



Thunbergia impatioides (Acanthaceae), a new species from Thailand

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Key words

new species
pollen
Thailand
Thunbergia

Abstract A new species, *Thunbergia impatioides*, was discovered from Thailand and is here described. Detailed descriptions including pollen and seed morphologies, distribution, ecology and illustration are provided.

Published on 30 April 2018

INTRODUCTION

Thunbergia is a large genus of Acanthaceae subfamily *Thunbergioideae* s.lat. (Brummitt 1989, Takhtajan 1997, Schönenberger & Endress 1998), consisting of c. 100 species distributed in tropical and subtropical regions of Africa, Madagascar, Asia and Australia (Borg et al. 2008). The members of *Thunbergia* differ from most other Acanthaceae mainly in their lack of retinacula and cystoliths, their twining habit (a few species are erect), large floral bracts and bracteoles (prophylls), reduced calyx and lack of an endothecium (Lindau 1895, Bremekamp 1953, Schönenberger & Endress 1998).

The morphological characters of Asian *Thunbergia* are: Perennial herbaceous or woody climbers, shrubs, rarely erect or trailing herbs without cystoliths. The leaves are always simple and with a petiole, they are opposite, ovate or lanceolate to hastate or sagittate and their margins are entire to lobed to dentate. The flowers are pedicellate, axillary, solitary, paired, up to four arranged in fascicles or with many flowers in racemes with leaf-like bracts. The bracteoles are paired and enclosing the calyx and most or all of the corolla tube, sometimes fused on one side and persistent. The calyx is annular and much shorter than the bracteoles, subentire, undulate or 5–20-toothed or sinuate. The corolla forms a straight or curved tube. The tube is cylindrical, ventricose or gradually widened towards its apex, \pm equally 5-lobed, spreading or recurved and contorted in bud. The stamens are didynamous and inserted near the base of the corolla tube. The anthers are 2-theous, oblong or ovoid, \pm spurred at base, and \pm bearded. The disk is short and annular or pulvinate. The ovary is ovoid and consists of 2 locules and has 2 ovules per locule. The style is glabrous or pubescent. The stigma is funnel shaped, bilobed or 2-cleft, and entire or fringed. The fruit is a woody capsule, subglobose at the base and with an elongated beak. Each capsule has 2–4 seeds which are hemispherical, smooth or sculptured and without retinacula (Imlay 1938, Jiaqi et al. 2011, Adhikari et al. 2013). The pollen of Thunbergaceous plants are spheroidal, with the spiraperturate and the exine ornamentation being psilate,

granulate or rarely baculate. This pollen type is very special in this family and has been considered to represent a primitive condition (Lindau 1893, Bremekamp 1955, Raj 1961, Erdtman 1969, Hong-Pin & Chia-Chi 2005). In Thailand, 13 species were previously reported. Eight species were recorded as *T. coccinea*, *T. erecta*, *T. fragrans*, *T. grandiflora*, *T. hossei*, *T. laurifolia*, *T. nivea* and *T. similis* (Imlay 1938). Later, *T. papilionacea* was reported (Norsaengsri & Tatana 2012). And then the checklist of Thai plant names was made. Eleven species including native and introduced species were enumerated as *T. affinis*, *T. alata*, *T. coccinea*, *T. colpifera*, *T. erecta*, *T. fragrans*, *T. grandiflora*, *T. hossei*, *T. laurifolia*, *T. nivea* and *T. similis* (The Forest Herbarium 2014).

While preparing a treatment of *Thunbergia* for the Flora of Thailand, the beautiful pink flower of this new species attracted our attention.

***Thunbergia impatioides* Suwanph. & S.Vajrodaya, sp. nov.**
— Fig. 1–4; Map 1

Markedly differing from *T. fragrans* Roxb. by having terete stem with 2-furrows (vs 4-angled), terete petiole with a furrow (vs 4-angled), terete pedicel (vs 4-angled), ovate 5–7 nerved bracteoles (vs cordate 10–12 nerved), involute calyx (vs revolute), magenta to pink (vs white), anther theca rounded (vs mucronate theca), stigma magenta to pink (vs white), pollen smaller ($42\text{--}44 \pm 0.67$ vs $54\text{--}56 \pm 0.67$ μm) and reticulate ornamentation on seed surface (vs glabrous with long papillae). — Type: C. Suwanphakdee 523 (holo BKF; iso BK, BKF, K, KKU, L, QBG), Thailand, Kanchanaburi, Srisawat, Khao Pu, Salakpra Wildlife Sanctuary Park, 26 Oct. 2016.

Etymology. The specific epithet refers to the gross appearance of its flower which is quite similar to a common ornamental balsam, *Impatiens walleriana* Hook.f. (Balsaminaceae).

Woody twiner with rootstock, scabrous-strigose in almost all parts. **Stems** several, slender with runners, terete with 2-furrows. **Leaves** light green; petiole, 0.7–1.0 cm long, with a furrow. **Lamina** elliptic to elliptic-oblong, 4.0–4.5 by 1.0–2.0 cm, slightly coriaceous, base cordate or slightly hastate, apex acute or mucronate, margin strigose, veins 5–7, palmate arranged. **Flower** axillary, solitary; salver-form, 3.0–5.0 cm diam, magenta to pink with yellow throat; **pedicel**: 1.5–2.5 cm long, terete; **bracteoles** ovate, 1.5–2.0 by 1.0–1.5 cm, 5–7-nerved, glabrous on adaxial side, base rounded, apex mucronate, margin strigose; **calyx**: longer than ovary, involute, subequal, 13-toothed, 2.0–4.0 mm long; **corolla tube**: slender ventricose, 2.0–3.0 cm

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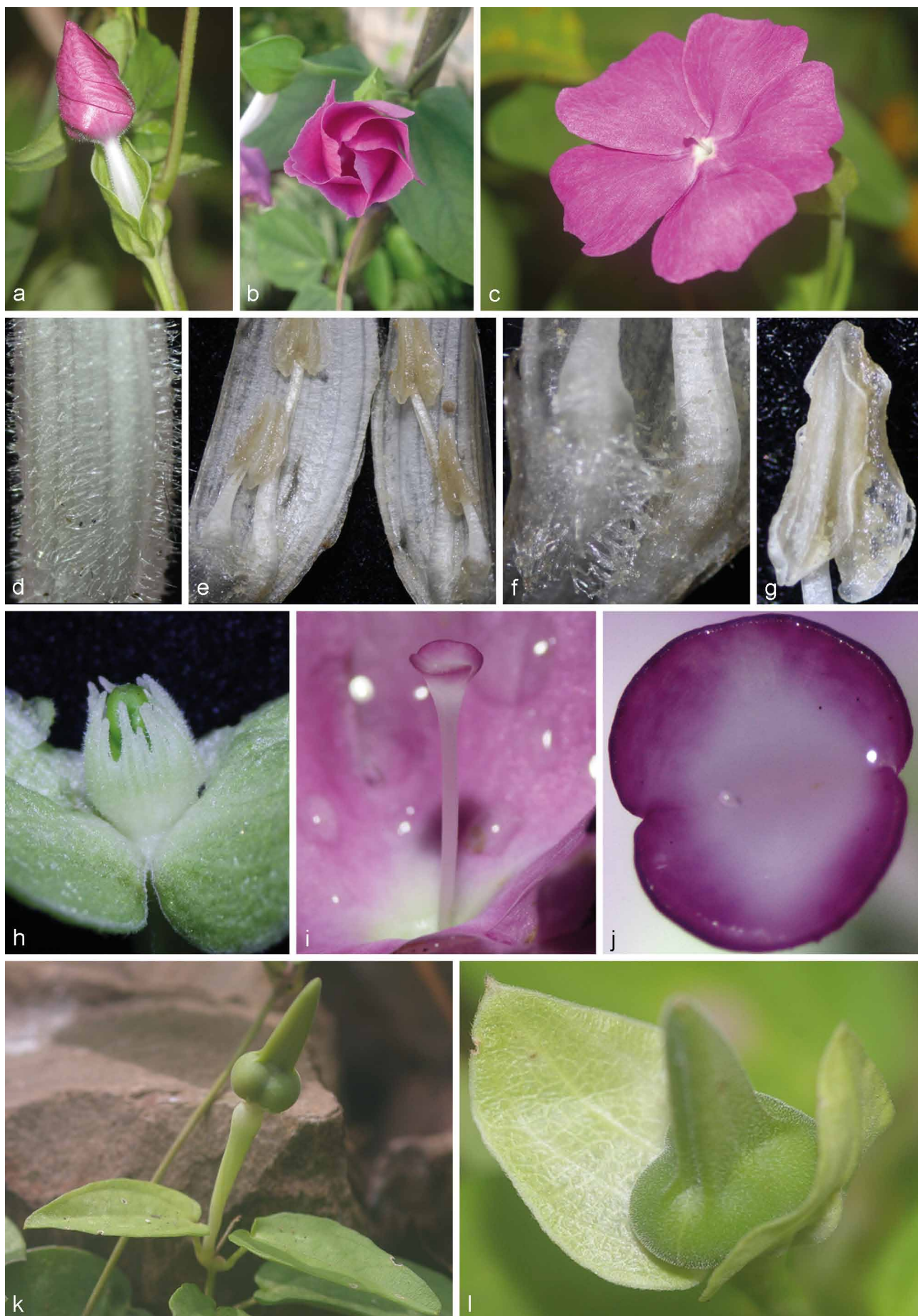


Fig. 1 *Thunbergia impatienoides* Suwanph. & S.Vajrodaya. a–b. Flower bud; c. flower; d. corolla tube with glandular hairs; e. stamens; f. glandular hairs on filament base; g. anther; h. calyx and ovary; i. style and stigma; j. stigma; k. fruit; l. fruit close-up (C. Suwanphakdee 523 (BK, BKF, K, KKK, L, QBG)). — Photos: C. Suwanphakdee.

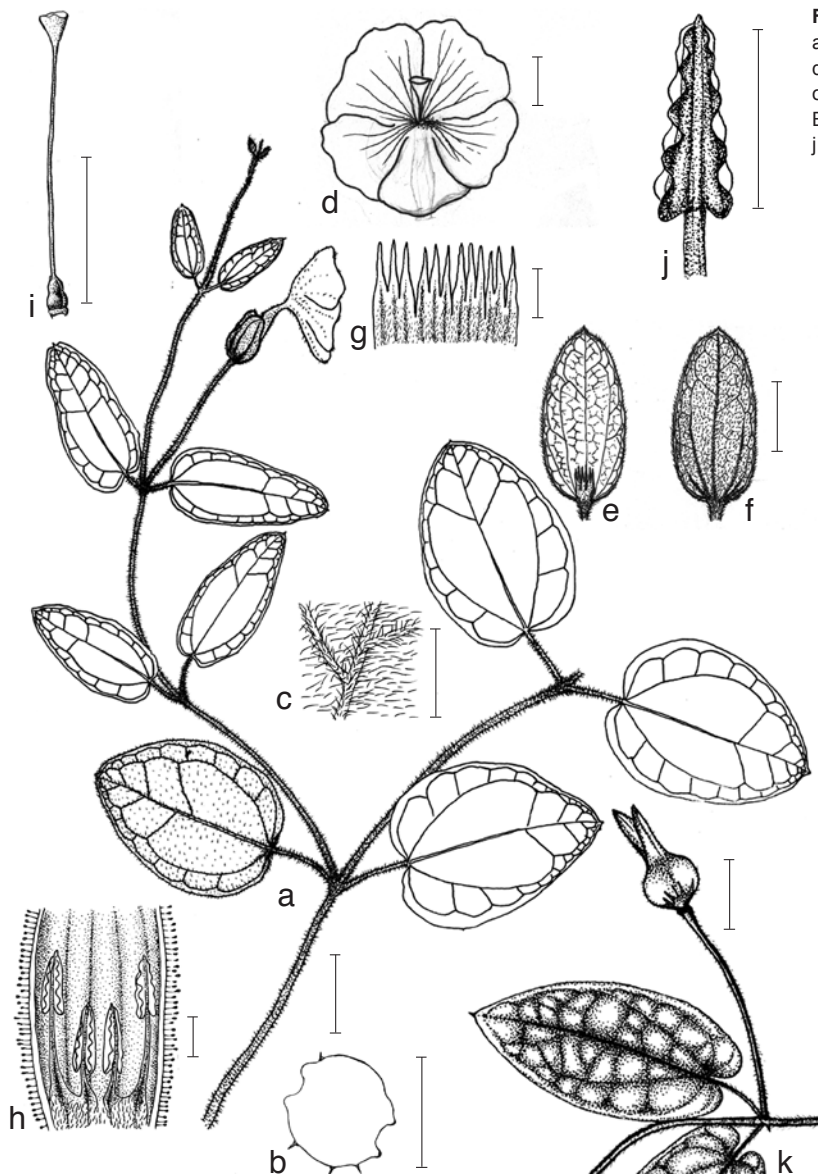


Fig. 2 *Thunbergia impatioides* Suwanph. & S.Vajrodaya. a. Branch with flower; b. cross section of stem; c. part of leaf; d. mature flower; e–f. bracteole (inside and outside); g. calyx; h. part of flower; i. pistil; j. anther; k. fruit (C. Suwanphakdee 523 (BK, BKF, K, KKU, L, QBG)). — Scale bars: a, c–f, i, k = 1 cm; b, g, h, j = 2 mm. — Drawn by T. Srisuk.

long, whitish pale pink, densely glandular hairs outside, glabrous inside; *corolla lobe* fan-shaped, 2.0–2.5 by 1.5–2.0 cm, slightly overlapped, covered with glandular hairs, abaxial surface slightly hirsute, margin repand; *stamens* erect, densely glandular hairs at the filamentous base, basal theca rounded; *shorter stamens* filament c. 3 mm long, anther c. 2 mm long; *longer stamens* 2–3: filament c. 6 mm, anther c. 2 mm long; *disk* thin and white; *pollen grains* in monad, spheroidal, $42\text{--}44 \pm 0.67 \mu\text{m}$ diam with spiraperturate aperture. *Ovary* ovoid with beaked, 2.0–3.0 by 1.0–2.0 mm and forming 4-lobed, style 2.0–2.5 cm long, stigma bilobed, pink or purplish and exsert at anthesis. *Fruit* a capsule, hirsute, basal part 1.0–1.2 by 0.7–0.8 cm, beak 1.3–1.5 cm with pedicel 1.5–2.8 cm long, thick upward. *Seed* globose to subglobose, 3.5–4.0 mm diam, seed coat with regular reticulate ornamentation.

Distribution — Endemic to Thailand (border of northern and western Thailand in Tak province and in western Thailand in Kancharaburi and Ratchaburi provinces).

Habitat & Ecology — In shaded area in dipterocarp and mixed deciduous forests. Flowering: November to January; fruiting: December to February.

Specimens examined. Tak, 18 Jan. 1974, C. Phengklai 3156 (BKF); Ratchaburi, Pho Tharam, Khao Tha Kho, 21 Nov. 1985, G. Staples 318 (BKF); Kancharaburi, Srisawat, Khao Phu, Salakpra wildlife sanctuary, 26 Oct. 2015, C. Suwanphakdee 523 (type).

Notes — Based on gross morphological characters *Thunbergia impatioides* is similar to *T. fragrans* but differ in having runner stems which is unique. The stem is terete with two furrows (one on each side) and the petiole has a furrow. The flower, which is very showy, is always presented as solitary in the leaf axil. It has an attractive and for Asian *Thunbergia* unseen pink colour. The distinguishing flower colour characters are dark purple or magenta in flowering bud and turning to pink when mature. The pedicel is rounded and scabrous. The flower is salver-shaped when mature. The corolla lobe is fan-shaped. The five stamens are uniformly didynamous with two shorter and three longer ones. The base of the theca is rounded (usually spurred in *Thunbergioideae*). The capsule is hirsute and not glabrous and waxy as in *T. fragrans* (compared in Table 1). The seed of both species are similar but the surface is reticulate in *T. impatioides* and long papillate in *T. fragrans* (Fig. 3). The pollen grains are spheroidal monads. The aperture is spiraperturate which is the common character of *Thunbergia*. The pollen ornamentation is baculate with fossula. The difference of pollen morphology between *T. impatioides* and related species is the size ($42\text{--}44 \pm 0.67 \mu\text{m}$ vs $54\text{--}56 \pm 0.68 \mu\text{m}$) which significantly supports *T. impatioides* to be new to science. The pollen morphological characters of both species are shown (Fig. 4).

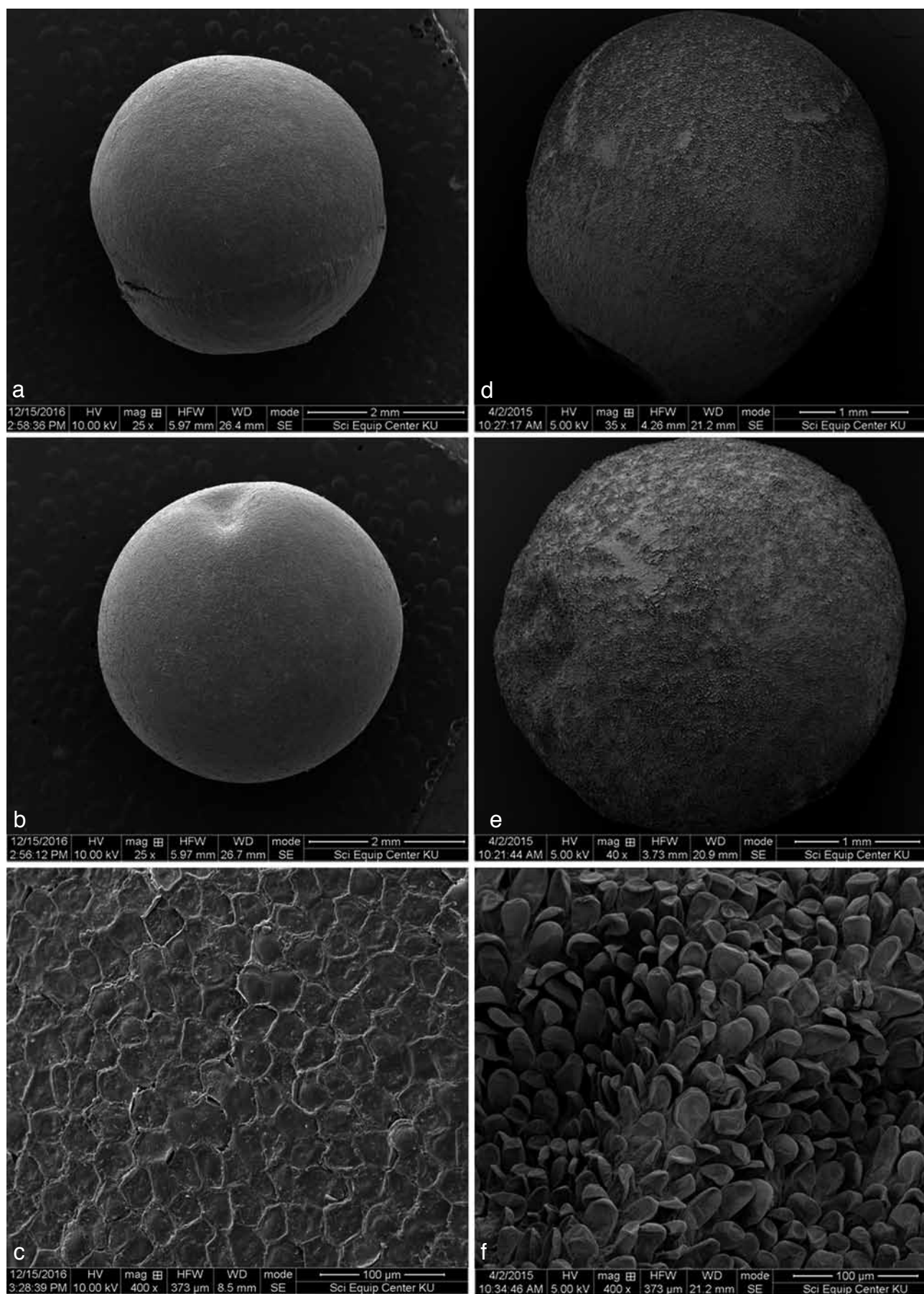


Fig. 3 Seed morphology of a–c: *Thunbergia impatienoides* Suwanph. & S.Vajrodaya. a, b. Seed (size and top views); c. reticulate ornamentation on seed surface. — d–f: *Thunbergia fragrans* Roxb. d, e. Seed (size and top views); f. long papillae on seed surface (a–c: *C. Suwanphakdee* 523 (BK, BKF, K, KKK, L, QBG); d–f: *C. Suwanphakdee* 511 (BK, BKF, KKK, QBG)).

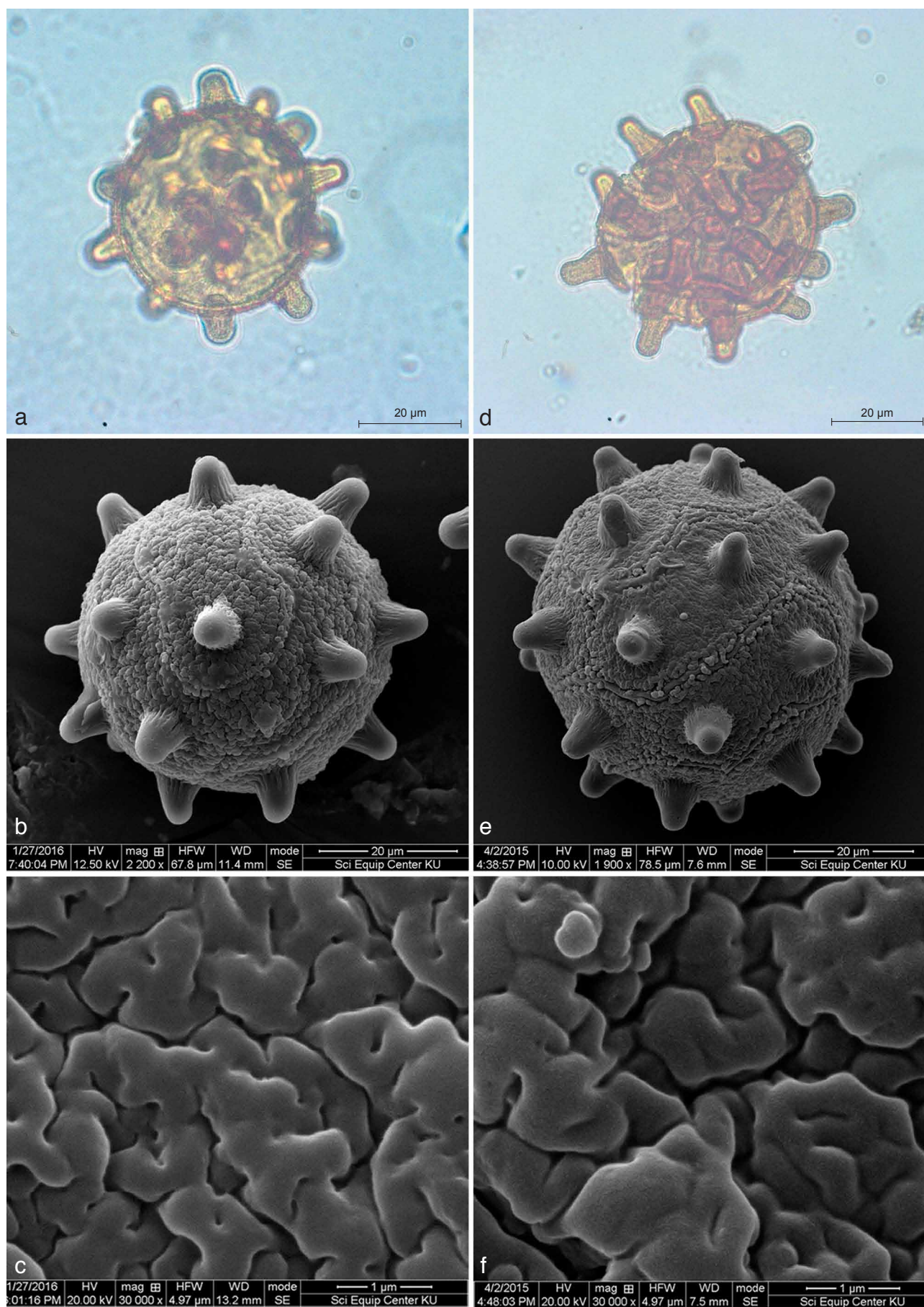
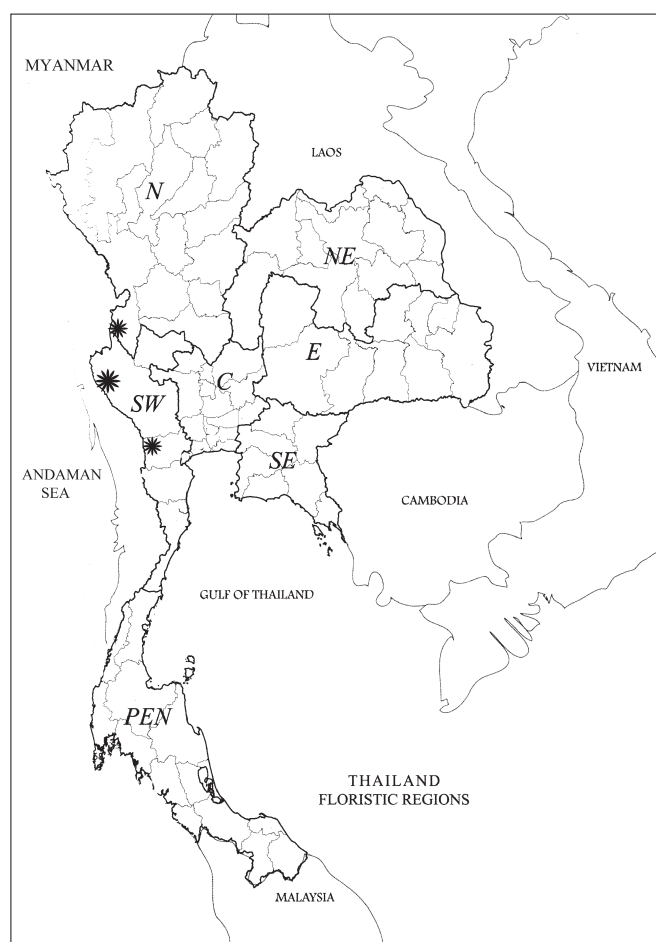


Fig. 4 Pollen morphology. a–c: *Thunbergia impatioides* Suwanph. & S.Vajrodaya. a. Pollen from light microscope; b. pollen from SEM; c. fossula. — d–f: *Thunbergia fragrans* Roxb. d. Pollen from light microscope; e. pollen from SEM; f. fossula (a–c: *C. Suwanphakdee* 523 (BK, BKF, K, KKU, L, QBG); d–f: *C. Suwanphakdee* 511 (BK, BKF, KKU, QBG)).

Table 1 Comparison between *Thunbergia fragrans* and *T. impatioides*.

Character	<i>T. fragrans</i>	<i>T. impatioides</i>
Stem	4-angled or forming 4-winged, hirsute	terete with 2 furrows, scabrous and strigose
Petiole	4-angled, hirsute	terete with a furrow, scabrous and strigose
Leaf	scabrous with short and long hairs	scabrous and strigose
Pedice	1.5–2.5 cm long, 4-angled or slightly 4-winged, glabrescent	3.5–4.0 cm long, rounded, scabrous
Flower	solitary, paired up to 4 or fascicled, white	always solitary, magenta to pink
Bracteoles	0.8–1.2 by 1.5–1.8 cm, cordate with 10–12-nerved, glabrescent on abaxial	1.0–1.5 by 1.5–2.0 cm, ovate with 5–7-nerved, scabrous and strigose on abaxial
Calyx	much longer than ovary, 11–14-toothed and revolute, 4.0–5.0 mm long, scabrous	subequal or shorter than ovary, 13-toothed and involute, 2.0–4.0 mm long, scabrous
Corolla tube	2.0–4.0 cm long, white, sparsely glandular hairs or glabrescent	2.0–3.0 cm long, whitish pale pink, densely glandular, hairs
Corolla lobe	obovate	fan-shaped
Stamen	sparsely glandular hair or glabrescent	densely glandular hairs
Filament	didynamous, slightly glandular hairs at the base	didynamous or 5 with 2 short and 3 long, densely glandular hairs at the base
Theca	mucronate at base	rounded at base
Pollen	54–56 ± 0.68 µm	42–44 ± 0.67 µm
Stigma	white	pink or purplish
Fruit	glabrous	hirsute
Seed	glabrous with long papillae	reticulate ornamentation

**Map 1** Distribution of *Thunbergia impatioides* Suwanph. & S.Vajrodaya.

Acknowledgements We thank the directors, curators and staff of herbaria (AAU, BK, BKF, BM, BO, C, G, G-DC, K, K-W, KEP, KKK, L, QBG, SING, TCD) for permission to study the specimens and references. We would like to thank Mr. Teerawut Srisuk for the line drawings and Dr. Piyakaset Suksathan (QBG) and Prof. Dr. Henrik Balslev (AAU) for useful comments. This work was supported by Thailand Research Fund (TRF) no. TRG5780290 and Research and Development Kasetsart University Institute, Kasetsart University.

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