolvulaceae (Suddee, Mattapha, Duangjai, Chantanaorrapint & Traiperm, pers. comm., 2019).

While preparing the treatment of Lamiaceae for the Flora of Thailand, five undescribed species of *Platostoma*, all belonging to *Platostoma* subgenus *Platostoma* were found during botanical excursions to North-Eastern Thailand in the period 2013–2018. Four taxa belong to *Platostoma* section *Mesona* (Blume) A.J.Paton and one, *P. ovatum* Suddee, A.J.Paton & J.Parn., belongs to *Platostoma* section *Ceratanthus* (G.Taylor) A.J.Paton. *Platostoma* section *Mesona* is characterized by nutlets which are apically acute and posterior stamens which are often appendiculate. *Platostoma* section *Ceratanthus* is characterized by nutlets which are apically rounded and posterior stamens which are inappendiculate, and furthermore the corolla is usually spurred or dorsally gibbous (Paton, 1997). Of the five new species, all are endemic to Thailand and three of them are endemic to Phu Wua Wildlife Sanctuary, Phu Langka National Park and the adjacent sandstone outcrop areas in North-Eastern Thailand. In all, 23 species of *Platostoma* are found in Thailand and a key to these is provided following the species descriptions below.

[1] Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation, Chatuchack, Bangkok 10900, Thailand.

[2] Science Directorate, Royal Botanic Gardens Kew, Richmond, Surrey, TW9 3AB, UK.

[3] Botany Department, Trinity Centre for Biodiversity Research, School of Natural Sciences, Trinity College Dublin, Ireland.

* Corresponding author: somrans@hotmail.com

Table 1. Range-restricted taxa from Phu Wua Wildlife Sanctuary, Phu Langka National Park and the adjacent sandstone outcrop areas.

Family	taxa	References
Apocynaceae	*Kopsia angustipetala* Kerr	Kerr, 1937
	Pottsia densiflora D.J.Middleton	Middleton, 2001
	Ceropegia thailandica Meve	Meve, 2009
	C. digitiformis Kidyoo	Kidyoo & Paliyavuth, 2017
	C. foetidiflora Kidyoo	Kidyoo, 2018
Burmanniaceae	*Thismia angustimitra* Chantanaorr.	Chantanaorrapint, 2008
Euphorbiaceae	*Croton poomae* Esser	Esser, 2002
Fabaceae	*Bauhinia sirindhorniae* K.Larsen & S.S.Larsen	Larsen & S.Larsen, 1997
	B. nakhonphanomensis Chatan	Chatan, 2013
Gesneriaceae	*Microchirita tadphoensis* C.Puglisi	Puglisi & Middleton, 2017
Lamiaceae	*Platostoma tridechii* Suddee	Suddee, 2010
	Plectranthus phulangkaensis Suddee, Suphuntee & Saengrit	Suddee *et al.*, 2014
Lauraceae	*Litsea phuwuaensis* Ngerns.	Ngernsaengsaruay, 2004
Loranthaceae	*Tolypanthus pustulatus* Barlow	Barlow, 2005
Melastomataceae	*Phyllagathis nanakorniana* Wangwasit, Norsaengsri & Cellin.	Wangwasit *et al.*, 2010
Orchidaceae	*Peristylus phuwuaensis* Kurzweil	Kurzweil, 2010
Pandanaceae	*Pandanus voradolii* Callm. & Buerki	Callmander & Buerki, 2018
Podostemaceae	*Hydrobryum somranii* M.Kato	Kato, 2004
	Polypleurum erectum M.Kato	Kato, 2006
	P. longifolium M.Kato	Kato, 2006
	P. phuwuaense M.Kato	Kato, 2006
Rubiaceae	*Ixora phulangkaensis* Chamch.	Chamchumroon, 2014
Zingiberaceae	*Caulokaempferia bracteata* K.Larsen & S.S.Larsen	Larsen, 2003
	C. jirawongsei Picheans. & Mokkamul	Picheansoonthon & Mokkamul, 2004
	C. phuwoaensis Picheans. & Koonterm	Picheansoonthon & Koonterm, 2008
	C. phulangkaensis Picheans.	Picheansoonthon & Koonterm, 2008
	C. phutokensis Picheans.	Picheansoonthon & Koonterm, 2008
	Curcuma prasina Škorničk.	Skornickova *et al.*, 2017

DESCRIPTION

Platostoma albiflorum Suddee, A.J.Paton & J.Parn., **sp. nov.**

Similar in morphology to *Platostoma grandiflorum* Suddee & A.J.Paton but differs in having the median lobe of posterior fruiting calyx ovate, acute and erect (vs orbicular, emarginate and strongly bent backwards in *P. grandiflorum*), corolla white (vs purple in *P. grandiflorum*). Type: Thailand. Bueng Kan, Seka District, Phu Wua Wildlife Sanctuary, Tham Phra Waterfall, 210 m, 14 Oct. 2017, *Suddee, Hemrat & Kiewbang 5326* (holotype **BKF!**; isotypes **BKF!**, **K!**). Fig. 1. & Map 1.

Erect annual herbs 10–50 cm tall. *Stems* round or round-quadrangular, rarely branched, densely pubescent with retrorse hairs. *Leaves* sessile to distinctly petiolate, linear-lanceolate to linear-oblanceolate, 30–50 by 5–8 mm, apex acute, base attenuate, margin entire to obscurely serrate,

chartaceous, densely scabrid-hispid above, sparsely to densely pubescent with denser hairs on veins and with sessile glands beneath; petioles 0–15 mm long, pubescent. *Inflorescences* terminal, up to 30 cm long and 1.5 cm wide; verticils 10–60 mm apart, clearly interrupted; cymes unbranched or branches obscure; bracts sessile, persistent, leaf-like, lanceolate, up to 30 mm long and 8 mm wide, green to dark green apically, pale green basally, exceeding verticil, apex acute or acuminate, adaxial pubescent on upper part, glabrous or glabrescent at base, abaxial pubescent to villous, each subtending 8–20 flowers; pedicels 1–1.5 mm long in flower, 2–3 mm long in fruit, pubescent. *Calyx* campanulate, 2–2.5 mm long at anthesis, tubular, 4–5 mm long in fruit; posterior lip clearly 3-lobed, erect, median lobe largest, ovate, acute, glabrous on inner side, sparsely pubescent outside, margin ciliate, lateral lobes triangular, acute, glabrous on inner sides, sparsely pubescent outside, margin ciliate; anterior lip 1-lobed, orbicular or

Figure 1. *Platostoma albiflorum* Suddee, A.J.Paton & J.Parn., A–B. Habit & habitat; C. Adjacent verticils interrupted; D. Flowers & fruiting calyx; E. Flowers; F. Fruiting calyx. All photographed by W. Kiewbang.

ovate-oblong, 1–1.5 mm long, sometimes obscured by indumentum in flower, much shorter than posterior, rounded at apex, glabrous on inner side, glabrous with sessile glands on outer side, curved upwards and closing throat, upper part of throat invisible; tube obscurely pitted by secondary transverse veins, with spreading white villous hairs outside, with short spur on anterior base. *Corolla* white, 3.5–4.2 mm long; posterior lip 3-lobed, erect, median lobe largest, ovate, acute to rounded at apex, lateral lobes lanceolate, ± equal to median lobe in length; anterior lip orbicular, 2–2.2 mm long, concave, villous with sessile glands outside, margin ciliate; tube 2–2.5 mm long, abruptly expanded above ovary, gibbous on posterior side. *Stamens* exserted, exceeding anterior corolla lobe; anterior pair attached at base of anterior corolla lobe, glabrous; posterior pair attached near base of corolla tube, scattered white villous on upper part to around half of length, pubescent, with long appendage at base. *Ovary* glabrous; style bifid with unequal pointed branches, anterior branch longer, not exceeding anterior stamens; disc with anterior side well developed, obtuse at apex, not exceeding ovary. *Nutlets* dark brown, oblong, acute at apex, ca 1 mm long, minutely striate, slightly producing mucilage when wetted.

Thailand.— NORTH-EASTERN: Bueng Kan [Phu Wua Wildlife Sanctuary (Tham Phra Waterfall, 201 m, 10 Oct. 2013, *Suddee et al. 4599* (**BKF**); ibid., 191 m, 22 Oct. 2015, *Suddee et al. 4976* (**BKF**); ibid., 212 m, 22 Oct. 2015, *Suddee et al. 4977* (**BKF**); along road to Tham Phra Waterfall, 174 m, 18 Nov. 2016, *Suddee & Hemrat 5163* (**BKF**); Tham Phra Waterfall, 210 m, 14 Oct. 2017, *Suddee et al. 5326* (**BKF**, **K**); along road to Tham Phra Waterfall, 155 m, 4 Nov. 2018, *Suddee et al. 5389* (**BKF**)].

Distribution.— Endemic to Phu Wua Wildlife Sanctuary.

Ecology.— In scrub forest by streams, open sandy areas in scrub forest on sandstone plateau, dry deciduous dipterocarp forest by paddy field, 150–200 m alt. Flowering & fruiting: October–November.

Vernacular.— Kaphrao thamphra (กะเพราถ้ำพระ).

Etymology.— The epithet refers to the white corolla.

Provisional Conservation Assessment.— This species is known only from Phu Wua Wildlife Sanctuary with an estimated known extent of occurrence around 10 km^2, is known from two locations only and the estimated known area of occupancy is around 1 km^2. One sub-population occurs by a paddy field and the other occurs near a popular waterfall where many tourists come in the rainy season. Both sub-populations are threatened with disturbance by agricultural and tourist activities respectively, and this might affect the survival chances of this species. The number of mature individuals in each subpopulation is less than 250. It is assessed here as Endangered, EN B1ab(iii) + B2ab(iii) D, following IUCN (2017).

Note.— This species is easily recognized by the white corolla, the clearly interrupted verticils and the obviously erect 3-lobed posterior calyx lip.

Platostoma busbanianum Suddee, A.J.Paton & J.Parn., **sp. nov.**

Similar in morphology to *Platostoma fimbriatum* A.J.Paton but differs in having posterior lip of fruiting calyx 1-lobed and anterior margins not expanded downward and not meeting each other under throat (vs posterior lip 3-lobed, anterior margins expanded downward and meeting each other under throat in P. fimbriatum). Type: Thailand. Bueng Kan, Seka District, Phu Wua Wildlife Sanctuary, road to Wat Tham Khong, 178 m, 14 Oct. 2017, *Suddee, Hemrat & Kiewbang 5325* (holotype **BKF!**; isotypes **BKF!**, **K!**). Fig. 2. & Map 1.

Erect annual herbs, up to 0.4 m tall. *Stems* round-quadrangular, usually branched near stem base, unbranched above, glabrous to sparsely pubescent with longer hairs at nodes. *Leaves* sessile or subsessile, linear or linear-oblong, 20–40 by 3–6 mm, apex acute, base cuneate to attenuate, margin entire, chartaceous, glabrous or glabrescent on both sides. *Inflorescences* purple, terminal, up to 200 mm long; verticils 8–20 mm apart; cymes unbranched; bracts purple, similar to leaves but reduced in size upwards, up to 30 mm long in the lowest pair, exceeding verticil, each subtending 3–5 flowers; pedicels 2–2.5 mm long in flower, 3.5–5 mm long in fruit, pubescent. *Calyx* campanulate, 2.5–3 mm long at anthesis, ovoid, 4.5–7 mm long in fruit; posterior lip 1-lobed, ovate, acute to acuminate at apex, glabrous or glabrescent on both sides, margin slightly decurrent on tube, finely dentate-serrate; anterior lip ovate-orbicular, 1.5–1.8 mm long, rounded at apex, curved upwards and closing throat, margin curved backwards, glabrous on both sides, with sessile glands on outer side; tube

Figure 2. *Platostoma busbanianum* Suddee, A.J.Paton & J.Parn., A–B. Habit & habitat; C. Leaves; D– E. Flowers with yellow anthers; F. Fruiting calyx. All photographed by W. Kiewbang.

smooth to obscurely pitted by secondary transverse veins, glabrous or glabrescent on upper part, hispid at base outside, gibbous at anterior base. *Corolla* purple, 6–7 mm long; posterior lip 3-lobed, median lobe subtruncate with minute acute tip at middle, with a tuft of hairs on back, margin curved backwards, lateral lobes minute, ovate-oblong, longer than median lobe, erect, obtuse at apex, tip curved backwards; anterior lip pointing downwards, ovate-oblong, 4–4.2 mm long, slightly concave, villous outside, margin long fimbriate; tube 2–2.5 mm long, abruptly expanded above ovary, strongly gibbous on posterior side. *Stamens* exserted, equal or slightly exceeding anterior corolla lip; anterior pair attached at base of anterior corolla lobe, villous; posterior pair attached near base of corolla tube, densely long villous, with long appendage at base. *Ovary* glabrous; style bifid with pointed unequal branches, anterior branch longer, not exceeding anterior stamens; disc with anterior side well developed, obtuse at apex, not exceeding ovary. *Nutlets* brown, oblong, acute at apex, 1–1.2 by 0.7–1 mm long, minutely striate, producing mucilage when wetted.

Thailand.— NORTH-EASTERN: Bueng Kan [Phu Wua Wildlife Sanctuary, road to Tham Phra Waterfall, 174 m, 10 Oct., 2013, *Suddee et al. 4589* (**BKF**); ibid., 178 m, 22 Oct. 2015, *Suddee et al. 4974* (**BKF**); ibid., 174 m, 18 Nov. 2016, *Suddee & Hemrat 5162* (**BKF**); ibid., 176 m, 14 Oct. 2017, *Suddee et al. 5324* (**BKF**); road to Wat Tham Khong, 178 m, 14 Oct. 2017, *Suddee et al. 5325* (**BKF**, **K**); Tham Phra, Kon Nam Aoy, 266 m, 13 Sept. 2018, *Suddee et al. 5373* (**BKF**)].

Distribution.— Endemic to Phu Wua Wildlife Sanctuary.

Ecology.— In scrub forest by paddy field, open sandy areas in scrub forest on sandstone plateau, 150–200 m alt. Flowering & fruiting: October –November.

Vernacular.— Muang busban (ม่วงบุศบรรณ).

Etymology.— This species is named in honour of Assoc. Prof. Busban Na Songkhla of the Department of Botany, Chulalongkorn University, Bangkok.

Provisional Conservation Assessment.— This species is known only from Phu Wua Wildlife Sanctuary with an extent of occurrence of around 30 km^2, from three locations and the estimated known area of occupancy around 5 km^2. Some sub-populations occur by paddy fields which might be disturbed by agricultural activities thereby affecting the survival chances of this species. It is assessed here as Endangered, EN B1ab(iii) + B2ab(iii), following IUCN (2017).

Note.— This species is easily recognized by the downward pointing fimbriate anterior corolla lobe and the 1-lobed acute to acuminate posterior calyx lip.

Platostoma hemratianum Suddee, Puudjaa & Kiewbang, **sp. nov.**

Similar in morphology to *Platostoma albiflorum* Suddee, A.J.Paton & J.Parn. (this volume) but differs in having adjacent verticils touching each other and forming a spike-like inflorescence (vs clearly interrupted in *P. albiflorum*), corolla bluish-purple (vs white in *P. albiflorum*). Type: Thailand. Bueng Kan, Bueng Khong Long District, Phu Langka National Park, along dirt road to Wat Tham Khaen, 174 m, 4 Nov. 2018, *Suddee, Puudjaa, Hemrat & Kiewbang 5387* (holotype **BKF!**; isotypes **AAU!**, **BKF!**, **K!**, **TCD!**). Fig. 3. & Map 1.

Erect annual herbs, 10–50 cm tall. *Stems* slender, quadrangular, pubescent, with denser and longer hairs at nodes. *Leaves* sessile to subsessile, linear, 10–60 by 1.5–5 mm, apex acute to acuminate, base attenuate, margin subentire to coarsely serrate, chartaceous, sparsely pubescent on both sides, with hairs denser on veins beneath. *Inflorescences* terminal, up to 50 mm long, 8–15 mm wide; adjacent verticils touching each other and forming a spike-like inflorescence, lower ones sometimes interrupted; cymes with two secund branches; bracts sessile, green, arranged in 4-rows, ovate-lanceolate to linear-lanceolate, acuminate at apex, concave at base, up to 45 by 5 mm, adaxial glabrescent to pubescent, abaxial pubescent, exceeding verticil, each subtending 10–22 flowers; pedicels 1–2 mm long in flower, 1.5–2.5 mm long in fruit, pubescent. *Calyx* campanulate, 1.8–2 mm long at anthesis, tubular, 4.5–5.5 mm long in fruit; posterior lip clearly 3-lobed, rarely obscure, ovate; lobes acute to obtuse at apex, glabrous inside, glabrous to glabrescent outside, margin ciliate; anterior lip ovate or rounded, ca 1 mm in diam., curved upwards and closing throat, glabrescent to pubescent outside; tube obscurely pitted by secondary transverse veins, densely pubescent outside, with spur on anterior base.

Figure 3. *Platostoma hemratianum* Suddee, Puudjaa & Kiewbang, A–B. Habit & Habitat; C–D. Flowers; E–F. Fruiting calyx. All photographed by W. Kiewbang.

Corolla bluish-purple, 3–4 mm long; posterior lip 3-lobed, median lobe largest, apex acute to obtuse, bent backward, lateral lobes erect, less than half the size of median lobe, ± the same length, acute at apex; anterior lip orbicular-ovate, ca 2 mm long, slightly concave, pubescent outside, margin fimbriate; tube 1.5–2 mm long, widely expanded towards throat, gibbous on posterior side. *Stamens* exserted, anterior pair exceeding anterior corolla lip; anterior pair attached at the base of anterior corolla lobe, pubescent; posterior pair attached near the base of corolla tube, pubescent, with appendage at base. *Ovary* glabrous; style bifid with unequal pointed branches, anterior branches longer, not exceeding anterior stamens; disc with anterior side well developed, acute at apex, not exceeding ovary. *Nutlets* brown, oblong, acute at apex, ca 1 mm long, smooth, producing mucilage when wetted.

Thailand.— NORTH-EASTERN: Bueng Kan [Phu Langka National Park, Suan Sawan, Wat Sethaphol, 247 m, 15 Sept. 2018, *Suddee et al. 5382* (**BKF**); ibid., 218 m, 4 Nov. 2018, *Suddee et al. 5386* (**BKF**); along dirt road to Wat Tham Khaen, 174 m, 4 Nov. 2018, *Suddee et al. 5387* (**AAU**, **BKF**, **K**, **TCD**)].

Distribution.— Endemic to Phu Langka National Park.

Ecology.— Open areas in dry deciduous dipterocarp forest on a sandstone plateau and by a paddy field, 150–250 m alt. Flowering & fruiting: October–November.

Vernacular.— Hemrat phu langka (เห็มรัตน์ภูลังกา).

Etymology.— This species is named in honour of Mr Chandee Hemrat, a member of the technical staff of BKF who has long been working hard for the Flora of Thailand project.

Provisional Conservation Assessment.— This species is known only from two locations in Phu Langka National Park with an extent of occurrence of less than 50 km^2, and an estimated known area of occupancy around 5 km^2. The first subpopulation occurs near a temple which has religious activities all year round, and camping around the temple is common. The second subpopulation occurs by a paddy field which might be disturbed by agricultural activities. These activities might affect the survival chances of this species and it is assessed here as Endangered, EN B1ab(iii) + B2ab(iii), following IUCN (2017).

Note.— This species is easily recognized by the spike-like inflorescence, the bluish-purple corolla and the 3-lobed posterior calyx lip.

Platostoma ovatum Suddee, A.J.Paton & J.Parn., **sp. nov.**

Similar in morphology to *Platostoma intermedium* A.J.Paton but differs in having leaves hispid on both sides (vs scabrate on both sides with short sparse stiff hairs in *P. intermedium*), shorter calyx (1.8–2 mm long at anthesis, 2.8–3.2 mm long in fruit in *P. ovatum* vs 2.5–3 mm long at anthesis, 3–4 mm long in fruit in *P. intermedium*), corolla white with blue lines on lobes (vs white to pale purple without blue lines on lobes in *P. intermedium*). Type: Thailand. Chaiyaphum, Mueang District, Phu Laenkha National Park, Prong Phan Pee area, 924 m, 3 July 2017, *Suddee, Hemrat & Kiewbang 5230* (holotype **BKF!**; isotypes **AAU!**, **BKF!**, **K!**). Fig. 4. & Map 1.

Erect or ascending herbs 0.20–0.50 m tall. *Stems* quadrangular, much branched, hispid with long patent hair all over. *Leaves* subsessile to petiolate, ovate, 10–30 by 5–18 mm, apex obtuse, base obtuse or rounded, margin dentate-crenate, chartaceous, hispid with long patent hairs on both sides; petioles 1–12 mm long, hispid with long patent hairs. *Inflorescences* terminal only, 50–200 mm long; verticils up to 20 mm apart; cymes unbranched; bracts sessile, persistent, ovate, up to 10 mm long and 8 mm wide, acute, adaxial glabrescent with spare long patent hairs, abaxial densely hispid with long patent hairs, with scattered sessile glands, each bract subtending 1–5 flowers; pedicels up to 6 mm long in fruits, hispid with long patent hairs. *Calyx* widely campanulate, 1.8–2 mm long at anthesis, 2.8–3.2 mm long in fruit; posterior lip 3-lobed, median lobe obovate-orbicular, rounded at apex, margin ciliate or not, decurrent on tube, lateral teeth triangular, 1–1.2 mm long, ciliate or not; anterior lip broadly oblong, flat, straight, shorter than posterior, truncate or shallowly emarginate at apex, ciliate, longitudinal nerves prominent; tube short, glandular hispid with patent hairs outside, glabrous inside, without spur on anterior base. *Corolla* white with blue lines on lobes, 4.5–5 mm long, gibbous or very shortly spurred at base, projection not exceeding median lobe of posterior calyx lip; posterior lip 4-lobed,

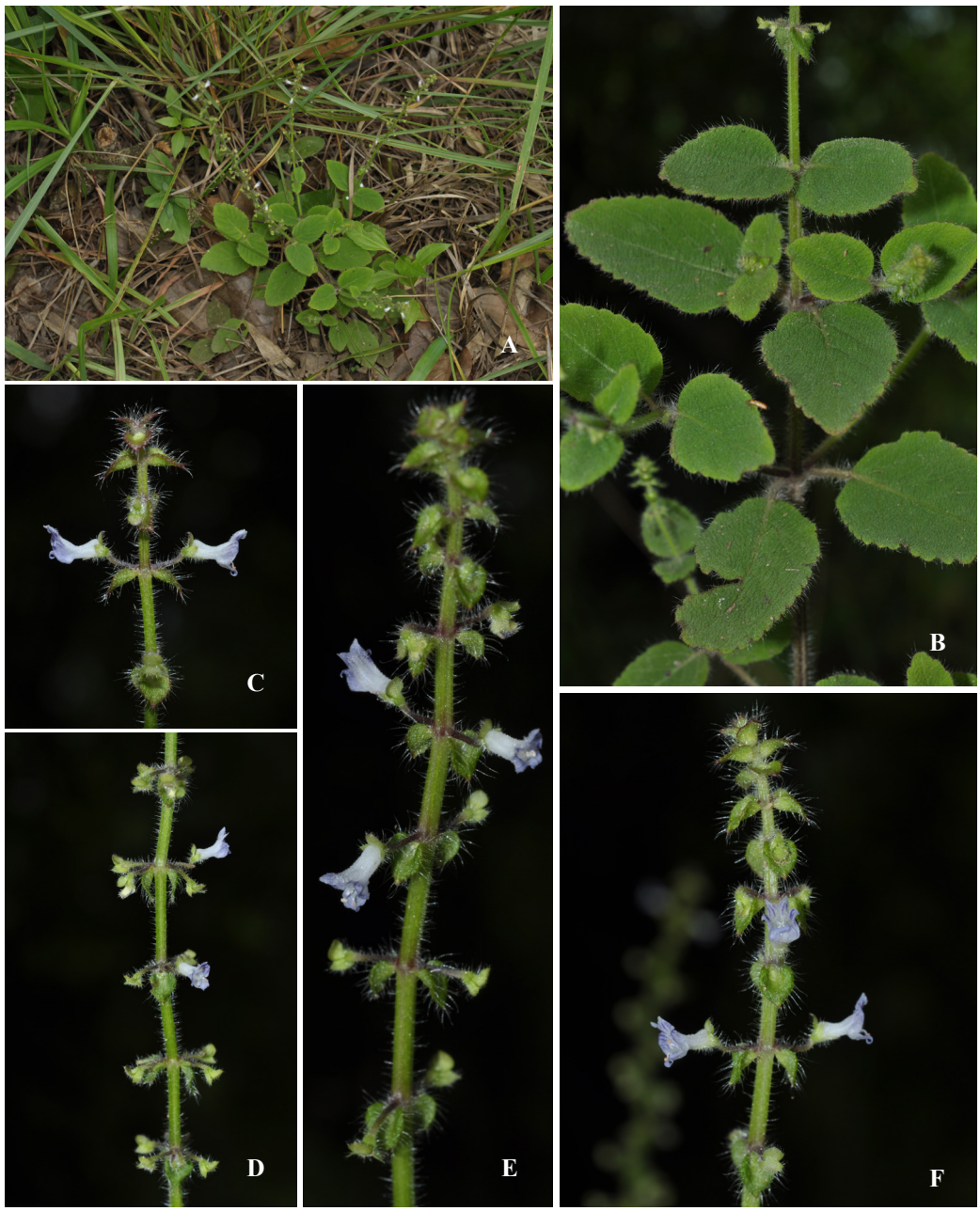


Figure 4. *Platostoma ovatum* Suddee, A.J.Paton & J.Parn., A. Habit & habitat; B. Leaves; C, F. Flowers; D–E. Flowers & fruiting calyx. All photographed by W. Kiewbang.

1.2–1.5 mm long, apex acute to obtuse, glabrous or glabrescent on inner side, pubescent on outer side, 2 middle lobes broader and longer, apex erect, 2 lateral lobes with apex curved backwards; anterior lip oblong, 1.5–2 mm long, entire, concave, apex acute, curled downwards; tube 2.5–3 mm long, straight or nearly so, glabrescent to pubescent outside with sparse yellow sessile glands, pubescent with denser hairs on anterior side inside; spur gibbous, never exceeding median lobe of posterior calyx lip, broadly obtuse at apex. *Stamens* with anterior pair slightly exserted, attached around base of anterior corolla lobe, glabrous; posterior pair included, attached at base of corolla tube, dilated toward base and decurrent into spur, finely pubescent to half-way from base, inappendiculate. *Ovary* glabrous; style included, bifid with subequal branches; disc lobed with the anterior side well developed. *Nutlets* brown, subglobose to globose-oblong, rounded at apex, 0.8–0.9 mm long, minutely striate, not producing mucilage when wetted.

Thailand.— EASTERN: Chaiyaphum (Phu Laenkha National Park, Prong Phan Pee area, 924 m, 3 July 2017, *Suddee et al.* (**AAU**, **BKF**, **K**).

Distribution.— Endemic to Phu Laenkha National Park.

Ecology.— Mixed deciduous forest along sandstone cliff, 850–1,000 m alt. Flowering & fruiting: June–July.

Vernacular.— Khao tok phu laenkha (ข้าวตอกภูแลนคา).

Etymology.— The epithet refers to the ovate leaves.

Provisional Conservation Assessment.— This species is known only from Phu Laenkha National Park with an estimated area of occupancy of around 0.5 km^2. The number of mature individuals in the population is less than 30. The species occurs in an area that attracts significant numbers of tourists: the Big Cycads site. The increased visitor numbers might increase disturbance in the area and this could affect the survival chances of this species. It is assessed here as Critically Endangered, CR B2ab(iii); D, following IUCN (2017).

Note.— This species is easily recognized by the hispid indumentum on all parts and the blue lines on corolla lobes.

Platostoma parnellianum Suddee, A.J.Paton & Kiewbang, **sp. nov.**

Similar in morphology to *Platostoma rubrum* Suddee & A.J.Paton but differs in having stem green, without black patch at the nodes (vs glossy greenish-yellow with a black patch at the nodes in *P. rubrum*), leaves chartaceous, not inrolled when dry (vs thick, subfleshy, often inrolled when dry in *P. rubrum*), adjacent verticils clearly interrupted (vs close together and spike-like in appearance in *P. rubrum*), corolla bluish-purple (vs white to light purple in *P. rubrum*). Type: Thailand. Ubon Ratchathani, Pho Sai District, along road to Phu Lom Forest Park, 160 m, 26 Oct. 2015, *Suddee, Mattapha, Hemrat & Kiewbang 4993* (holotype **BKF!**; isotypes **AAU!**, **BKF!**, **K!**, **TCD!**). Fig. 5. & Map 1.

Erect annual herbs, 15–60 cm tall, usually less than 50 cm tall. *Stems* quadrangular or round-quadrangular, glabrescent to pubescent, with denser and longer hairs at nodes. *Leaves* mostly sessile to subsessile with petiole to ca 1 mm long, linear, 30–70 by 2–6 mm, apex acute to acuminate, base attenuate, margin coarsely serrate, chartaceous, sparsely pubescent on both sides, with hairs denser on veins beneath. *Inflorescences* terminal, up to 90 mm long, 10–12 mm wide; adjacent verticils clearly interrupted, up to 1.5 cm apart; cymes with two secund branches; bracts sessile, green, conspicuously arranged in 4-rows, ovate to ovate-lanceolate, acuminate and deflexed at apex, strongly concave at base, up to 25 by 6 mm, adaxial glabrescent, abaxial pubescent, exceeding verticil, each subtending 5–15 flowers, forming an apical coma; pedicels 2–4 mm long in flower, 2.5–5 mm long in fruit, pubescent. *Calyx* campanulate, 2–2.2 mm long at anthesis, tubular, 6–7 mm long in fruit; posterior lip 1-lobed, ovate-oblong, obtuse at apex, glabrous inside, pubescent outside; anterior lip rounded, 1 mm in diam., curved upwards and closing throat, pubescent outside; tube obscurely pitted by secondary transverse veins, pubescent outside, with spur on anterior base. *Corolla* bluish-purple, 4–5 mm long; posterior lip 3-lobed, median lobe largest, apex acute to obtuse, deflexed, lateral lobes erect, ± half the size of median lobe, slightly longer than median lobe, acute to obtuse at apex; anterior lip orbicular-ovate, 2 mm long, concave, pubescent outside, margin not fimbriate; tube 2 mm long, widely expanded towards throat, gibbous on posterior side. *Stamens* exserted, exceeding anterior corolla lip; anterior pair attached at base

Figure 5. *Platostoma parnellianum* Suddee, A.J.Paton & Kiewbang, A–B. Habit & Habitat; C–E. Flowers; F. Fruiting calyx. A–E photographed by W. Kiewbang; F photographed by S. Rueangruea.

of anterior corolla lobe, glabrous; posterior pair attached near base of corolla tube, only slightly pubescent, with appendage at base. *Ovary* glabrous; style bifid with unequal pointed branches, anterior branches longer, not exceeding anterior stamens; disc with anterior side well developed, acute at apex, not exceeding ovary. *Nutlets* brown, oblong, 1.5 mm long, smooth, producing mucilage when wetted.

Thailand.— EASTERN: Ubon Ratchathani [Phosai District, along road to Phu Lom Forest Park, 160 m, 26 Oct. 2015, *Suddee et al. 4993* (**AAU**, **BKF**, **K**, **TCD)**; ibid., 166 m, 30 Jan. 2017, *Suddee et al. 5196* (**BKF**); ibid., *Suddee et al. 5198* (**BKF**)].

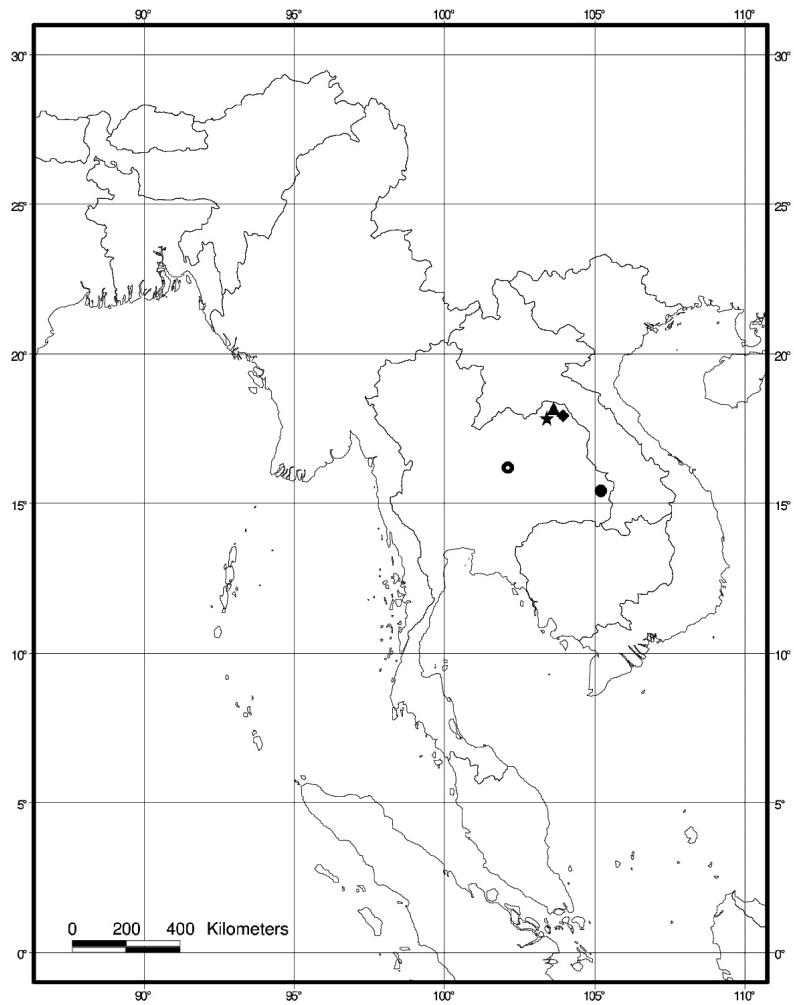
Distribution.— Endemic to Pho Sai District, Ubon Ratchathani Province.

Ecology.— Open areas by paddy field, 150–200 m alt. Flowering & fruiting: October–November.

Vernacular.— Muang sriphosai (ม่วงศรีโพธิ์ไทร).

Etymology.— This species is named in honour of Prof. John Parnell of TCD, a board member of the Flora of Thailand project.

Provisional Conservation Assessment.— This species is known only from Pho Sai District, Ubon Ratchathani Province with an estimated area of occupancy of around 1 km^2. The species occurs in



Map 1. Distribution of *Platostoma albiflorum* Suddee, A.J.Paton & J.Parn. (★); *P. busbanianum* Suddee, A.J.Paton & J.Parn. (▲); *P. hemratianum* Suddee, Puudjaa & Kiewbang (◆); *P. ovatum* Suddee, A.J.Paton & J.Parn. (⊙) and *P. parnellianum* Suddee, A.J.Paton & Kiewbang (●).

a waste area by a paddy field and the agricultural activities could affect the survival chances of this species. It is assessed here as Critically Endangered, CR B2ab(iii), following IUCN (2017).

Note.— *Platostoma parnellianum* is similar to *P. rubrum* but is a much shorter plant. The height is usually 20–40 cm whereas *P. rubrum* usually grows to nearly 1 m high. The living plant has thick leaves, glossy greenish-yellow stem with a black patch at the nodes, and conspicuous leathery bracts at the top of the inflorescence.

KEY TO THE SPECIES OF *PLATOSTOMA* IN THAILAND

1. Posterior stamens inappendiculate
  2. Corolla without distinct spur at posterior base; posterior stamens attached around the midpoint or at the base of corolla tube
    3. Posterior stamens attached around the midpoint of corolla tube
      4. Posterior lip of calyx clearly 1-lobed; anterior lip 4-toothed **10. P. hispidum**
      4. Posterior lip of calyx clearly 3-lobed or lateral lobes minute and fused to the median lobe; anterior lip 2-toothed
        5. Leaf margin serrate in both upper and lower half of leaf blade
          6. Median lobe of the posterior calyx lip oblong, margin slightly curved backwards; teeth of anterior calyx lip shortly acute or obtuse at apex, shorter than posterior; throat open **6. P. coloratum**
          6. Median lobe of the posterior calyx lip orbicular, margin strongly reflexed backwards; teeth of anterior calyx lip long acuminate at apex, equal or subequal to posterior; throat ± closed **20. P. siamense**
        5. Leaf margin serrate in upper half only, entire in lower half of leaf blade **13. P. lanceolatum**
    3. Posterior stamens attached at the base of corolla tube
      7. Leaves scabrate on both sides **11. P. intermedium**
      7. Leaves hispid on both sides **16. P. ovatum**
  2. Corolla with distinct spur at posterior base; posterior stamens attached at the base of corolla tube only
    8. Leaves sessile or subsessile; corolla spur slightly exceeding the median lobe of posterior lip **12. P. kerrii**
    8. Leaves distinctly petiolate; corolla spur gibbous to far exceeding the median lobe of posterior lip
      9. Corolla spur more than twice as long as posterior calyx lip, far exceeding the median lobe
        10. Stems very short; leaves 2–3 pairs, subradical or forming a rosette near stem base
          11. Median lobe of posterior fruiting calyx lip ca 2 mm wide; plants usually producing stolons **21. P. stoloniferum**
          11. Median lobe of posterior fruiting calyx lip 3–4 mm wide; plants rarely producing stolons **2. P. annamense**
        10. Stems distinct; leaves usually more than 3 distant pairs
          12. Leaves large, 50–250 mm long, broadly elliptic or broadly obovate, apex rounded or obtuse **2. P. annamense**
          12. Leaves small, 10–45 mm long, ovate, apex acute or shortly cuneate **4. P. calcaratum**[1]
      9. Corolla spur less than twice as long as posterior calyx lip, hardly or slightly exceeding the median lobe
        13. Spur equal in length or slightly longer than median lobe of posterior calyx lip; leaves densely pilose-villous on both sides **15. P. ocimoides**
        13. Spur gibbous, never exceeding the median lobe of posterior calyx lip
          14. Leaves scabrate on both sides **11. P. intermedium**
          14. Leaves hispid on both sides **16. P. ovatum**
1. Posterior stamens appendiculate
  15. Lateral lobes of posterior fruiting calyx with anterior margins extended greatly downwards and overlapping or meeting each other under the throat
    16. Leaves sessile or subsessile, linear or linear-oblong; posterior lip of corolla with lateral lobes much smaller than the subtruncate median lobes; margin of anterior corolla lip fimbriate; margin of posterior calyx lip with spreading hairs **8. P. fimbriatum**
    16. Leaves petiolate, ovate or ovate-lanceolate; posterior lip of corolla with 3 more or less equal, acute to obtuse lobes; margin of anterior corolla lip not fimbriate; margin of posterior calyx lip without hairs **22. P. tectum**
  15. Lateral lobes of posterior fruiting calyx with anterior margins separated, never overlapping or meeting each other under the throat
    17. Leaves sessile or subsessile
      18. Posterior lip or fruiting calyx 1-lobed
        19. Fruiting calyx-tube ovoid, hispid at base outside; posterior lip acute to acuminate at apex; anterior lip glabrous on both sides **3. P. busbanianum**
        19. Fruiting calyx-tube ovate-oblong or tubular, pubescent or villous outside; posterior lip obtuse or rounded at apex; anterior lip glabrous inside, pubescent outside
          20. Median lobe of posterior corolla-lip with apex subtruncate in appearance; fruiting calyx-tube ovate-oblong **23. P. tridetchii**
          20. Median lobe of posterior corolla-lip with apex acute or obtuse; fruiting calyx-tube tubular
            21. Adjacent verticils close together, spike-like in appearanc **19. P. rubrum**
            21. Adjacent verticils clearly interrupted **18. P. parnellianum**

18. Posterior lip or fruiting calyx clearly 3-lobed
22. Adjacent verticils clearly interrupted; corolla white **1. P. albiflorum**
22. Adjacent verticils touching each other, only the lower ones sometimes interrupted; corolla bluish-purple **9. P. hemratianum**
17. Leaves with petioles short or long but distinctly petiolate
23. Apex of median lobe of posterior fruiting calyx lip acute or acuminate
24. Posterior lip of fruiting calyx clearly 3-lobed
25. Leaves ovate, ovate-lanceolate or elliptic-ovate **17. P. palustre**
25. Leaves linear-lanceolate to linear-oblanceolate **1. P. albiflorum**
24. Posterior lip of fruiting calyx clearly 1-lobed
26. Fruiting calyx tube tubular, pubescent to villous all over outside; anterior lip pubescent to villous outside **5. P. cambodgense**[2]
26. Fruiting calyx tube ovoid, hispid at base outside; anterior lip glabrous on both sides **3. P. busbanianum**
23. Apex of median lobe of posterior fruiting calyx lip rounded or emarginate
27. Median lobe of posterior fruiting calyx lip orbicular-obovate or orbicular
28. Median lobe of posterior fruiting calyx lip orbicular-obovate, apex rounded **23. P. tridechii**
28. Median lobe of posterior fruiting calyx lip orbicular, apex emarginate **5. P. cambodgense**[2]
27. Median lobe of posterior fruiting calyx lip oblong or obovate-oblong
29. Fruiting calyx-tube with an anterior spur at the base, hispid, prominently pitted by secondary transverse veins; median lobe of posterior lip obovate-oblong; anterior lip equal in length to lateral lobes of posterior lip **14. P. mekongense**
29. Fruiting calyx-tube without a spur at the base, villous, pitting between the secondary transverse veins obscure; median lobe of posterior lip oblong; anterior lip much shorter than lateral lobes of posterior lip **7. P. cochinchinense**

[1] Only the variety *Platostoma calcaratum* var. *garrettii* occurs in Thailand.

[2] Two varieties occur in Thailand, *Platostoma cambodgense* var. *cambodgense* and *P. cambodgense* var. *subulatum*. More specimens and more study is required in order to decide, if these varieties should be recognized as distinct, separate species.

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