

A REVISION OF THE INDOCHINESE–MALESIAN GENUS STROPHIOBLACHIA (EUPHORBIACEAE)

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SUMMARY

The genus *Strophoblachia* Boerl. is very variable, but does not show any gaps in characters, which can be used for a further delimitation of taxa. This is shown for characters like habit, leaf blade shape, leaf blade base, staminate petals and disc lobes, bracts, and the fimbriae of the pistillate calyx. The characters show their differences on the same specimen (e.g., leaf shape), within the same area (e.g., size and number of staminate petals), or in different areas of the distribution range (e.g., efrimbriate pistillate calices in China, Thailand, and Sulawesi). Therefore, the formerly recognized species and varieties are united into a single accepted species, *S. fimbriicalyx*.

INTRODUCTION

Boerlage (1900) described the genus *Strophoblachia* with the single species *S. fimbriicalyx*, for which he used material from Sulawesi. *Strophiola* refers to the caruncle present on the seed, and *blachia* refers to the resemblance with the Euphorbiaceae genus *Blachia* Baill. Pax (1911) introduced a second species, *S. glandulosa*, based on material collected by Pierre in Cochinchina.

Later on three varieties were added. Airy Shaw (1971) assigned the variety *efimbriata* (China) to *S. fimbriicalyx*, and var. *cordifolia* to *S. glandulosa* (Thailand), and within the latter species Gagnepain (1926) described the variety *tonkinensis* (Vietnam). The latter variety has been regarded as a synonym of *S. fimbriicalyx* (Airy Shaw, 1971).

Airy Shaw (1971) considered both species to be distinct. According to him *S. fimbriicalyx*, with its smoother more shining leaves, occupies a distinctly different distribution (widespread from China to Vietnam to Indonesia and the Philippines) than *S. glandulosa*, which is restricted to SE Thailand and Kampuchea (and/or Cochinchina).

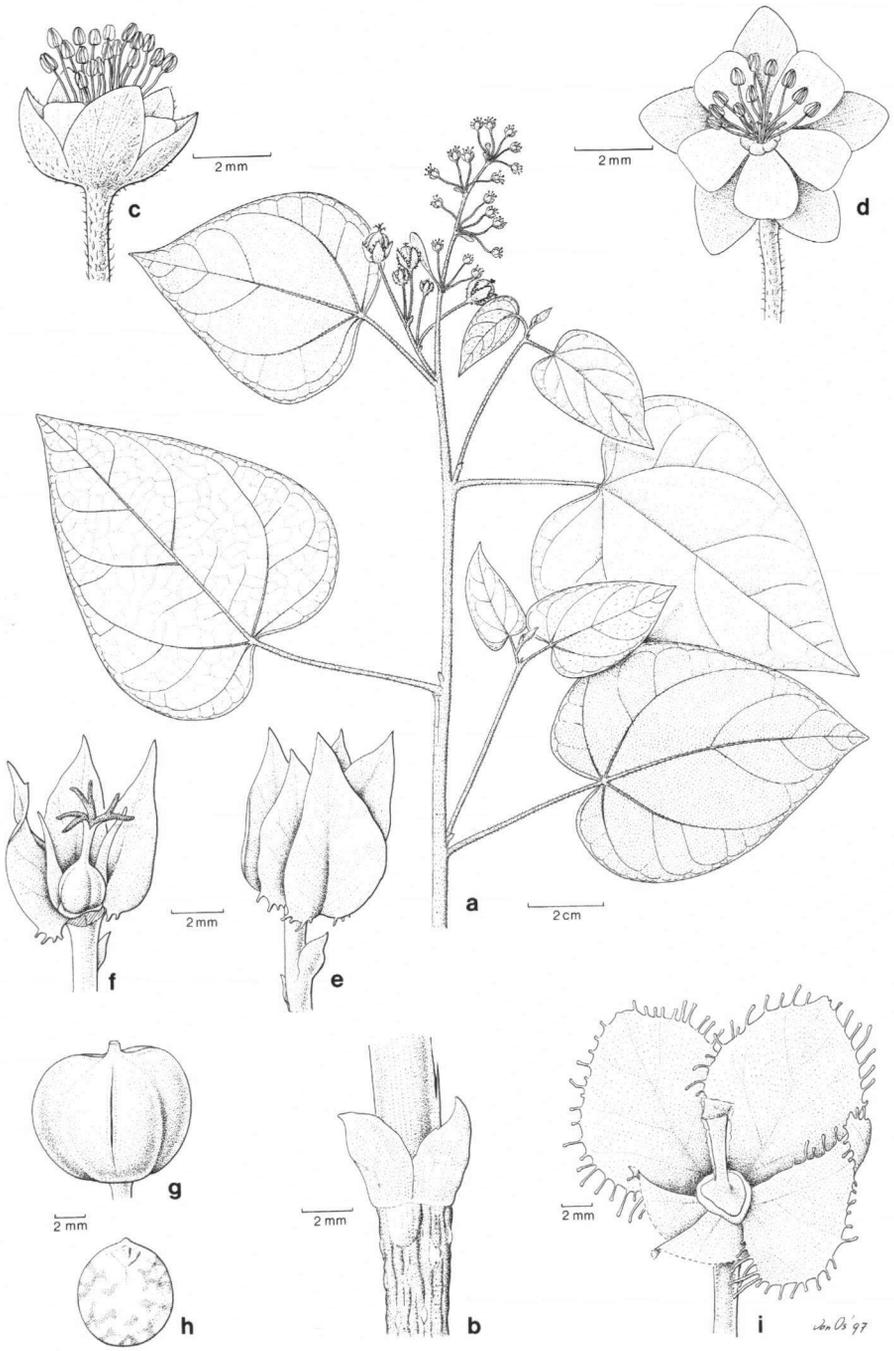
The present study will show that *Strophoblachia* is extremely variable without showing distinct demarcation lines between different character states. Thus, our conclusion will be that only one species can be recognized and no other (infraspecific) taxa.

Strophoblachia is placed by Webster (1994) in the tribe Codieae (subfam. Crotonoideae), based on the pollen type, presence of endosperm, simple hairs, imbricate sepals, number of stamens, terminal inflorescences, and unlobed leaves without glands.

Typical for the genus are the absence of stipulae; persistent bracts at the base of side branches; monoecy; the short, mainly terminal, 'racemose' inflorescences; the 5-merous flowers with imbricate sepals, of which the pistillate ones are accrescent in fruit and usually possess long glandular fimbriae along the margin; the presence of petals in staminate flowers and the absence of them in pistillate flowers (with exceptions

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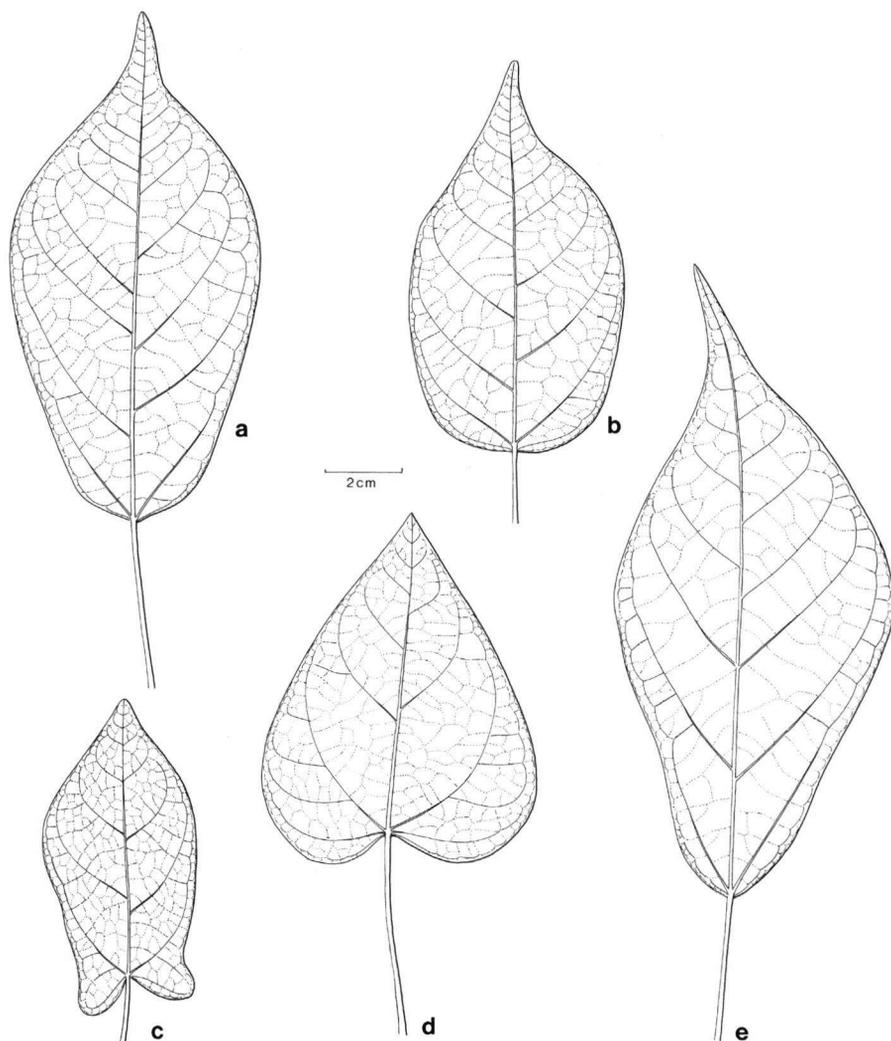


Fig. 2. *Strophoblachia fimbriicalyx* Boerl. – Different leaf shapes and bases: a. obovate, truncate; b. elliptic, truncate; c. panduriform, emarginate; d. ovate, emarginate; e. obovate, suddenly widened above the middle, rounded [all L; a: Merrill 11564; b: PNH (Britton 115) 19417; c: Maxwell 76-104; d: Maxwell 75-169; e: PNH (Kondo & Edaño) 36890].

Fig. 1. *Strophoblachia fimbriicalyx* Boerl. a. Habit; b. bud bracts at base of side branch; c. & d. staminate flower; e. pistillate flower; f. pistillate flower with a few sepals removed showing the exceptional presence of a few petals; g. fruit; h. seed; i. column with persistent calyx after fruit dehiscence [all L; a, c, d: Maxwell 75-169; b: PNH (Britton 115) 19417; e, f: Forsten s.n.; g, h: Bogor Botanical Garden IV.J.A.XX-3; i: BS (McGregor) 32273].

in both sexes); the presence of a disc (pistillate flowers) or disc lobes (staminate flowers); many (20–50) stamens; a 3-locular ovary; lobed, glabrous fruits; carunculate, marbled seeds with endosperm.

Especially the absence of stipulae is noteworthy, they or their scars could not be detected. Just above the petiole a quite large axillary bud can be found, which may be mistaken for a pair of stipulae because the bud is well protected by 2 quite hard bracts. These bracts are persistent for a long time after development of the side branch giving the branches a very typical, somewhat untidy appearance (Fig. 1).

VARIABILITY IN THE GENUS STROPHIOBLACHIA

The variability in the genus as used for the delimitation of taxa, is not only between the supposed two species, but also between plants from different regions, different plants of the same region, and even between parts of the same plant.

The habit varies between very small or herb-like shrubs in Thailand to large(r) shrubs and treelets in the other areas. The Thai specimens are from areas which are regularly burnt and their thick roots indicate that they could be much larger plants if fire would be absent.

The leaf shape (Fig. 2) is very variable, from panduriform (= violin-shaped; mainly Thailand and Vietnam, Fig. 2c) to ovate (throughout whole range, including specimens with panduriform leaves, Fig. 2d) to more elliptic (Fig. 2b) to obovate (mainly Philippines and Sulawesi, but also some panduriform specimens, Fig. 2a) to obovate and suddenly broadened above the middle (Philippines, Fig. 2e). Likewise, Fig. 2 shows the differences in shape of the leaf base, which varies from emarginate (Fig. 2d) to truncate (Fig. 2b) to rounded (Fig. 2e). The cordate (or panduriform) leaf form was described as a separate variety for Thailand, but as the shape occurs in other areas too and as the different shapes gradually merge into each other, the variety cannot be distinguished and has to be synonymised.

The differences between *S. fimbriicalyx* and *S. glandulosa* as mentioned by Airy Shaw (1971) could not be observed, both species have smooth and rather dull leaves

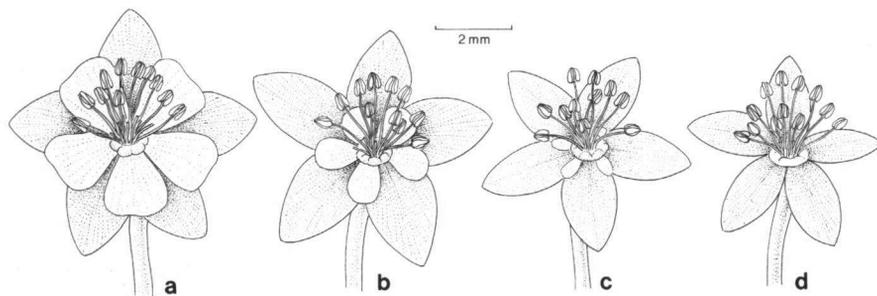


Fig. 3. *Strophoblachia fimbriicalyx* Boerl. — Staminate flowers: a. petals well-developed, disc lobes shallowly lobed; b. petals much smaller, disc lobes much deeper lobed; c. petals very small, disc lobes almost completely bisected; d. petals absent, disc lobes completely cleft [after drawings made by Nguyen Nghia Thin & Vu Hoai Duc].

and *S. fimbriata* is not shinier and smoother than the *S. glandulosa* specimens. However, the Thai material, which is attributed to *S. glandulosa*, usually has more hairy leaves and bud bracts, though these are exceptionally encountered in the Philippines as well.

The arrangement of the staminate flowers is also variable. Usually they occur in simple short racemes, but in Vietnam solitary flowers were found, while in Thailand several inflorescences appeared to be thyriform, with several staminate flowers grouped on racemously placed cymules.

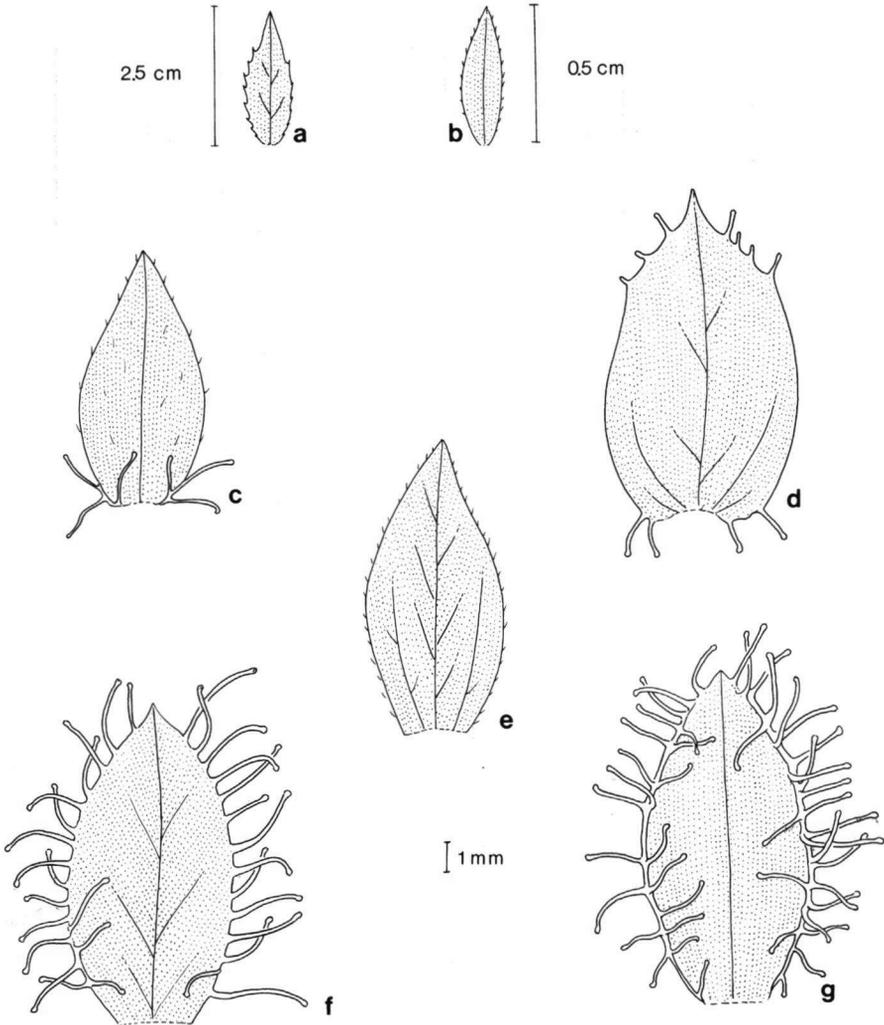


Fig. 4. *Strophoblachia fimbriicalyx* Boerl. – Bracts and sepals of pistillate flowers. Bracts: a. Leaf-like; b. bract-like. – Sepals: c. with basal glandular trichomes; d. with apical and basal glandular trichomes; e. trichomes absent; f. margin completely covered with a single row of glandular trichomes; g. idem, double row of trichomes; margins variably hairy [after drawings made by Nguyen Nghia Thin & Vu Hoai Duc].

The staminate flowers usually possess 5 sepals, 5 petals, 5 bilobed disc lobes, and c. 30 stamens. However, the petals are very variable in size (Fig. 3) and they can occasionally even be absent (Fig. 3d). The disc lobes can be shallowly (Fig. 3d) to deeply lobed (Fig. 3b) or they can be split completely and appear as 10 separate disc lobes (Fig. 3c).

The pistillate flowers usually show 5 sepals, a circular disc, and a 3-locular ovary. Very characteristic (and used to provide the name for the epithet) are the long glandular fimbriae along the margins of the sepals. However, these can be very variable (Fig. 4). They may sometimes appear in double rows (Fig. 4g), but usually appear as a single row (Fig. 4f), they may be restricted to the basal part of the sepals (Fig. 4c), or they may be completely absent (and then the sepals have hairy margins, Fig. 4e). The almost efimbriate specimens were described as a separate variety for China (Fig. 4d). However, specimens with few fimbriae can also be found in Thailand and completely efimbriate specimens are found in Sulawesi. These three groups are very disjunct and do not form a breeding community. It seems likely to assume that the loss of fimbriae has occurred and may occur more often and, therefore, this feature does not merit any taxonomic destination. *Forsten s.n.* from Sulawesi even shows branches (though not connected to each other) with fimbriate and efimbriate sepals. The *Forsten s.n.* material was also exceptional because several (efimbriate) flowers possessed petals. These were similar in shape to the sepals but smaller. The bracts are also variable, from the usual leaf-like shape to a more bract-like shape (Fig. 4a and b, resp.).

The above discussion will hopefully have shown that it is more or less impossible to distinguish different taxa. Therefore, we are obliged to unite the two species and the various varieties into one species.

STROPHIOBLACHIA

Strophoblachia Boerl., Handl. Fl. Ned. Indië 3, 1 (1900) 235; Pax & K. Hoffm. in Engl., Pflanzenr. IV.147, iii (1911) 35; Merr., Enum. Philipp. Flow. Pl. 2 (1923) 455; Gagnep. in Lecomte, Fl. Indo-Chine 5 (1926) 408; Airy Shaw, Kew Bull. 37 (1982) 36; Alph. Enum. Euphorb. Philipp. Is. (1983) 45; G.L. Webster, Ann. Missouri Bot. Gard. 81 (1994) 107. — Type species: *Strophoblachia fimbriicalyx* Boerl.

Small shrub to treelet, monoecious. *Indumentum* consisting of simple hairs, glabrescent. *Stipules* absent, but bracts of axillary buds persistent and stipule-like, glabrous to hairy, stiff chartaceous. *Leaves* simple, alternate; petiole not to basally and apically slightly pulvinate; blade panduriform to cordate to obovate, papery, symmetric, not punctate; base emarginate to rounded; margin entire, flat; apex acuminate to caudate, very apex rounded to acute; venation pinnate, basally with 2 (or 4 when cordate or panduriform) footnerves, nerves looped and closed near the margin, veins and veinlets indistinctly reticulate. *Inflorescences* terminal racemes to thyrses, either staminate (with up to more than 10 flowers, each alternate or up to 5 per cymule), pistillate (up to 5 flowers, often more per node), or mixed with the pistillate flowers basally and the staminate ones apically, the latter appearing later, axes short, glabrous to pilose, glabrescent. *Bracts* ovate to usually obovate and leaf-like, pilose with simple cilia or glandular hairs. *Flowers* actinomorphic, petals shorter than sepals; sepals 5, imbricate, free, ovate. *Staminate flowers*: sepals hairy to glabrous; petals (0 or) 5, reduced to

fully developed, obovate or obdeltoid, glabrous, membranous; disc lobes episepalous, 5 (or 10), bilobed, trilobed, or separate, glabrous; stamens 15–50, filaments filiform, often adnate to others, glabrous, anthers basifixed, 2-locular, opening latero-extrorse with a longitudinal slit; pistillode absent. *Pistillate flowers*: sepals glabrous except when young, 5-nerved, margin usually fringed with long glandular fimbriae in 1 (or 2) rows, when (partly) absent margin densely pilose or subglabrous; petals absent (to seldom present and sepal-like); disc ring-like, glabrous; ovary glabrous, 3- (or 4-) locular, ovules one per locule; style present, short; stigmas split except for the basal part, spreading horizontally, glabrous above, few hairs present, persistent. *Fruit* a 3- (or 4-)lobed rhagma, outside and inside glabrous, dehiscent septically and loculicidally; wall thin, woody; pedicel elongated; sepals persistent, accrescent, glabrous; column after dehiscence basally slightly thickened, apically somewhat broadened with 3 or 4 traces of veins per septum, margins with narrow fibrous strips of septa remnants. *Seeds* usually 3 per fruit, marbled, carunculate, endotesta fibrous. *Embryo* flat, erect, anatropous, surrounded by copious endosperm.

Distribution — Monotypic, found in SE Asia mainland (S China, Thailand, Kampuchea, Vietnam) and Malesia: Philippines and Sulawesi.

***Strophoblachia fimbricalyx* Boerl. — Fig. 1–4, Map 1**

Strophoblachia fimbricalyx Boerl., Handl. Fl. Ned. Indië 3, 1 (1900) 236, 284; Merr., Philipp. J. Sci., Bot. 4 (1909) 284; Pax & K. Hoffm. in Engl., Pflanzenr. IV.147, iii (1911) 36; IV.147, v (1912) 285; Merr., Enum. Philipp. Flow. Pl. 2 (1923) 455; Airy Shaw, Kew Bull. 25 (1971) 544; Anonymous, Icon. Corm. Sinic. 2 (1972) 609, f. 2948; Airy Shaw, Kew Bull. 37 (1982) 36; Alph. Enum. Euphorb. Philipp. Is. (1983) 45; Hô, P.H., Ill. Fl. Vietnam 2 (1992) 348, f. 4362. — *Strophoblachia fimbricalyx* Boerl. var. *fimbricalyx*: Airy Shaw, Kew Bull. 25 (1971) 544. — Neotype (selected here): *Forsten s.n.* (holo L, barcode L 0023492; iso L, barcodes L 0023493–6), Sulawesi.

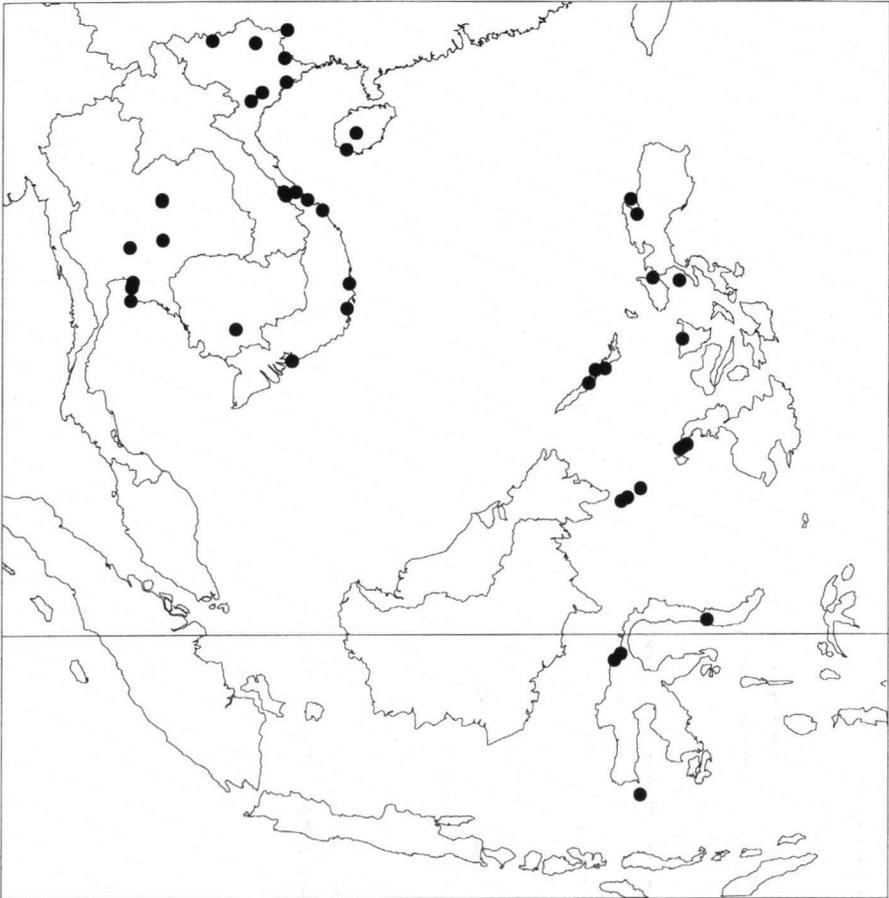
Strophoblachia glandulosa Pierre ex Pax in Pax & K. Hoffm. in Engl., Pflanzenr. IV.147, iii (1911) 36, f. 10; Gagnep. in Lecomte, Fl. Indo-Chine 5 (1926) 409, f. 48: 1–4; Airy Shaw, Kew Bull. 25 (1971) 544; Kew Bull. 26 (1972) 341; Hô, P.H., Ill. Fl. Vietnam 2 (1992) 348, f. 4363. — *Strophoblachia glandulosa* Pax var. *glandulosa*: Airy Shaw, Kew Bull. 25 (1971) 544. — Type: *Pierre 588* (holo P; iso BO, UC), Cochinchina (Kampuchea / Cambodia), Prov. Tpong (= Shrok Thpong).

Strophoblachia glandulosa Pierre ex Pax var. *tonkinensis* Gagnep. in Lecomte, Fl. Indo-Chine 5 (1926) 410. — Syntypes: All Vietnam (all P): *d'Alleizette 456*, Quang-yen; *Balansa 707*, Tankeuin; *Bon 1967 & 2083*, Kien-khé; *Bon 2571*, Lat-son; *Eberhardt 1542*, Thua-thien; *Eberhardt 3232*, Langson; *Eberhardt 4537 & 4550*, Prov. Bac-kan, Cho-moi; *Eberhardt 4750*, Prov. Bac-kan, Ba Be; *Pétélot 832*, Cho-ganh; *Poilane 1235*, Quang-tri Prov., Huyen-huong-hoa; *Poilane 1654*, Prov. de Thanh-hoa, Phong-y; *Poilane 4692*, Nha-trang; *Poilane 10407*, Quan-tri Prov., Dent du Tigre; *Poilane 10496*, Quan-tri, Dong-ché.

Strophoblachia fimbricalyx Boerl. var. *efimbriata* Airy Shaw, Kew Bull. 25 (1971) 544. — Type: *Morse 435* (holo K), China, Kwangsi Prov., Lungchow.

Strophoblachia glandulosa Pierre ex Pax var. *cordifolia* Airy Shaw, Kew Bull. 25 (1971) 545; Kew Bull. 26 (1972) 34. — Type: *Kerr 20481* (holo K), Thailand, SE Region, Rachasima Circle, Ban Pai, Kawn Ken (near Korat).

Small shrub to treelet, up to 2 m high, dbh up to 5 cm; flowering branches 1.5–3 mm thick, smooth, glabrescent. *Bark* rough. *Leaves*: petiole 0.5–7 cm long, glabrous to pilose, glabrescent; blade 6–19 by 1.3–9.5 cm, index 2–2.3, glabrous to subpilose



Map 1. Distribution of *Strophoblachia fimbricalyx* Boerl.

and glabrescent on lower surface, venation flat above, raised below, nerves 6 or 7 per side between footnerves and apical sinus. *Inflorescences* up to 7 cm long, axes green. *Bracts* up to 13 by 2.5 mm. *Staminate flowers* 4–4.5 mm in diam.; pedicel 5–20 mm long, subpilose; sepals 3–4 by 2–3.5 mm, (green to) cream-white, glabrous when older; petals (0–)1–2.8 by (0–)1.2–3.8 mm; disc lobes 0.7–1.2 by 0.3–0.8 mm; stamens white to light yellow, filaments 1.8–2.8 mm long, anthers 0.3–0.6 by 0.3–0.5 mm. *Pistillate flowers* 5–15 mm in diam.; pedicel up to 13 mm long; sepals and fimbriae green to pale yellow, blade 4–8.5 by 2.8–4 mm, fimbriae up to 1 mm long; (petals ovate to elliptic, c. 4.5 by 2 mm); ovary 1.2–2 by 1.7–2 mm; style 0.9–2 mm long, stigmas 2.5–4.5 mm long, united in lower 0.5–1.4 mm. *Fruit* 11–13 by 8–10 mm, dark brown when dry, (dark) green when fresh, wall less than 1 mm thick; pedicel up to 23 mm long; sepals 12–15 by 7.5–10 mm with the fimbriae up to 4.2 mm long; column after dehiscence 6.5–7 mm long. *Seeds* ± globose, 6–7 by 5.5–6 by 4.5–5 mm. *Embryo* seen immature.

Distribution — Thailand (NE, C, SE), China (Kwangsi), Kampuchea (Shrok Thpong), Vietnam, and Malesia: Philippines and Sulawesi. A typical dry monsoon distribution.

Habitat & Ecology — Solitary to common plant, usually found in secondary forest, but also at the margin of primary forest, in dry dipterocarp forest, deciduous forest, and (occasionally burned) bamboo forest. Soil: rocky, calcareous or sand. Altitude: sea level up to 250 m. Flowering and fruiting almost the whole year through (less so in Nov.–Jan.).

Vernacular names — Philippines: Sallapigo, salsaligau (Iloko; Merrill, 1923).

Uses — In the Philippines, Mindoro, dry seeds are used in fermented drinks.

ACKNOWLEDGEMENTS

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REFERENCES

- Airy Shaw, H.K. 1971. Notes on Malesian and other Asiatic Euphorbiaceae. CXLIII. Notes on *Strophoblachia* Boerl. Kew Bull. 25: 544, 545.
Boerlage, J.G. 1900. Handleiding tot de kennis der Flora van Nederlandsch Indië 3, 1: 235, 236, 284. Leiden.
Gagnepain, F. 1926. Euphorbiacées. In: M.H. Lecomte (ed.), Flore Générale de l'Indo-Chine 5: 408–410, f. 48: 1–4. Paris.
Pax, F. 1911. Euphorbiaceae-Cluytieae. In: A. Engler (ed.), Das Pflanzenreich IV.147, iii: 35, 36, f. 10. Leipzig.
Webster, G.L. 1994. Synopsis of the genera and suprageneric taxa of Euphorbiaceae. Ann. Missouri Bot. Gard. 81: 107.

IDENTIFICATION LIST

All specimens are identified as *Strophoblachia fimbricalyx* Boerl.

- d'Alleizette 456.
Balansa 707 — van Balgooy & van Setten 5687 — Bogor Botanical Garden VIII-F-43; VIII-F-43a; XV.JA.XX-3; XV.KBXIX-4 — Bon 1967; 2083; 2571; 2707; 2909 — BS 241; 32273; 44298; 44312.
J. & M.S. Clemens 4384 — M.S. Clemens 4930; 18144.
Docters van Leeuwen 1879.
Eberhardt 1542; 3232; 4537; 4550; 4750.
FB 4504; 31151.
Hennipman 5020 — How 70758.
de Joncheere 1025; 1030.
Kerr 20481; 20688.
Lakshnakara 1055 — Lau 259.
Maxwell 74-830; 75-169; 76-35; 76-104 — Merrill 11564 — Morse 435.
Pétélot 832; 923 — Pierre 588 — PNH 19417; 36890 — Poilane 1235; 1654; 4692; 5221; 7869; 10471; 10496; 24860.
Smitinand 12403 — Soejarto & Reynoso 6321 — Squires 339.
Vidal y Soler 1716; 1719; 3700 — de Vogel 5023.
Wang 35141 — Warburg 14818.