

## *Thunbergia amphaii* (Acanthaceae) a new species from Thailand

CHALERMPOL SUWANPHAKDEE<sup>1,2,\*</sup>, KWANJAI KHAMMONGKOL<sup>3</sup>, DAVID J. MIDDLETON<sup>4</sup> & SOMRAN SUDDEE<sup>5</sup>

### ABSTRACT

*Thunbergia amphaii*, a new species from North-Eastern Thailand is described and illustrated. The pseudo-umbel inflorescence is diagnostic for this species. The pollen morphology, especially the size and the pericolpate aperture arrangement, further support this species as new to science.

KEYWORDS: Endemic, North-Eastern Thailand, pollen morphology, taxonomy, Lamiales.

Accepted for publication: 7 March 2021. Published online: 18 March 2021

### INTRODUCTION

This new species was discovered by park rangers in Phu Langka National Park during field patrols under the “Smart Patrol System” of the Department of National Parks, Wildlife and Plant Conservation. Protected areas are at the frontline of efforts to protect species and habitats from poaching and other threats. The Spatial Monitoring and Reporting Tool (SMART) is designed to improve anti-poaching efforts and overall law enforcement effectiveness in established conservation areas and management zones (SMART, 2014). The plants were found in a semi-shady area in dry evergreen forest along a stream.

*Thunbergia* Retz. (Acanthaceae, subfamily Thunbergioideae) is a genus of about 100 species of perennial climbers and shrubs, distributed in tropical and subtropical regions of Africa, Madagascar, Asia and Australia (Borg *et al.*, 2008). Since the genus was first described by Retzius (1780), the number of species in Asia has steadily grown, with particular milestones being Clarke (1884), Kurz (1877), Ridley

(1923), Benoist (1930) and Hu *et al.* (2011). An account of *Thunbergia* for Thailand is being prepared by the first author, which has already resulted in reports of a number of new taxa and new records (Suwanphakdee, 2017, 2018). After careful examination of the relevant literature and herbarium collections of similar species, the *Thunbergia* species from Phu Langka National Park has not been found to match any of the other known species in the genus. It is thus described and illustrated here.

### MATERIAL AND METHODS

Fresh materials were collected in the field for morphological and palynological studies. Measurements of vegetative and reproductive parts were made using a dissecting microscope when necessary. The type material and additional voucher specimens were prepared and have been deposited at BK, BKF, K and SING. Pollen grains were prepared for study using a modified acetolysis technique (Erdtman, 1960). The pollen slides were investigated under a

<sup>1</sup> Department of Botany, Faculty of Science, Kasetsart University, Bangkok 10900, Thailand.

<sup>2</sup> Palynology Special Research Unit (P-SRU), Department of Botany, Faculty of Science, Kasetsart University, Bangkok 10900, Thailand.

<sup>3</sup> Phu Langka National Park, Department of National Parks, Wildlife and Plant Conservation, Ban Phaeng District, Nakhon Phanom 48140, Thailand.

<sup>4</sup> Singapore Botanic Gardens, National Parks Board, 1 Cluny Road, 259569 Singapore.

<sup>5</sup> Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation, 61 Phahonyothin Road, Ladyao, Chatuchak, Bangkok 10900, Thailand.

\* Corresponding author: [fscicps@ku.ac.th](mailto:fscicps@ku.ac.th)

light microscope (LM) and a scanning electron microscope (SEM) at the Scientific Equipment Center, Faculty of Science, Kasetsart University, Bangkok, Thailand. Permanent slides of the pollen grains are deposited at the Palynology Special Research Unit, Department of Botany, Faculty of Science, Kasetsart University, Bangkok, Thailand.

## TAXONOMIC TREATMENT

### DESCRIPTION

**Thunbergia amphaii** Suwanph., K.Khamm., D.J.Middleton & Suddee, **sp. nov.**

Similar to *Thunbergia lutea* T.Anderson in overall corolla tube shape but differing in the inflorescence being a terminal simple pseudo-umbel (vs a single axillary flower in *T. lutea*), bracteoles creamy white to white, elliptic-ovate to ovate, split on both sides for more than half of their length (vs reddish white to purplish red, elliptic, split on one side), calyx 5-lobed (vs 12–14 lobed in *T. lutea*), with glandular hairs on filaments (vs densely hispid at base in *T. lutea*), with a uniseriate row of glandular trichome hairs along the line of dehiscence on anthers (vs glabrous in *T. lutea*), capsule puberulous or scabrous and with glandular hairs (vs glabrous in *T. lutea*). Type: Thailand, Nakhon Phanom, Ban Phaeng District, Phu Langka National Park, 200 m alt., 30 Aug. 2020, fl., *Tetsana, Suddee, Puudjaa, Thananthaisong & Hemrat 1846* (holotype **BKF!**; isotypes **BK!**, **K!**, **SING!**). Figs. 1 & 2.

Perennial erect herbs or undershrubs to slightly woody climbers to 2 m long. *Stems* slender, glabrous except for the hirsute nodes, rounded to rounded-quadrangular, longitudinally 2-furrowed. *Leaves* opposite; petiole 4–7 mm long, flattened on upper side, scabrous; lamina elliptic, elliptic-oblong, oblong or oblong-obovate, 12–14 by 3.5–5 cm, apex acute, acuminate or cuspidate, base cuneate to attenuate, margins entire and decurrent on the petiole, slightly undulate, glabrous on both surfaces; lateral veins 8–10 on each side, looping and joining to form an intramarginal vein. *Inflorescence* terminal, pseudo-umbel, 3–8-flowered, 5–8 by 4–6 cm; peduncle 1.5–2 cm long, puberulous; bracts 2, linear-lanceolate, 1.5–2 by 0.8–1 mm, coriaceous, green, apex acuminate, base truncate, hirsute on abaxial surface, adaxial surface glabrous, without obvious veins. *Flower* with pedicel 1.5–1.7 cm long, glabrous; bracteoles

connate at base and then free on both sides for more than half of their length, elliptic-ovate to ovate, 1.2–1.5 by 0.8–1 cm, chartaceous, creamy white to white, apex acute or mucronate, base truncate to slightly cordate, margin entire, adaxial surface with glandular and uniseriate hairs, abaxial surface glabrous, 7-nerved; receptacle ca 1 mm long and 2 mm wide. *Calyx* annular, subequally 5-toothed, lobes 4–5 mm long, acuminate, glandular hairy, more densely so abaxially. *Corolla* bilabiate, 4.5–5 by 1.2–1.8 cm; white or creamy white; tube 3–4 cm long, white to creamy white with yellow or dark yellow-brown bands or strips in throat, densely glandular hairy at the base, becoming less so around the middle of the inner surface; lobes 5 (2 upper and 3 lower), orbicular, subequal, 1–1.2 cm broad, lower lobes emarginate, white or creamy white with a yellow patch, slightly overlapping and reflexed, shortly and densely glandular hairy on both surfaces. *Stamens* ascending, filaments with dense glandular hairs, anthers bearded on basal spurs; shorter stamens with filaments 4–5 mm long, anthers 5–6 mm long, glabrous, appendage glabrous; longer stamens with filaments 7–8 mm long, anthers 5–6 mm long, one theca with a uniseriate row of glandular trichome hairs along the line of dehiscence, one theca glabrous, appendage with dense long hairs. *Disk* thick, white, 1–1.2 mm long. *Ovary* ovoid, ca 2 by 2.5 mm, shallowly 4-lobed; style 2–2.3 cm long; stigma white, 2-lobed, funnel-shaped, each lobe split on one side, slightly exerted at anthesis. *Capsule* basal part 1–1.5 by 1–1.5 cm, beak 2.5–3 cm long, puberulous or scabrous and with glandular hairs, with stipe 2–3 mm long, glandular hairy, with green persistent bracteoles; pedicel 2–2.5 cm long.

Thailand.—NORTH-EASTERN: Nakhon Phanom [Ban Phaeng District, Phu Langka National Park, 200 m alt., 16 Aug. 2020, *Khammongkol 218* (**BK**, **BKF**); *ibid*, 30 Aug. 2020, fl., *Tetsana et al. 1846* (**BK**, **BKF**, **K**, **SING**)].

Distribution.—Endemic.

Ecology.—Uncommon in dry evergreen forest along a stream, 200 m alt. Flowering: August–September.

Vernacular. —Nam nae khao amphai (หนามแน้วขาวอัมไพ).

Etymology. —This species is named in honour of Mr Amphai Phaseeda, a park ranger at Phu Langka National Park who first found the plant.

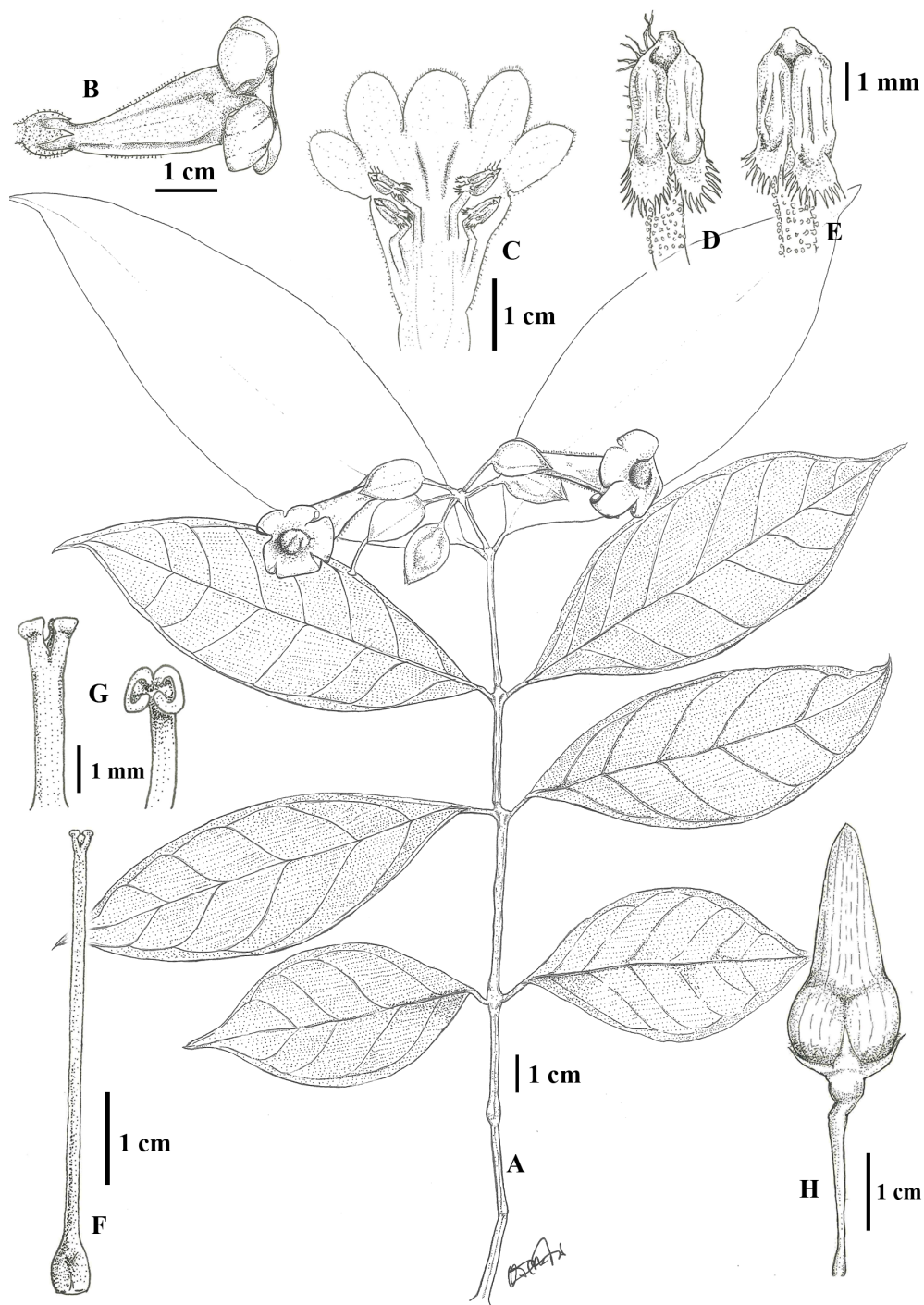


Figure 1. *Thunbergia amphaii* Suwanph., K.Khamm., D.J.Middleton & Suddee: A. Branch with inflorescence; B. Flower (side view); C. Corolla opened out; D. Apex of longer stamen; E. Apex of shorter stamen; F. Pistil; G. Stigma; H. Capsule (from type: *Tetsana*, et al. 1846 (BK, BKF, K, SING), drawn by Sangtawan Sriboran).



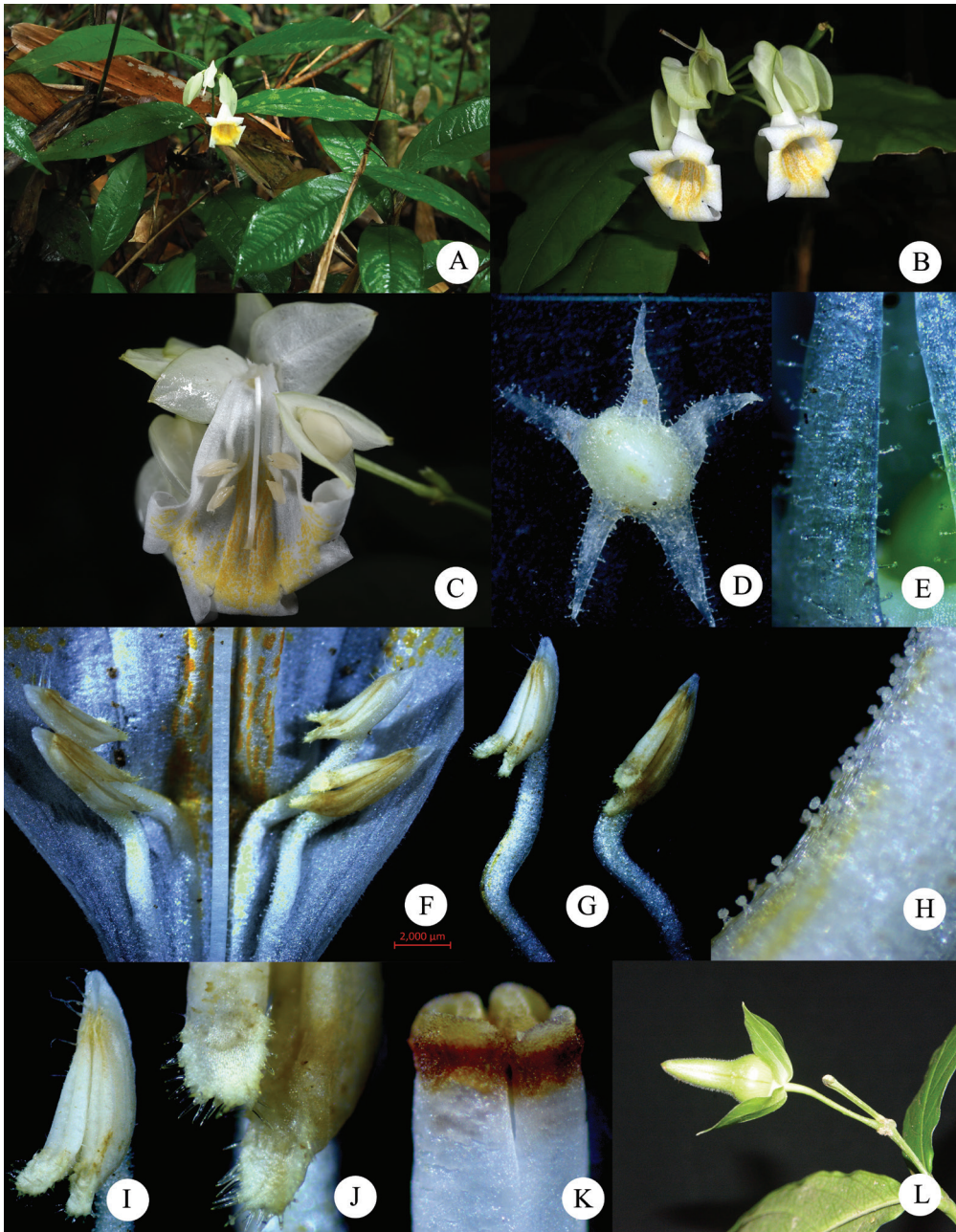


Figure 2. *Thunbergia amphaii* Suwanph., K.Khamm., D.J.Middleton & Suddee: A. Habit; B. Inflorescence; C. Flower; D. Calyx; E. Glandular hairs on calyx; F. Stamens; G. Longer and shorter stamens; H. Glandular hairs on filament; I. Anther; J. Bearded spur; K. Stigma; L. Capsule (photos A, D–K by Sangtawan Sriboran; B, C by Naiyana Tetsana; L by Kwanjai Khammongkol).

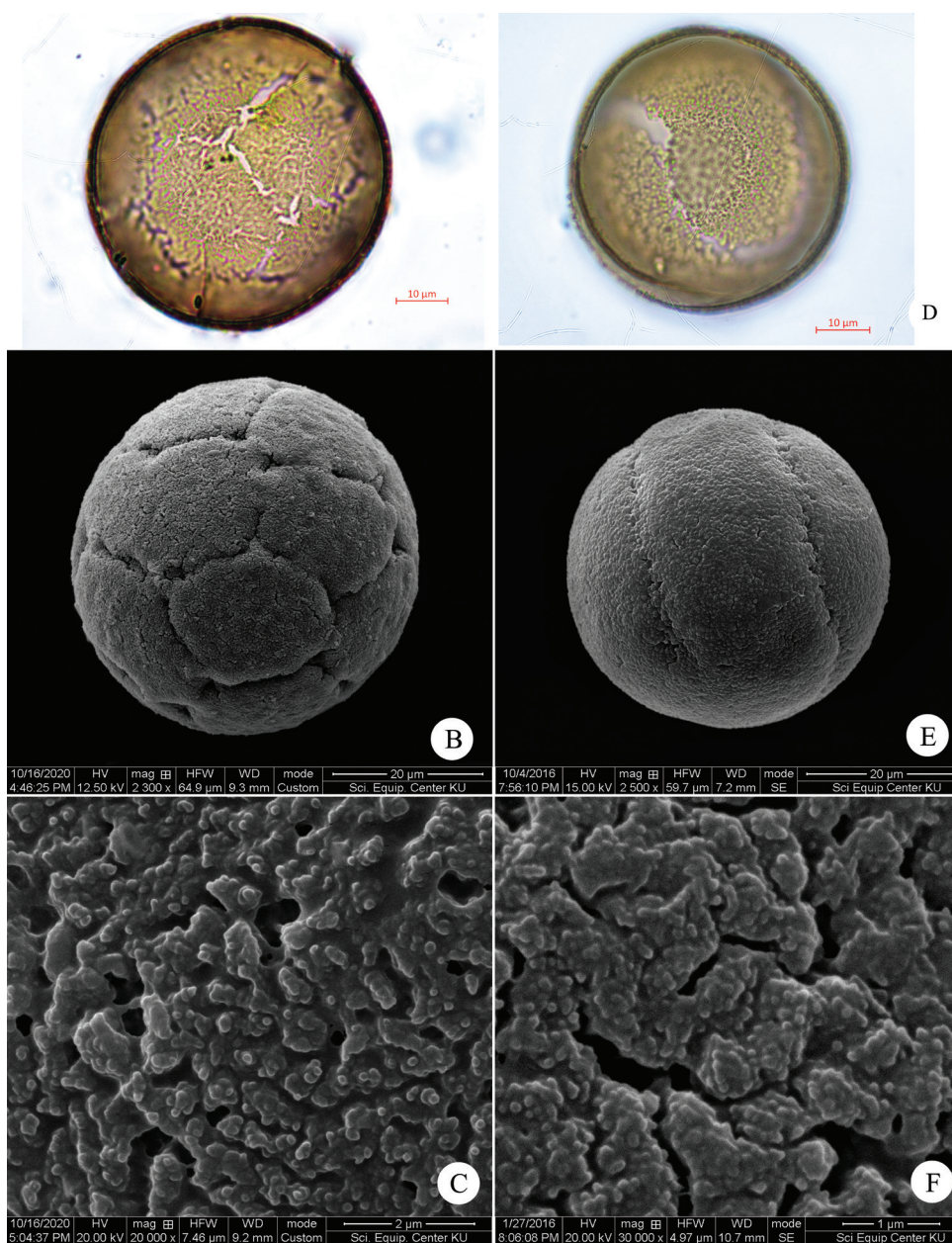


Figure 3. Pollen morphology, *Thunbergia amphai* Suwanph., K.Khamm., D.J.Middleton & Suddee: A. Pollen from light microscope; B. Pollen from SEM; C. Fossula with granula (*Tetsanaet al. 1846* (BK, BKF, K, SING)); *Thunbergia lutea* T.Anderson: D. Pollen from light microscope; E. Pollen from SEM; F. Fossula with granula (*Suwanphakdee & Wongnak 542* (BK, BKF, K, KU, QBG)).



Provisional Conservation Assessment.— Following IUCN Standard and Petitions Committee (2019) criteria, a conservation status of Data Deficient (DD) is proposed. *Thunbergia amphaii* is known only from one small population where a few individuals were observed. The species might occur in other areas in the Phu Langka National Park. Further exploration is needed.

Notes.— This species is distinguished by the inflorescence being pseudo-umbellate, a character not previously known in the genus *Thunbergia*. The calyx is 5-lobed, which is the lowest number of lobes in the genus for species with lobes. The uniseriate and glandular hairs on the line of dehiscence on the anthers are only known in this species. The pollen grains are monads, globose and foveolate with granulate ornamentation. The pollen is larger than in *Thunbergia lutea*,  $58\text{--}60 \pm 1.41 \mu\text{m}$  (vs  $51\text{--}53 \pm 1.51 \mu\text{m}$  in *T. lutea*), the exine is  $2\text{--}3 \pm 0.31 \mu\text{m}$  (vs  $1\text{--}2 \pm 0.41 \mu\text{m}$  in *T. lutea*), and the aperture arrangement is pericarpate (vs spirapetrate in *T. lutea*); a pericarpate aperture arrangement has not previously been recorded from this genus.

## ACKNOWLEDGEMENTS

We would like to thank Naiyana Tetsana, Pachok Puudjaa, Theerawat Thananthaisong, Chandee Hemrat and the staff of Phu Langka National Park for their assistance in the field, Sangtawan Sriboran for the line drawings, and Anuwat Sarapan for technical support. We would also like to thank the editors and reviewers for useful suggestions and comments. This work was supported by the Thailand Research Fund (TRF) no. TRG5780290 and Research and Development Kasetsart University Institute, Kasetsart University.

## REFERENCES

- Benoist, R. (1930). Acanthaceae. In: F. Gagnepain (ed.), Flore Générale de l'Indo-Chine 4: 614–621. Masson, Paris.
- Borg, A.J., McDade, L.A. & Schonenberger, J. (2008). Molecular phylogenetics and morphological evolution of Thunbergioideae (Acanthaceae). Taxon 57(3): 811–822.
- Clarke, C.B. (1884). Acanthaceae. In: J.D. Hooker (ed.), Flora of British India 4: 390–393. L. Reeve & Co.
- Erdtman, G. (1960). The acetolysis method. Svensk Botanisk Tidskrift 54: 561–564.
- Hu, C.C. & Thomas, F.D. (2011). *Thunbergia*. In: C.Y. Wu, P.H. Raven & D.Y. Hong (eds), Flora of China 19: 377–379. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis.
- IUCN Standard and Petitions Committee (2019). Guidelines for using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Committee. Downloadable from <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>. (Accessed on 28 September 2020).
- Kurz, S. (1877). Acanthaceae. Forest Flora of British Burma 2: 239–241. Office of the Superintendent of Government Printing, Calcutta.
- Retzius, J.A. (1780). *Thunbergia*. Physiographiska Salskapets Handlingar 1(3): 163.
- Ridley, H.N. (1923). Acanthaceae. The Flora of the Malay Peninsula 2: 555–557. L. Reeve & Co. Ltd., London.
- SMART (2014). Spatial Monitoring And Reporting Tool. North Carolina Zoological Park on behalf of the SMART Collaboration Source: <http://www.smartconservationsoftware.org/>.
- Suwanphakdee, C. & Suksathan, P. (2017). *Thunbergia lutea* T. Anderson (Acanthaceae), a new record for Thailand. Thai Forest Bulletin (Botany) 45(2): 113–117.
- Suwanphakdee, C. & Vajrodaya, S. (2018). *Thunbergia impatioides* (Acanthaceae), a new species from Thailand. Blumea 63: 20–25.