

Three new species of *Syzygium* Gaertn. (Myrtaceae) from Cambodia and Vietnam

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Three new species of *Syzygium* Gaertn. (Myrtaceae) from Cambodia and Vietnam

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new species.

MOTS CLÉS

Myrtaceae,
Vietnam,
Cambodia,
Khánh Hòa,
sanctuaire de vie sauvage
Phnom Samkos,
Poilane,
espèces nouvelles.

ABSTRACT

Three new species of *Syzygium* Gaertn. (Myrtaceae) are described and illustrated for Indochina, two from Vietnam and one from Cambodia. *Syzygium quoctrianum* W.K. Soh, H.V.Sam & J.Parn., sp. nov. and *Syzygium samianum* W.K. Soh & J.Parn., sp. nov. are from Khánh Hòa province, Vietnam, and *Syzygium veal* W.K. Soh, H.V.Sam & J.Parn., sp. nov. was discovered in Phnom Samkos Wildlife Sanctuary, Cambodia.

RÉSUMÉ

Trois espèces nouvelles de Syzygium Gaertn. (Myrtaceae) du Cambodge et du Vietnam.

Trois espèces nouvelles de *Syzygium* Gaertn. (Myrtaceae) sont décrites et illustrées pour l'Indochine, deux du Vietnam et une du Cambodge. *Syzygium quoctrianum* W.K. Soh, H.V. Sam & J.Parn., sp. nov. et *Syzygium samianum* W.K. Soh & J.Parn., sp. nov. sont originaires de la province de Khánh Hòa, Vietnam; *Syzygium veal* W.K. Soh, H.V. Sam & J.Parn., sp. nov. a été découverte dans le sanctuaire de faune de Phnom Samkos, au Cambodge.

INTRODUCTION

Syzygium Gaertn. is the largest genus in the Myrtaceae Juss. with c. 1200 species (Parnell *et al.* 2007; World Flora Online Plant List 2023) of mainly trees occurring in the tropics and subtropics from Africa to the Pacific Islands. The Southeast Asian region is the most species-rich for *Syzygium* with much morphological heterogeneity. *Syzygium* is also one of the most common tree genera in the Old World tropics and hence an important ecological component of many tropical forest ecosystems, e.g. food resources for wildlife from nectar, pollen and fleshy fruit (Parnell *et al.* 2007). In mainland Southeast Asia, *Syzygium* is found in diverse habitats ranging from lowland to highland, along flowing bodies of water and in various forest types (Chantaranothai & Parnell 2002; Soh & Parnell 2015).

The genus in Indochina was first revised by François Gagnepain for the *Flore Générale de l'Indochine* (Gagnepain 1921) as *Eugenia* L. s.l. In Gagnepain's (1921) revision, which covered the presently recognised political boundaries of Cambodia, Laos, Vietnam, part of the Mekong basin in Thailand and Zhanjiang in South China, 55 species were recognised. Merrill & Perry (1938) updated the Indochinese checklist under *Syzygium* based on original material supplied by Gagnepain and new collections by Paul Pételot. Thereafter, a substantial amount of herbarium material was collected following a revival of botanical activities in the region after the Second World War. After a gap of more than seven decades, Soh and Parnell published a revised account of the Indochinese *Syzygium* in 2015 which included specimens collected between the 1940s and 2010 (Soh & Parnell 2015). This research has facilitated subsequent discovery of new species in the region in other recent floristic studies, e.g. since then seven new species of *Syzygium* have been published (Tagane *et al.* 2015, 2018; Chantaranothai *et al.* 2016). This highlights the fact that much of the region's flora still awaits discovery and/or formal description. During our study of materials for the upcoming Flora of Cambodia, Laos and Vietnam (FCLV), we found over 200 specimens of *Syzygium* at the herbarium of the Muséum national d'Histoire naturelle (P) collected by Eugène Poilane that were not available at the time of the previous revision. Before the renovation of P and the reconditioning of its specimens between 2008 and 2012 (Le Bras *et al.* 2017), these specimens were likely not yet incorporated into the main collection and therefore were overlooked in our previous study. These *Syzygium* specimens were collected between 1919 and 1947, exist as a large number of duplicates and are unannotated. The herbarium labels bear a typical hallmark of Poilane's work ethic – as they are highly informative, complete with description of the plant, locality, ecological information, vernacular names, traditional uses and various comments arising from his observations (Burgos & Carré 2021). The wealth of information in this collection is important for the forthcoming FCLV because earlier works had relied largely on herbarium specimens with poor often scant label information.

Amongst Poilane's collections and other collections gathered after 2010, we discovered three morphologically distinct taxa

which did not bear a resemblance to any known species of *Syzygium* in Cambodia, Laos and Vietnam or the surrounding areas and are therefore described here as new to science. The descriptions and keys to all *Syzygium* species in Cambodia, Laos and Vietnam will be presented in the FCLV revision of Myrtaceae which is currently in preparation.

MATERIAL AND METHODS

Over 900 type specimens of *Syzygium* were compared with the specimens of the new species. The type specimens were either examined from the original materials (BK, BKF, BM, K, L, KEP, P, SING and TCD) or digital images (downloaded from *Global Plants* database, *Botanical Survey of India Phanerogams Type* database and individual herbaria from e.g. A, BM, GH, HITBC, K, KAG, KYO, L, P and TAIF). Additionally, non-type specimens were also examined as part of the ongoing FCLV revision of Myrtaceae and these were largely original materials from A, BK, BKF, BM, CPNP, E, GH, HN, K, KEP, L, NY, P, TCD, U and VFU. With the exception of floral parts, all macromorphological measurements were made from dried herbarium specimens. Floral measurements were made from rehydrated herbarium flowers. All other information was extracted from herbarium labels.

TAXONOMIC TREATMENT

Family MYRTACEAE Juss.

Genus *Syzygium* Gaertn.

Syzygium quoctrianum

W.K.Soh, H.V.Sam & J.Parn., sp. nov.

(Fig. 1)

Similar to *Syzygium lineatum* (DC.) Merr. & L.M.Perry in the narrowly spaced secondary veins, the straight and close to the margin intramarginal veins and the long conical hypanthium, but differs in having relatively small leaves (*S. quoctrianum* sp. nov.: 3–5.5 × 2–3 cm; *S. lineatum*: 6–9 × 2.2–4.5 cm), a revolute leaf margin (*S. lineatum*: flat margin), the first order branching inflorescence (*S. lineatum*: second order branching inflorescence) and the sessile flowers (*S. lineatum*: pedicellate flowers).

TYPE MATERIAL. — Vietnam • Khánh Hòa province [Nhatrang]; 1800 m a.s.l.; 21.V.1922; Poilane 3572; holo-, P[P04460694]!, iso-, P[P06666932]!).

ETYMOLOGY. — This species is named in recognition of Mr Nguyen Quoc Tri, Deputy Minister, Ministry of Agriculture and Rural Development Vietnam, who has done so much to promote sustainable forest management in the country.

DISTRIBUTION. — Endemic to Vietnam, so far known only from the type locality in Khánh Hòa province.

HABITAT. — A highland species, documented in shrubby vegetation on moist peaty soil, at 1800 m elevation hence on a dwarf montane forest.

PHENOLOGY. — Collected in flower in May.

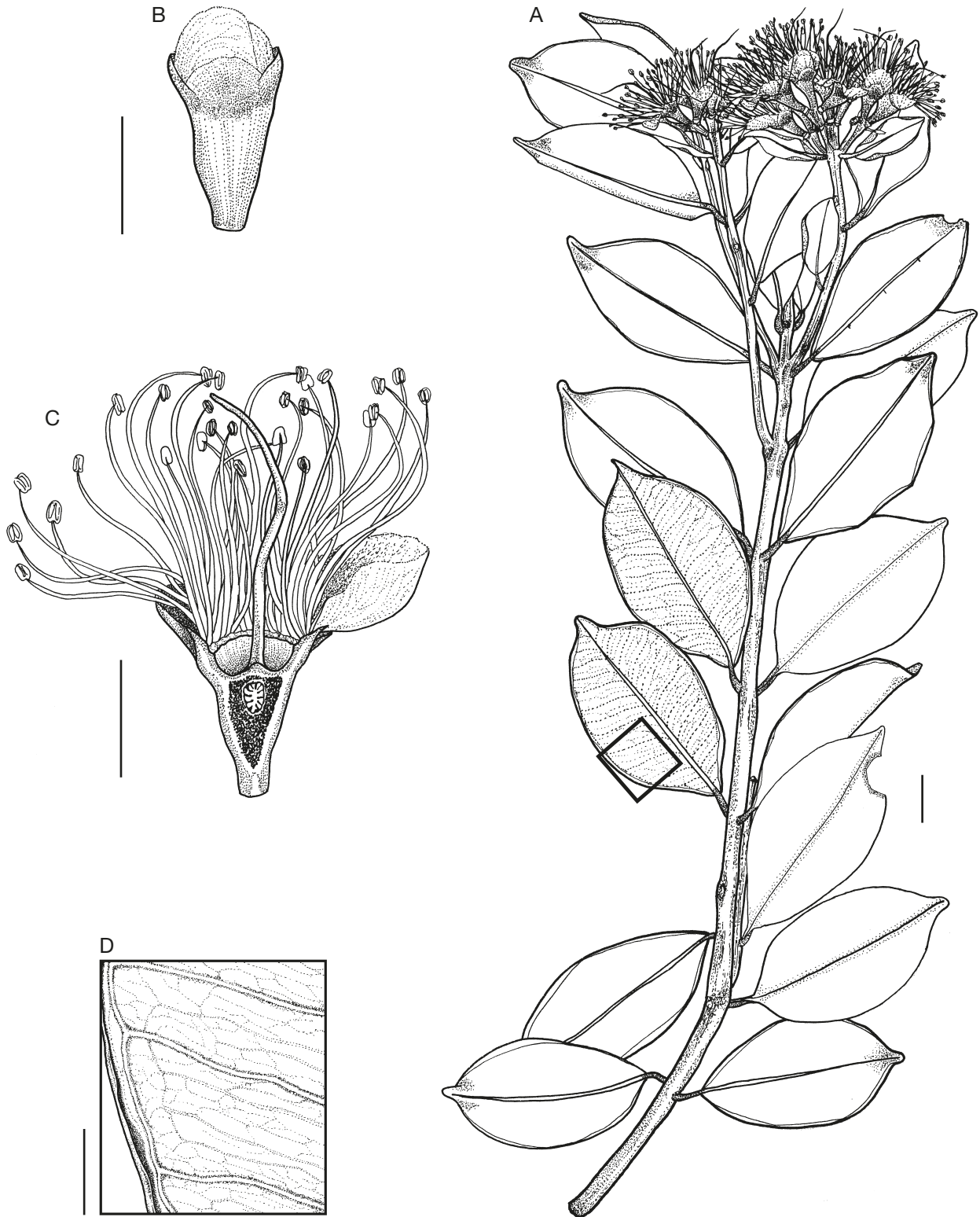


FIG. 1. — *Syzygium quoctrianum* W.K. Soh, H.V.Sam & J.Parn., sp. nov.: **A**, flowering branch; **B**, flower bud; **C**, longitudinal section of mature flower; **D**, leaf venation. *Poilane* 3572. Scale bars: A, 1 cm; B, C, 5 mm; D, 2 mm. Drawn by Wu Kuang Soh.

CONSERVATION STATUS. — DD (Data Deficient) (IUCN 2012). The locality in the herbarium label is stated as ‘Nhatrang’ which most probably refers to the province Khánh Hòa rather than the capital Nhatrang which is in the lowlands since the specimen was collected at 1800 m a.s.l. The landscape above 1000 m a.s.l. in

Khánh Hòa province appears to be forested on satellite imagery in Google Earth (images taken between 2018 and 2021). However an accurate location of the collection point is unknown. Further information on location, population size and habitat quality are needed.

DESCRIPTION

Tree, 4 m tall, trunk 7.9 cm diameter, glabrous. Twig terete, *c.* 3 mm diameter, stout, surface smooth, whitish to brownish, not contrasting to leaf colour, young twig angular. Leaves opposite, coriaceous to subcoriaceous, greenish-brown, dark green *in vivo*, 3–5.5 × 2–3 cm, 1.5–2 times as long as wide, elliptic, base cuneate, margin revolute, apex acuminate, acumen distinct, 0.2–0.4 cm long, $\frac{1}{10}$ – $\frac{1}{20}$ of blade length, recurved; midrib sunken above, raised below; secondary veins very slender, 11–16 per side, 2–4 mm apart, 65–70 degrees from midrib, faint, raised above and below; tertiaries faint, reticulate; intramarginal veins 0.5–1 mm from margin, straight, margin revolute; petiole 0.4–0.8 cm long, $\frac{1}{14}$ – $\frac{1}{5}$ of blade length, *c.* 1 mm diameter, slender, brownish, not contrasting to blade colour. Inflorescence terminal, 2–3 cm long (not including stamens), paniculate, first order branching, flowers to 15 flowers; main axes *c.* 8 mm long; bracts and bracteoles caducous, *c.* 1 mm long. Flower greenish white *in vivo*, fragrant *in vivo*, sessile, hypanthium not glaucous, not fibrous, 6–7.5 × 4.5–5 mm, conical, pseudostalk indistinct; sepals 4, free, 2–2.5 × 3–4 mm, semiorbicular; petals 4, free, 4.5 × 6 mm, not coherent, semiorbicular; outer stamens *c.* 1.5 cm long, anther sacs parallel, connective gland conspicuous; style *c.* 12.5 mm long, ovules 8 per locule, irregularly radiating. Fruit not seen.

Syzygium samianum

W.K.Soh & J.Parn., sp. nov.
(Fig. 2)

A species morphologically similar to *Syzygium sublaetum* (Craib) Byng & Christenh. in the distinct tertiary veins, the pyriform hypanthium with distinct pseudostalk, the racemose inflorescence and the pedicellate flowers but can be distinguished from this species by the relatively small leaves (*S. samianum*: 2.5–5 × [0.7–]1.2–2.5 cm; *S. sublaetum*: 5.5–12 × 2–4 cm), straight intramarginal veins (*S. sublaetum*: looped intramarginal veins), the relatively short pedicel (*S. samianum*: 1–2 mm long; *S. sublaetum*: 5–45 mm long) and the relatively small hypanthium (*S. samianum*: [5.5–]7–8 × [4–]5–6 mm; *S. sublaetum*: 8.8–11 × 5.5–6.7 mm).

TYPE MATERIAL. — **Vietnam** • Khánh Hòa province [Pro. Nha Trang], peninsula of Mt Hòn Hèo; 3.V.1923; *Poilane* 6237; holo-, P[P01065741]!, iso-, P[P01065739, P06871647, P00855380]!).

ADDITIONAL SPECIMENS EXAMINED. — **Vietnam** • West of Nhatrang, between [Song -tan] and [D'out]; 1500 m a.s.l.; 27.V.1922; *Poilane* 3781; P[P04884449]!).

ETYMOLOGY. — This particular species is named in honour of Dr Hoàng Văn Sâm, a botanist affiliated with the Vietnam National University of Forestry, who has significantly contributed to advancing our knowledge of the Vietnamese flora and to train emerging botanists in the country.

DISTRIBUTION. — Endemic to Vietnam, so far known only in the South-central Vietnam in the Khánh Hòa province including the Hòn Hèo peninsula.

HABITAT. — This species occurs in both lowland and highland habitats: one gathering was collected at the peninsular of Mt Hòn Hèo between 350 and 500 m elevation, which habitat would likely be hill evergreen forest. Another specimen was collected in the same province at 1500 m elevation on rocky, peaty and acidic soil, which altitude would infer a habitat dominated by montane forest.

PHENOLOGY. — Flowers were collected in May.

CONSERVATION STATUS. — Near Threatened (NT) (IUCN 2012). On the satellite imager in Google Earth (images taken between 2018 and 2021), the landscape at Mt Hòn Hèo and the areas above 1000 m elevation in Khánh Hòa province appear to be arboraceous. The forest at Mt Hòn Hèo is protected. The estimated Extent of Occurrence which ranges from Mt Hòn Hèo to the west of Khánh Hòa province is approximately 3600 km². However information on the exact location and habitat quality is not available to satisfy either the Critically Endangered, Endangered or Vulnerable criteria. Therefore the species is provisionally evaluated as Near Threatened (NT).

DESCRIPTION

Shrub, 2.5 m tall, trunk 6 cm diameter, glabrous. Twig terete, 1.5–2.5 mm diameter, slender, surface smooth, pale brownish, not contrasting to leaf colour. Leaves opposite, coriaceous, brownish, 2.5–5 × (0.7–)1.2–2.5 cm, 1.5 to 3.5 times as long as wide, elliptic, obovate, oblong-elliptic, oblong-obovate, base cuneate, slightly attenuate, margin revolute, apex acute, blunt, acumen indistinct; midrib sunken above, raised below; secondary veins very slender, 11–15 per side, narrowly spaced, 1.5–3 mm apart, 40–55 degrees from midrib, prominent, raised above and below; tertiaries faint, reticulate; intramarginal veins *c.* 0.5 mm from margin, straight; petiole (1–)2.5–6 mm long, $\frac{1}{6}$ – $\frac{1}{15}$ of blade length, *c.* 1 mm diameter, slender or stout, brownish, not contrasting to blade colour. Inflorescence terminal, to 2 cm long, racemose or first order branching, flowers 3 to 17; axes 0.5–0.8 cm long; bracts and bracteoles caducous, not seen. Flower white (*in vivo*), sessile or pedicellate, pedicel 1–2 mm, hypanthium not glaucous, not fibrous, (5.5–)7–8 × (4–)5–6 mm, pyriform, pseudostalk distinct, 3–3.5 mm long; sepals 4, free, 3 × 5 mm, semiorbicular; petals 4, free, 6–7 × 6–7 mm, semiorbicular; outer stamens *c.* 1 cm long, anther sacs parallel, connective gland conspicuous; style *c.* 11 mm long, ovules *c.* 4 per locule, irregularly radiating. Fruit not seen.

REMARKS

The specimen collected at 1500 m elevation (*Poilane* 3781) displays smaller and narrower leaves (2.5–3.4 × 0.7–1.2 cm, 3 to 3.5 times as long as wide) and shorter petiole (1–2.5 mm long) than lowland specimen (*Poilane* 6237) which has larger and broader leaves (2.5–5 × 1.5–2.5 cm, 1.5 to 2 times as long as wide) and longer petiole (4–6 mm long). It is often the case that plants collected in the mountains along ridges are found in exposed habitats and therefore their leaves frequently reflect extreme environmental conditions in such features as the recurved leaf margin, reduced foliage, coriaceous leaf texture, and reduced petiole (Van Steenis 1948).

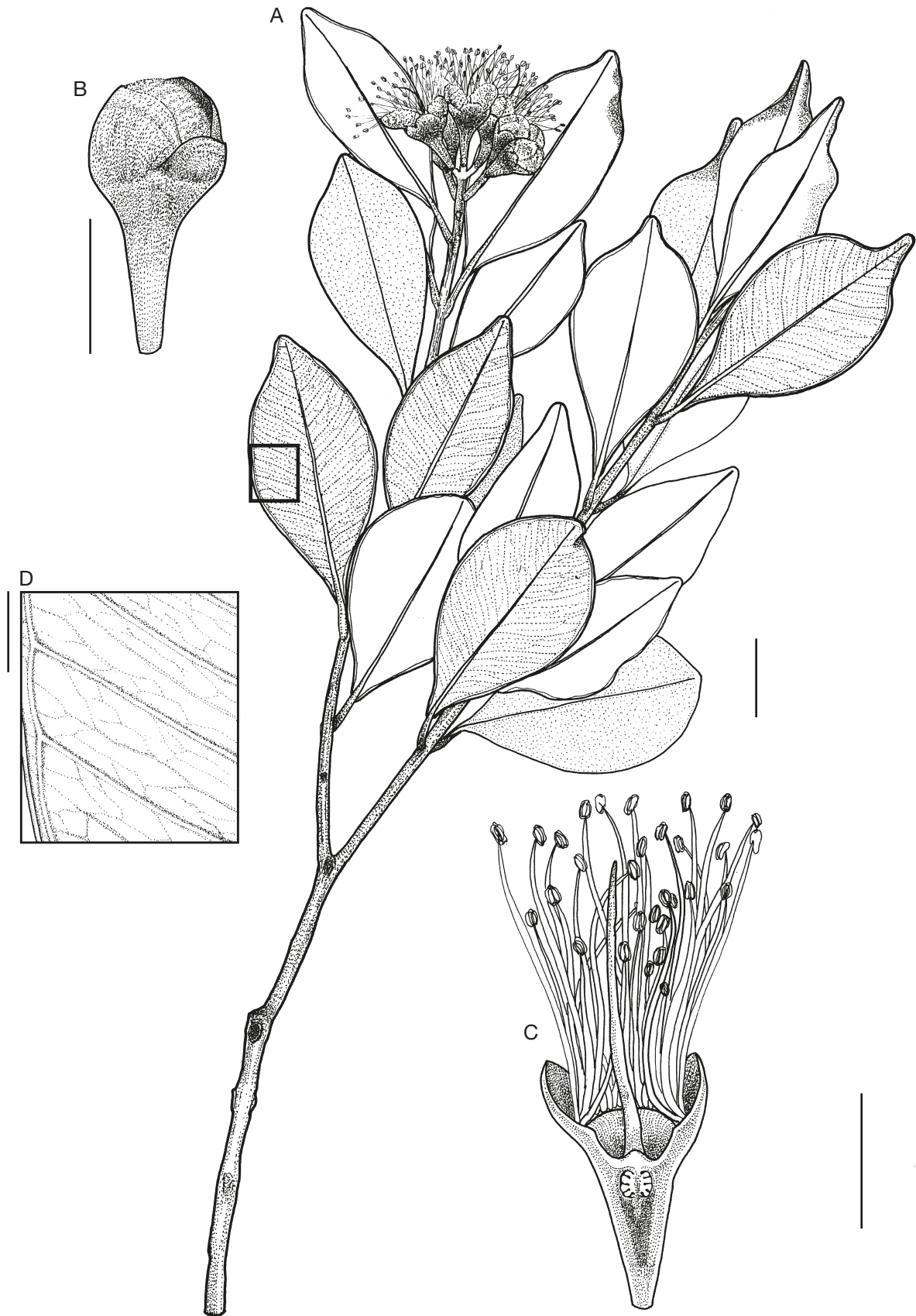


FIG. 2. — *Syzygium samianum* W.K. Soh & J.Parn., sp. nov.: **A**, flowering branch; **B**, flower bud; **C**, longitudinal section of mature flower; **D**, leaf venation. *Poilane* 6237. Scale bars: A, 1 cm; B, C, 5 mm; D, 2 mm. Drawn by Wu Kuang Soh.

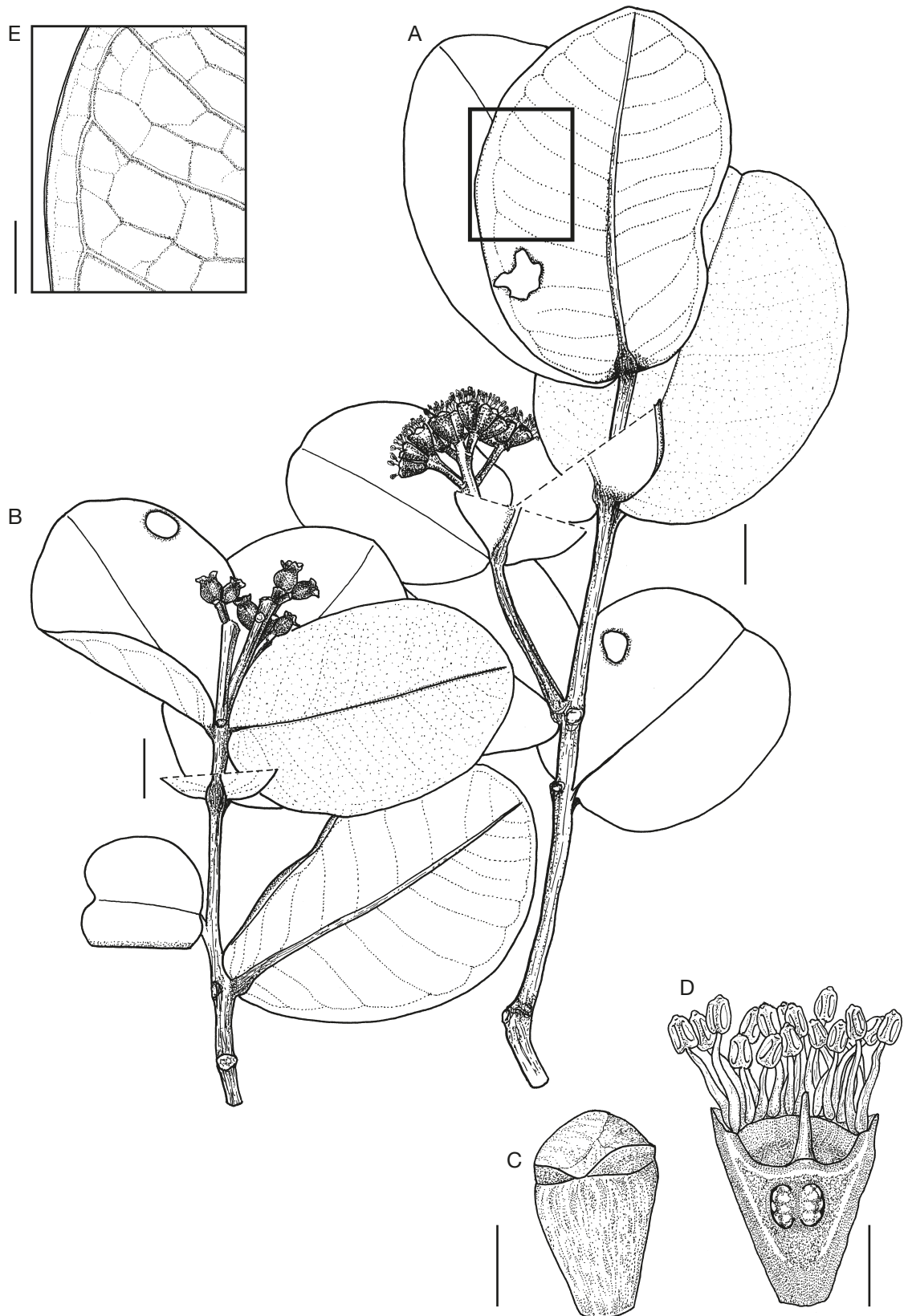


FIG. 3. — *Syzygium veal* W.K. Soh, H.V.Sam & J.Parn., sp. nov.: **A**, flowering branch; **B**, fruiting branch; **C**, flower bud; **D**, longitudinal section of mature flower; **E**, leaf venation. *Thomas et al.* 36. Scale bars: A, B, 1 cm; C, D, 2 mm; E, 5 mm. Drawn by Wu Kuang Soh.

Syzygium veal

W.K. Soh, H.V. Sam & J. Parn., sp. nov.
(Fig. 3)

A species which is morphologically allied and similar to *Syzygium borneense* (Miq.) Miq. in the secondary veins which are widely spaced (5–15 mm apart), about 10 per side and sunken above, the inflorescence with a compact head of 7–9 flowers and the obconic hypanthium with indistinct pseudostalk but differs in the sessile leaf (*S. borneense*: petiole 7–10 mm long), cordate leaf base (*S. borneense*: leaf base attenuate) and relatively large hypanthium (*S. veal* sp. nov.: 3.5–4.5 × 3–4 mm; *S. borneense*: 1.5–2 × 1.5 mm).

TYPE MATERIAL. — Cambodia • Pursat, Phnom Samkos Wildlife Sanctuary, c. 5 km south-southwest of Phnom Krachau peak; 12°8'27.78"N, 102°54'31.46"E; 1200 m a.s.l.; 19.I. 2011 (Cardamoms Preliminary Dendroclimatological Expedition); Thomas, Ly, Siraat & Buckley 36; holo-, P[P00848517]!, iso-, E[E00726509]!.

ETYMOLOGY. — Named after the habitat of the species 'veal' in Khmer which refers to seasonally dry and sandy savannah.

DISTRIBUTION. — Endemic to Cambodia, so far known only from the type locality in Phnom Samkos Wildlife Sanctuary.

HABITAT. — High elevation grassland, growing at the margin of thickets in open grassland area at 1200 m elevation.

PHENOLOGY. — Collected in flower and early fruiting in January.

CONSERVATION STATUS. — Data Deficient (DD) (IUCN 2012). The species is only known from one collection from Phnom Samkos Wildlife Sanctuary. Further field observations on the population size, the Extent of Occurrence and/or Area of Occupancy, and the quality of habitat are needed.

DESCRIPTION

Small tree, 3 m tall, glabrous. Twig terete, c. 3–4 mm diameter, stout, surface smooth, whitish to brownish, not contrasting to leaf colour. Leaves opposite, coriaceous, brownish, (1.5)4–8.8–10.5 × 3–6.8 cm, 1.3 to 1.7 times as long as wide, obovate, base cordate, apex rounded, retuse or shallowly emarginate; midrib sunken above, raised below; secondary veins 9–10 per side, widely spaced, (4–)5–15 mm apart, 45–70 degrees from midrib, prominent, sunken above, raised below; tertiaries prominent, reticulate; intramarginal veins (1.5–)2–5 mm from margin, slightly looped; leaf sessile, petiole indistinct, less than 1 mm long, keeled abaxially, leaf scar 3–4 mm diameter. Inflorescence terminal or axillary, 1.4–2 cm long, paniculate, first order branching; axes c. 1.4 cm long; bracts and bracteoles caducous; flowers sessile, hypanthium not glaucous, not fibrous, 3.5–4.5 × 3–4 mm, obconic, pseudostalk indistinct; sepals 4, free, 0.4 × 1 mm, broadly triangular; petals 4, coherent, 2 × 2.2 mm, orbicular; stamens white *in vivo*, outer stamens c. 3.5 mm long; anther sacs parallel, connective gland conspicuous; style 2.5–3 mm long, ovules c. 15 per locule, irregularly radiating. Fruit immature, 4.5 × 3.5 mm, ellipsoid.

REMARKS

Allied to *Syzygium borneense* (Miq.) Miq. The sanctuary is notable for its large diversity of habitats, including several types of forests. The interior of the sanctuary is largely un-

explored by scientists, but small-scale surveys suggest that many rare, unique and even endemic species are present.

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