



Five new species of *Syzygium* (Myrtaceae) from Indochina and Thailand

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Abstract

Five new species of *Syzygium* (Myrtaceae), *S. honbaense*, *S. phamhoangii* and *S. yersinii* from Khanh Hoa Province, Vietnam, *S. phoukhaokhouayense* from Phou Khao Khouay National Protected Area, Vientiane Province, Laos, and *S. scabrum* from Bung Khla, Phu Wua Wildlife Sanctuary, Buengkan Province, Thailand, are described and illustrated. Photographs, vernacular names and preliminary conservation assessments are provided for them.

Keywords: Flora, Laos, Myrtales, new species, Thailand, taxonomy, Vietnam

Introduction

The genus *Syzygium* Gaertner (1788: 166), with over 1200 species, are trees or shrubs characterized by sympodial branch, simple, opposite, gland dotted (punctulate or pustulate) and exstipulate leaves with intramarginal veins, usually paniculate inflorescences (sometimes reduced to a raceme, cyme or congested flower cluster), obconic, funnel-shaped or sometimes clavate hypanthium, many stamens and 1–2 seeded fruit (Parnell & Chantaranothai 2002, Chen & Craven 2007, Ashton 2011, Soh & Parnell 2015, Govaerts *et al.* 2018). The species are widely distributed in the Old World tropics to the margin of the subtropics and are important components in various forest types including lowland evergreen forest, kerangas forest, peat swamp forest, riparian forest and upper montane forest (Ashton 2011). In Indochina, Soh & Parnell (2015) reviewed the taxonomy of *Syzygium* and recognized 27 species in Cambodia, 30 species in Laos and 49 species in Vietnam.

In Indochina and its adjacent countries of Southeast Asia, we have carried out botanical inventories since 2011 and discovered many new species, new records and noteworthy plant collections (e.g. Dang *et al.* 2015, 2016, 2017, Komada *et al.* 2018, Naiki *et al.* 2015, 2017a, b, Ngoc *et al.* 2016, Pham *et al.* 2017, Soejima *et al.* 2016, Souladeh *et al.* 2017, 2018, Tagane *et al.* 2015a, b, c, 2016a, b, c, 2017a, b, c, 2018a, b, Toyama *et al.* 2016, 2017, Yahara *et al.* 2016, Yang *et al.* 2018). As for *Syzygium*, a total of 749 specimens were gathered through the surveys in Southeast Asia, among which 344 were from Indochina. Using these materials, we reported five *Syzygium* species new to the flora of Cambodia (Tagane *et al.* 2015c, 2017c) including a new species, *S. elephantinum* Tagane (2015c: 121), and four newly recorded species, *S. angkae* (Craib 1929: 115) Chantaranothai & Parnell (1993: 592), *S. attenuatum* (Miquel 1885: 437) Merrill & Perry (1939: 185), *S. nervosum* De Candolle (1828: 260) and *S. praecox* (Roxburgh 1832: 488) Rathakrishnan & Nair (1983: 288). Consequently, the number of species in Cambodia came up to 32.

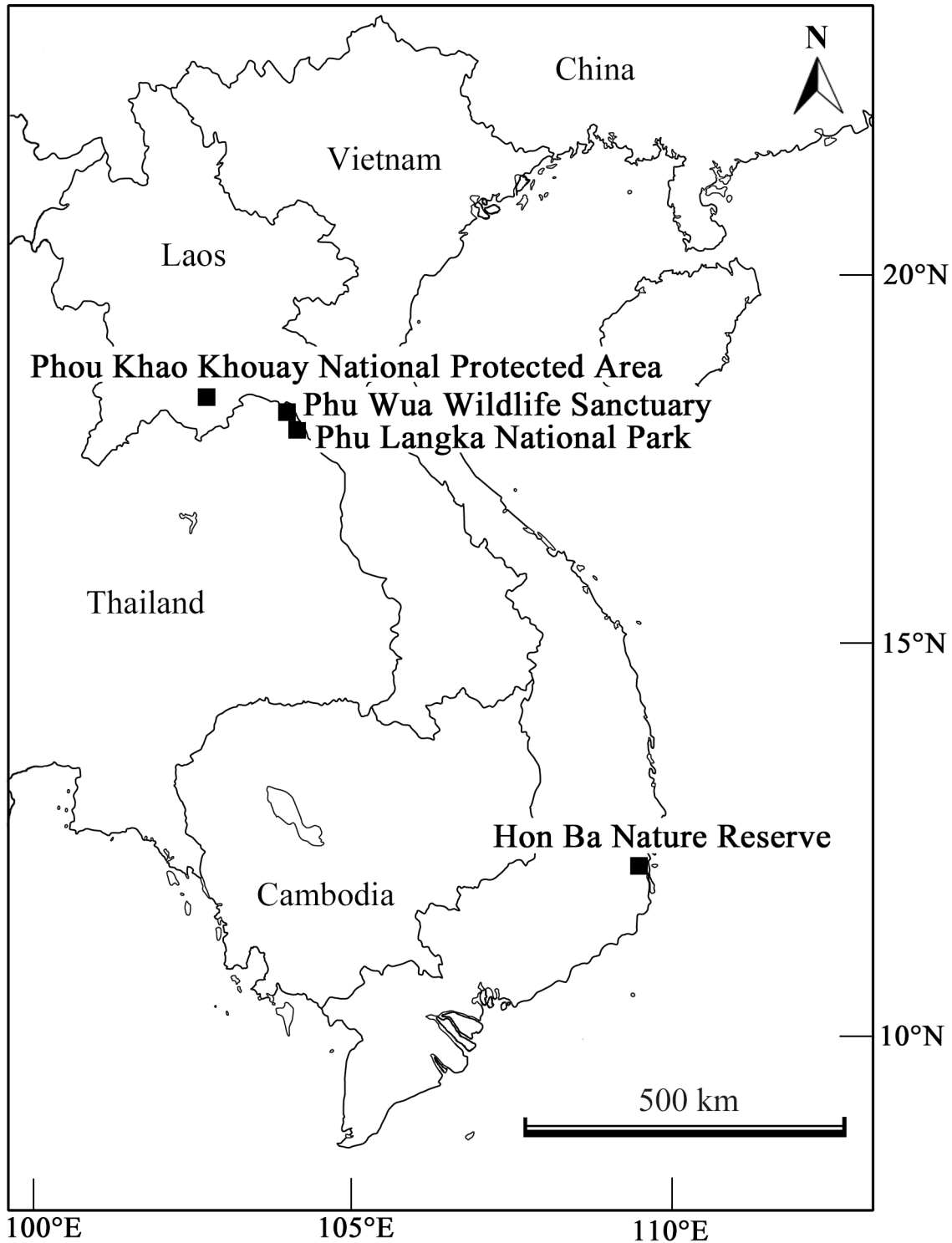


FIGURE 1. Locations of Hon Ba Nature Reserve (Vietnam), Phou Khao Khouay National Protected Area (Laos), Phu Wua Wildlife Sanctuary and Phu Langka National Park (Thailand).

The recent progress in identifying our collections led us to discover additional five undescribed species of *Syzygium* from Indochina. We here describe these species; *Syzygium honbaense*, *S. phamhoangii* and *S. yersinii* from Hon Ba Nature Reserve, Vietnam, *S. phoukhaokhouayense* from Phou Khao Khouay National Protected Area, Laos and *S. scabrum* from Bung Khla, Phu Wua Wildlife Sanctuary, Buengkan Province, Thailand (Figure 1). The illustrations, preliminary conservation assessment and DNA barcodes of the two plastid regions of *rbcL* and *matK* are also presented for them.



FIGURE 2. *Syzygium honbaense* Tagane, V.S.Dang & Yahara. A) Habit, B) Flowering branch, C) Bark, D) Lower leaf surface, E) Inflorescence, F & G) Flowers, H) Flower after anthesis showing hypanthium, sepals and style; Stamens and petals fallen. Photographs: A–H for Tagane *et al.* V612, taken by S. Tagane on 21 July 2013.

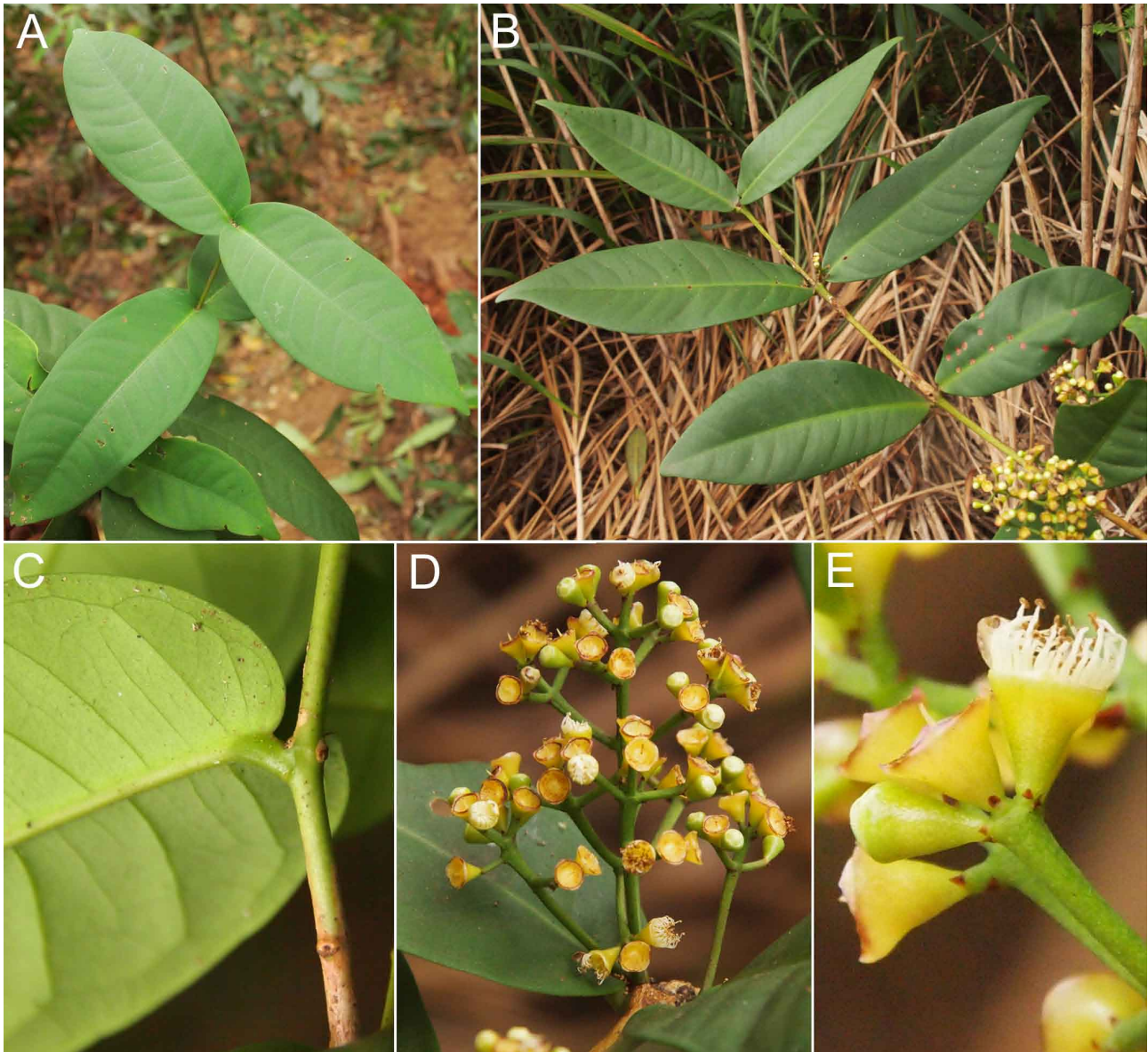


FIGURE 3. *Syzygium phamhoangii* Tagane, V.S.Dang & Yahara. A) Leafy branch, B) Flowering branch, C) Portion of lower leaf surface, D) Inflorescence, E) Flowers. Photographs: A–E for *Toyama et al. V909*, taken by S. Tagane on 20 Feb. 2014.

Materials and Methods

Morphological observations

The new species was recognized by detailed comparisons with morphologically similar species through literature review (Parnell & Chantaranonthai 2002, Hô 2003, Chen & Craven 2007, Ashton 2011, Soh & Parnell 2015, Tagane *et al.* 2015c), dry specimens from the herbaria BKF, BO, FOF, FU, HN, HNL, KAG, KKKU, KYO, RUPP, TNS, VNM (acronyms follow Thiers 2018, except Herbarium of Hon Ba Nature Reserve, presently without an acronym), and digitized plant specimens available on the web (e.g. JSTOR Global Plants, <https://plants.jstor.org/>). The measurements of the description below are based on the herbarium materials we collected.

DNA barcoding

Total DNA was extracted from the silica-dried leaf pieces collected in the field. DNA extraction using a modified CTAB method. Amplification and sequencing of the two DNA barcode regions, partial genes for the large subunit ribulose-1,5-bisphosphate carboxylase oxygenase (*rbcL*) and maturase K (*matK*) were performed according to published protocols (Kress *et al.* 2009, Dunning and Savolainen 2010) as in Toyama *et al.* (2015).

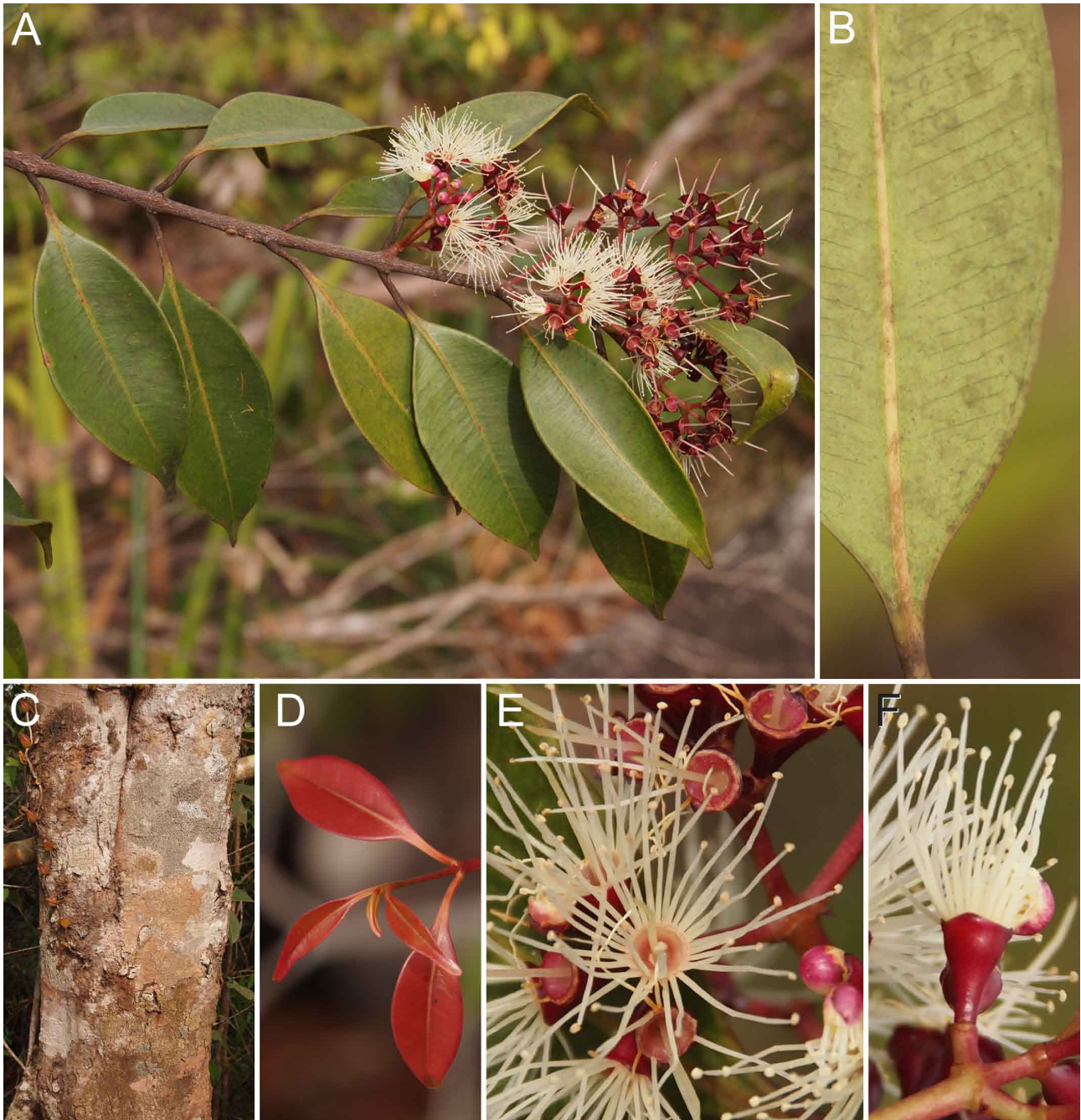


FIGURE 4. *Syzygium phoukhaokhouayense* Soulad., Tagane & Yahara. A) Flowering branch, B) Portion of lower leaf surface, C) Bark, D) Young shoot, E & F) Flowers. Photographs: A–F for *Yahara et al. L1827*, taken by S. Tagane on 26 Dec. 2017.

Taxonomy

Syzygium honbaense Tagane, V.S.Dang & Yahara, *sp. nov.* (Figure 2).

TYPE:—VIETNAM. Khanh Hoa Province, Mt. Hon Ba, 12°07'29.45"N, 108°57'51.11"E, elev. 1204 m, 21 July, 2013, Tagane S., Yahara T., Nagamasu H., Fuse K., Toyama H., Tran H., Dang V.S., Loi X.N., Thach N.D., Cuong Q.N., Hieu P.N.H. & Thach K.N. V612 [fl.] (holotype KYO!, isotypes KAG!, VNM, the herbarium of Hon Ba Nature Reserve).

Syzygium honbaense is distinct from all the other *Syzygium* species in the region by having terminal inflorescences with 3 to 5 reddish flowers, ca. 1.1 cm long hypanthium and relatively smaller leaves, to 7.2 × 2.7 cm.

Tree, 10 m tall. Young twigs terete, grayish brown, glabrous, ca. 1 mm in diam., old twigs grayish brown, internode (0.5–)1.2–2.6 cm long. Leaves opposite, blade elliptic, elliptic-oblong, rarely obovate, (1.7–)2.6–7.2 × (0.8–)1.2–2.7

cm, 1.8–3.2 times longer than wide, coriaceous, dark yellowish green to grayish green adaxially, dull brownish yellow abaxially, glabrous on both surfaces, base cuneate, apex acuminate or acute, margin entire, slightly recurved when dry, midrib sunken adaxially, prominent abaxially, secondary veins 8–10 pairs, prominent on both surfaces, intersecondary veins distinct adaxially, intramarginal veins 1 (rarely 2, faintly visible), 1–2 mm apart from margin; petiole (0.4–)0.8–1 cm long, concave adaxially, rounded abaxially, grayish green to yellowish brown, glabrous. Inflorescences terminal, racemose, 3- to 5-flowered, rarely solitary, peduncle 0.8–1.4 cm long, rachis and lateral branches terete or occasionally slightly compressed; bracteoles caducous, not seen. Flower buds subglobose, ca. 1.1 cm in diam., reddish purple (*in vivo*). Hypanthium funnel-shaped, ca. 1.1 cm long, glabrous, pseudostipe indistinct, or very short to 1 mm long. Sepals 4, depressed ovate, 2.5–4 × 7–8 mm, apex rounded, margin fringed with whitish, membranous part, petals 4, suborbicular, ca. 9 mm in diam., membranous, with ca. 180 gland dots per petal. Stamens many, more than 340, 1.1–1.5 cm long, anthers 0.8–0.9 mm long, filaments reddish purple (*in vivo*), glabrous. Style ca. 1.4–1.7 cm long, glabrous, ovary 2-locular, ovules 18–20 per locule. Fruit and seeds not seen.

Distribution:—Vietnam (so far only known from the type locality, Mt. Hon Ba).

Habitat and Ecology:—Hill evergreen forest, at ca. 1200 m elevation.

Phenology:—Flowering specimens were collected in July.

Etymology:—The new species is named after the type locality, Hon Ba Nature Reserve in Khanh Hoa Province of Vietnam.

Vernacular name:—Trâm hòn bà.

Preliminary conservation assessment:—Critically Endangered (CR). During our intensive botanical surveys in Mt. Hon Ba from 2011 to 2013, only one flowering individual was found at the edge of the evergreen forest, along the road to the summit of Mt. Hon Ba. This situation satisfies the CR (critically endangered) status in criterion D of IUCN Red List Categories (IUCN 2012).

Note:—Among the *Syzygium* species having relatively large (hypanthium > 1 cm in diam.) and reddish to purplish flowers in Indochina, *S. honbaense* is easily distinguished from the other species by a combination of its smallest leaves ((1.7–)2.6–7.2 cm long vs. longer than (6–)12 cm) and terminal inflorescences.

Syzygium phamhoangii Tagane, V.S.Dang & Yahara, *sp. nov.* (Figure 3).

TYPE:—VIETNAM. Khanh Hoa Province, Mt. Hon Ba, 12°06'46.88"N, 108°58'14.43"E, elev. 919 m, 20 Feb. 2014, Toyama H., Dang V.S., Tagane S., Fuse K., Yahara T., Nagamasu H., Tran H., Nguyen V.N., Nguyen Q.C., Do N.T. & Ho N.P.H. V909 [fl.] (holotype KYO!, isotypes FOF!, KAG!, VNM!, the herbarium of Hon Ba Nature Reserve).

Syzygium phamhoangii is similar to *Syzygium balsameum* (Wight 1841: 16) Walpers (1843: 179) in the shape of leaves and axillary inflorescences but distinguished by its obtuse to slightly cordate leaf base (vs. cuneate to long attenuate), shorter petioles ((1–)2–4 mm long vs. 4–15 mm long), larger hypanthium (3.5–4 mm long vs. 2.5–3.5 mm long) and more ovules per locule in ovary (12–16 ovules vs. 3–8 ovules).

Shrub, 1.5 m tall. Young twigs slightly compressed, yellowish to reddish brown, old twigs terete, yellowish brown, glabrous, internode (1.5–)2.5–7.4 cm long. Leaves opposite, blade elliptic-oblong, (5–)9.3–17 × (2.2–)3.4–6.5 cm, 2.1–3.5 times longer than wide, thinly coriaceous, grayish green to dull brownish yellow adaxially, light yellowish brown abaxially, glabrous on both surfaces, apex acuminate, acumen to 1.5 cm long, base obtuse, rounded, slightly cordate, margin entire, slightly recurved when dry, midrib sunken adaxially, prominent abaxially, secondary veins 10–12 pairs, (0.5–)1–2.1 cm apart, slightly prominent abaxially, intersecondary veins usually distinct, tertiary veins indistinct on both surfaces, intramarginal vein 1, outer one ca. 0.8 mm from margin, inner one ca. 5 mm apart from margin; petiole (1–)2–4 mm long, glabrous. Inflorescences axillary on leafy twig, paniculate, 4–5.8 cm long, 18–48 flowered, peduncle up to 1.3–1.9 cm long, rachis and lateral branches slightly compressed, bracteoles triangular, ca. 1.1 mm long, apex acute, glabrous, caducous. Flower bud ca. 2 mm in diam., whitish (*in vivo*). Hypanthium funnel shaped, 3.5–4 mm long, reddish brown when dry, glabrous, sessile. Sepals 4, broadly triangular, ca. 0.5 × 1.5 mm, petals 4, orbicular, ca. 2 mm in diam., membranous, 3 gland dots per petal. Stamens 44–50, 1.7–3 mm long, anthers ca. 0.6 mm long, filaments white (*in vivo*), 1.2–2.4 mm long. Style ca. 2 mm long. Ovary 2-locular, ovules 12–16 per locule. Fruit and seeds not seen.

Distribution:—Vietnam (so far only known from the type locality, Mt. Hon Ba).

Habitat and Ecology:—Hill evergreen forest, at ca. 920 m elevation.

Phenology:—Flowering specimens were collected in February.

Etymology:—The specific epithet is chosen in honor of the excellent Vietnamese botanist Prof. Dr. Phạm Hoàng Hộ, who significantly contributed to the study of the flora of Vietnam.

Vernacular name:—Trâm phạm hoàng hộ.

Preliminary conservation assessment:—Critically Endangered (CR). *Syzygium phamhoangii* is known only from a single population in Mt. Hon Ba, at ca. 900 m above the sea level. The population with fewer than 15 mature individuals is very close to the road and can be easily affected by human disturbance. Therefore, this species is qualified as CR under criterion D (IUCN 2012).

Syzygium phoukhaokhouayense Soulad., Tagane & Yahara, *sp. nov.* (Figure 4).

TYPE:—LAOS. Vientiane Province, Thoulakhom district, Ban Pa Paek, Phou Khao Khouay National Protected Area, 18°22'35.28"N, 102°51'29.46"E, 905 m elev., 26 December 2017, *Yahara T., Tagane S., Souladeth P., Nagamasu H., Naiki A., Chayer S. & Kongxaisavath D. L1827* [fl.] (holotype FOF!, isotypes BKF, KAG, KYO!, NHL!, P).

Syzygium phoukhaokhouayense is similar to *S. syzygioides* (Miquel 1855: 431) Merrill & Perry (1938: 109) but differs in having coriaceous leaves (vs. chartaceous to subcoriaceous in *S. syzygioides*), longer petiole (7–12 mm long vs. 3–5 mm long), larger and reddish-purple hypanthium (4.1–4.5 mm long vs. ca. 3 mm long, greenish), longer styles (ca. 5 mm long vs. ca. 8.3 mm long) and fewer ovules per locule in ovary (4–5 per locule in *S. phoukhaokhouayense* vs. 10–14 per locule in *S. syzygioides*). Also, it is apparently similar to *S. lineatum* (De Candolle 1828: 287) Merrill & Perry (1938: 109) but easily distinguished by having more secondary veins (28–32 pairs in *S. phoukhaokhouayense* vs. 16–20 pairs in *S. lineatum*) and single intramarginal veins (vs. 2).

Tree, 6 m tall. Young twigs terete, reddish brown, glabrous, 2–2.5 mm in diam., old twigs grayish to reddish brown, internode (1–)2–3.6 cm long. Leaves opposite, blade elliptic to elliptic-oblong, 4.2–8.9 × 1.8–3.2 cm, 2.3–3.1 times longer than wide, coriaceous, reddish brown dark grayish brown adaxially, light yellowish brown abaxially, glabrous on both surfaces, apex acuminate, acumen to 1 cm long, base cuneate to attenuate, margin entire, slightly recurved when dry, midrib sunken abaxially, prominent and distinct adaxially, secondary veins 28–32 pairs, 1.5–2.8 mm apart, slightly prominent on both surfaces, intersecondary veins distinct, intramarginal veins 1, ca. 0.8 mm from margin; petiole 0.7–1.2 cm long, concave adaxially, rounded abaxially, blackish, glabrous. Inflorescences terminal and axillary near the top of branch, paniculate, 2.5–3.8 cm long, 8–40 flowered, peduncle up to 2.7 cm long, rachis and lateral branches compressed or slightly angled; bracteoles triangular, ca. 0.9 mm long, glabrous, caducous. Flower buds ca. 2.1 mm in diam., whitish to purplish (*in vivo*). Hypanthium funnel-shaped or campanulate, 4.1–4.5 mm long, blackish when dry, glabrous, pseudostipe ca. 2 mm long. Sepals 4, depressed semi-circular, 0.5 × 1.6 mm, petals 4, orbicular, ca. 2.4–3 mm in diam., membranous, gland dot lacking or 1 per petal. Stamens 30–32, 5.1–8.2 mm long, anthers ca. 0.4 mm long, filaments white (*in vivo*). Style ca. 8.3 mm long. Ovary 2-locular, ovules 4–5 per locule. Fruit and seeds not seen.

Distribution:—Laos (so far only known from Phou Khao Khouay National Protected Area).

Habitat and Ecology:—Open pine forest, at 905 m elevation.

Phenology:—Flowering specimens were collected in December.

DNA barcodes:—LC381851 (*rbcL*), LC381854 (*matK*); sequenced from *Tagane et al. L1827*.

Etymology:—The species epithet refers to the geographical location of the find, Phou Khao Khouay National Protected Area.

Vernacular name:—ໝາໂພ (Wa Phou).

Preliminary conservation assessment:—Critically Endangered (CR). At present, *Syzygium phoukhaokhouayense* is known from only a single individual in the Phou Khao Khouay National Protected Area, at 905 m elev. The area is close to the Vientiane Capital, and has been relatively intensively surveyed by many botanists (e.g. Newman *et al.* 2007, Souladeth & Meesawat 2012, Lucas *et al.* 2013). However, we could not find any specimen of this species in the major herbaria (BKF, FOF, HN, KAG, NHL, P, RUPP, TNS, VNM), indicating that this is a rare species. This situation is qualified as CR according to IUCN Red List criteria D (IUCN 2012).

Note:—The *matK* sequence of *S. phoukhaokhouayense* is identical with *S. syzygioides* (783/783 bp for GenBank accession no. AB924771 and AB925281, 780 bp for AB924710 and AB924734, 768/768 bp for AB924947). However, *S. phoukhaokhouayense* is easily distinguished from *S. syzygioides* by the diagnostic characters mentioned above, such as the differences in leaf thickness, length of petiole and style, and colour of hypanthium.

Syzygium scabrum Tagane, Soulad. & Yahara, *sp. nov.* (Figure 5).

TYPE:—THAILAND. Buengkan Province, Bung Khla, Phu Wua Wildlife Sanctuary, 22 Nov. 2015, *Phonsena P., de Wilde W.J.J.O & Duyfjes B.E.E 7280* [fl. & fr.] (holotype BKF!, isotypes BK, KKU).

Syzygium scabrum is similar to *S. vestitum* Merrill & Perry (1938: 110) in having reddish brown hairs on twigs, leaves and hypanthium, but differs in having more or less cordate leaf base (vs. broadly cuneate to rounded in *S. vestitum*), scabrid on both sides of leaf surfaces (vs. glabrous except on veins on abaxial side, never scabrid on adaxial side), more secondary veins (16–30 pairs vs. 10–16 pair) and longer styles (8–15.5 mm long vs. 6 mm long).

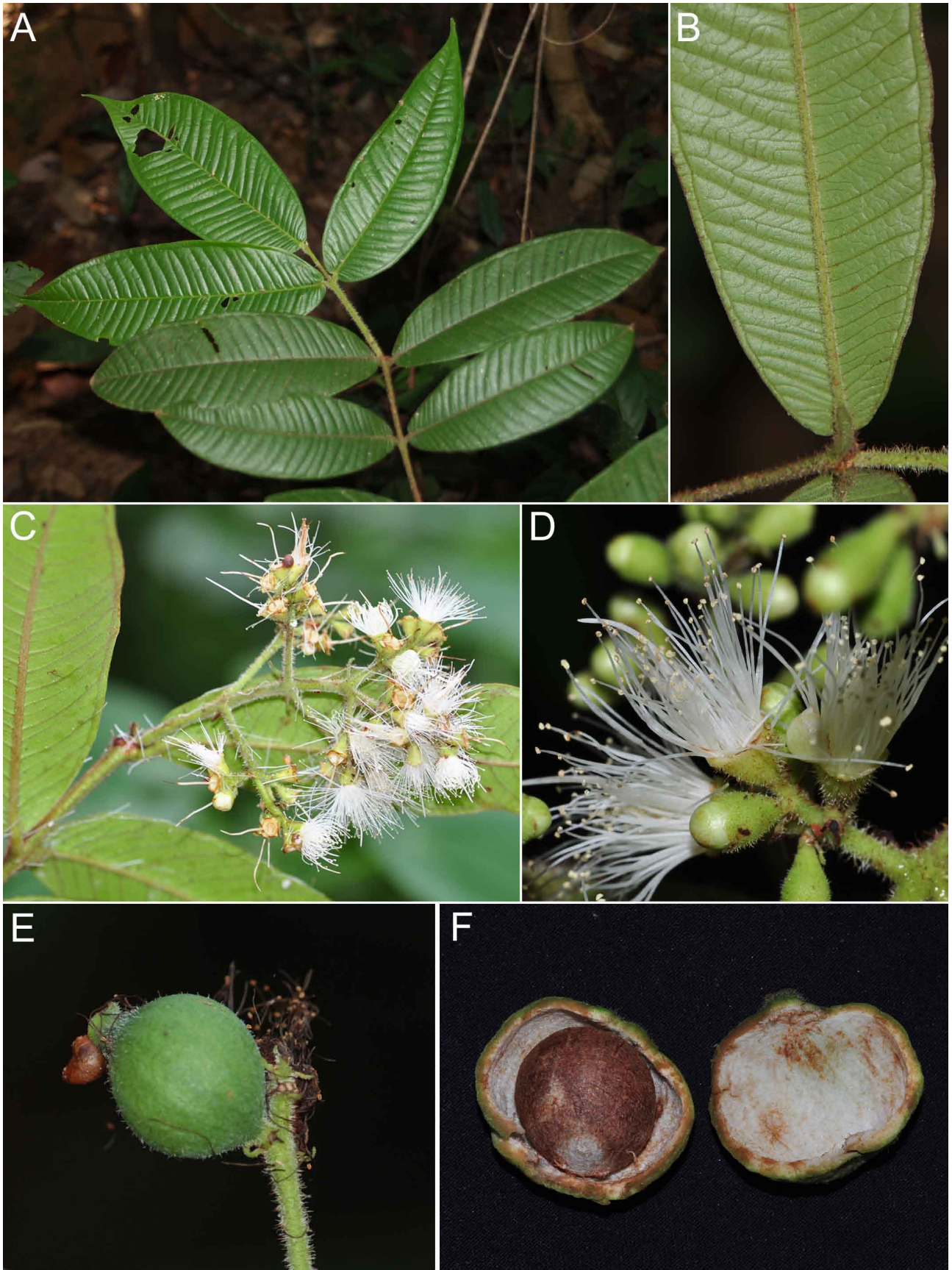


FIGURE 5. *Syzygium scabrum* Tagane, Soulad. & Yahara. A) Leafy twig, B) Portion of lower leaf surface, C) Inflorescence, D) Flowers and flower buds, E) Young fruit, F) Fruit and seed. Photographs: A & B for *Yahara et al.* L1727, taken by S. Tagane on Dec. 2017; C & D for *Souladeth 86*, taken by P. Sutthisaksopon on 24 May 2011; E & F for *Phonsena et al.* 7280 taken by P. Phonsena on 22 Nov. 2015.

Tree, 10 m tall. Twigs terete, 3–3.5 mm in diam., densely covered with yellowish brown, dark grayish brown, reddish brown hairs, internode 1.9–6.5 cm long. Leaves opposite, blade ovate-elliptic, ovate-oblong, (6.3–)11.5–19.5 × (2.2–)3.1–5.6 cm, 2.7–3.8 times longer than wide, chartaceous, apex acuminate, acumen to 1.2 cm long, base slightly cordate or rounded, margin entire, recurved, dark dull green to dark yellow-green abaxially, dull brownish yellow to brown abaxially, coarsely reddish brown hairy and scabrid on both surfaces, especially denser on midrib and secondary veins, midrib sunken adaxially, prominent abaxially, secondary veins (16–)21–26(–30) pairs, (2–)4–7 mm apart, sunken adaxially, prominent abaxially, intersecondary veins more or less distinct, prominent abaxially, intramarginal veins 1 or 2, (0.6–)1–4 mm from margin, prominent abaxially, outer ones (0.1–)0.6–1 mm from margin, prominent to indistinct; petiole (2–)3–4.5 mm long, densely scabrid as in twig. Inflorescences terminal, paniculate, 6–15 cm long, peduncle 2–8 cm long, densely scabrid with reddish brown hairs. Flower buds ca. 3.5 mm in diam. Hypanthium funnel-shaped, 4–5 mm long, densely covered with brown hairs, pseudostipe 2–3 mm long, bracteoles linear, ca. 4 mm long, densely brown hairy on both surfaces. Sepals 4, semi-circular, ca. 1.1 mm long, petals 4, orbicular, 2.8–3.5 mm in diam., membranous, with 30–50 gland dots per petal. Stamens many, to 12 mm long, anthers 0.2–0.4 mm long, filaments 0.8–11.6 mm long, white (*in vivo*), glabrous. Style (8–)13–15.5 mm long, glabrous. Ovary 2-locular, 5–10 per locule. Fruits (sub)globose, ca. 2.2 cm in diam., hairy when young, later glabrous except near calyx ring, calyx ring ca. 4 mm in diam., rim ca. 0.5 mm high. Seed 1, subglobose, 1.7 cm high, 1.5 cm in diam., dark brown, glabrous.

Paratypes:—LAOS. Vientiane Province: Thoulakhom District, Phou Khao Khouay National Protected Area, Ban Tha Heua, 18°21'15.82"N, 102°48'07.35"E, 769 m elev., 22 May 2011, *Souladeth P. 91* [fl.] (FOF, KKU!); *ibid.*, 26 Dec. 2017, *Yahara T., Tagane S., Souladeth P., Nagamasu H., Naiki A., Chayer S. & Kongxaisavath D. L1438* [fr.] (BKF, FOF!, KYO!, NHL); *ibid.*, 18°23'19.08"N, 102°54'40.61"E, elev. 695 m, *Yahara T., Tagane S., Souladeth P., Nagamasu H., Naiki A., Chayer S. & Kongxaisavath D. L1727* (FOF, KYO!); *ibid.*, 23 Apr. 2011, *Souladeth P. 86* [fr.] (FOF!, KKU!); Phou Khao Khouay, 29 Oct. 1971, *Vidal 5969* [fr.] (P [P00589453], image!). THAILAND. Nakhon Phanom Province, Ban Phaeng, Phu Langka National Park, Tat Kham Fall, 17°57'00"N, 104°09'44"E, elev. 150 m, 25 Aug. 2001, *Pooma R., de Wilde W.J.J.O., Duyfjes B.E.E., Chamchumroon V. & Phattarahirankanok K. 2613* [fl.] (BKF!).

Distribution:—Laos (Vientiane Province: Phou Khao Khouay National Protected Area), Thailand (Nakhon Phanom Province: Phu Langka National Park, Buengkan Province: Phu Wua Wildlife Sanctuary).

Habitat and Ecology:—In hill evergreen forest, at altitudes of 690–770 m in Laos, and in dry evergreen forest at an altitude of 150 m in Thailand.

Phenology:—Flowering specimens collected in August and November, fruiting in October to December.

DNA barcodes:—LC381850 (*rbcL*), LC381853 (*matK*); sequenced from *Yahara et al. L1438*.

Etymology:—The species epithet refer to its nature of roughened (scabrid) surfaces of twigs and leaves caused by dense hairs.

Vernacular name:—หว่าขน (Wa Khon) (**Thailand**); ຫວ້ຂົນ (Wa Khon) (Laos).

Preliminary conservation assessment:—Endangered (EN). Based on collections and our field observations, *S. scabrum* is considered to be widely distributed in forests at lower to high elevations (150–800 m) in Northeast Thailand and Central Laos, and the area of occupancy (AOO) of this species calculated based on the collection localities is less than 2200 km² with some disturbed localities in Laos. Therefore we qualify this species as EN according to the IUCN criteria of B1a & b (IUCN 2012).

Note 1:—This species has been confused with *S. vestitum* (type: Mt. Bana, Vietnam, *J. & M.S. Clemens 3296*, K, image!) by *Souladeth & Meesawat* (2012), *Chantaranothai* (2014), and *Soh & Parnell* (2015), but it is clearly distinguished from *S. vestitum* by the above diagnostic characters. *Syzygium vestitum* is restricted to northern to central Vietnam and southern China (southeast Yunnan) (Hô 2003, *Chen & Craven* 2007, from our field observations in SE Asia). The sequence of *matK* region of *S. scabrum* (GenBank accession no. LC381853) differs 7 bp of the total 760 bp from the *S. vestitum* (LC381852: *Tagane et al. V2522* (FU!) from Bach Ma National Park, Central Vietnam, ca. 25 km apart from the type locality of *S. vestitum*), supporting the separation of the two species.

Note 2:—The specimens *Souladeth P. 86*, *Souladeth P. 91* and *Yahara T. et al. L1438* were collected from the same tree.

Syzygium yersinii Tagane, V.S.Dang & Yahara, *sp. nov.* (Figure 6).

TYPE:—VIETNAM. Khanh Hoa Province, Mt. Hon Ba, 12°06'46.88"N, 108°58'14.43"E, elev. 919 m, 19 Feb. 2014, *Toyama H., Dang V.S., Tagane S., Fuse K., Yahara T., Nagamasu H., Tran H., Nguyen V.N., Nguyen Q.C., Do N.T. & Ho N.P.H. V786* [fl. bud] (holotype KYO!, isotypes FOF!, KAG!, VNM!, the herbarium of Hon Ba Nature Reserve).

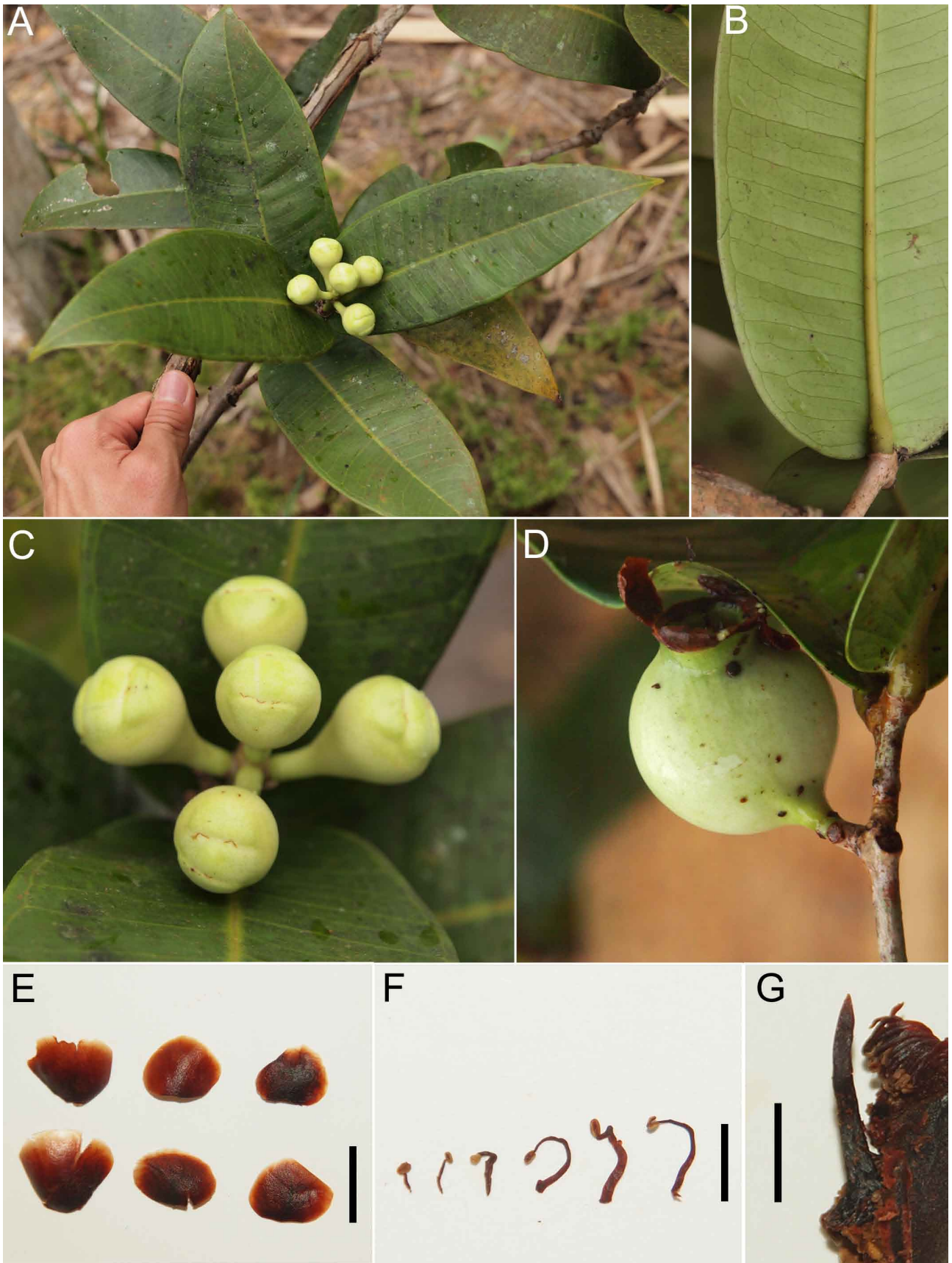


FIGURE 6. *Syzygium yersinii* Tagane, V.S.Dang & Yahara. A) Branch with flower buds, B) Portion of lower leaf surface, C) Flower buds, D) Fruit, E) Petals, F) Stamens, G) Dissected hypanthium showing style. Photographs: A–C for *Toyama et al. V786*, taken by K. Fuse on 20 Feb. 2014; D for *Toyama et al. V638*, taken by S. Tagane on 21 July 2013; E–G from *Tagane et al. V786* (KAG). Scale bars E = 1 cm, F & G = 5 mm.

Syzygium yersinii is similar to *S. chantaranothaianum* Soh & Parnell (2012: 558) in ovate-oblong leaf shape, very short petioles and terminal inflorescences but differs in having larger and thicker leaves (thickly coriaceous in *S. yersinii* vs. subcoriaceous in *S. chantaranothaianum*), reticulate tertiary vein (vs. scalariform) and larger flowers (hypanthium 1.8 cm long vs. 0.8–1 cm long).

Shrubs, 4 m tall. Young twigs terete, yellowish brown to grayish brown, glabrous, old twigs grayish brown to very pale creamy brown, glabrous, internode 2–13 cm long. Leaves opposite, blade ovate-oblong, 12.2–21.4 × 5.4–8.3 cm, 1.8–2.9 times longer than wide, thickly coriaceous, apex acuminate, acumen to 1.2 cm long, base slightly cordate to cordate, margin entire, recurved when dry, glabrous, midrib sunken adaxially, prominent abaxially, secondary veins 20–24 pairs, 0.6–1.5 cm apart, prominent and distinct on both surfaces, intersecondary veins prominent and distinct on both surfaces, tertiary veins reticulate, prominent on both surfaces, intramarginal veins 2, outer one ca. 0.6 mm apart from margin, inner one 2–3.5 mm apart from margin; petiole to 1.3 mm long, blackish when dry, glabrous. Inflorescence terminal, racemose, 3 to 5-flowered, peduncle 3 mm long, glabrous, bracteoles caducous, not seen. Flower buds ca. 2.2 cm long, 1.1 cm in diam., light yellowish green (*in vivo*). Hypanthium funnel shaped, ca. 1.8 cm long, glabrous, pseudostipe 4–7 mm long. Sepals 4, semi-circular, 4–5 × 6–8 mm, petals 5–6, orbicular, depressed ovate, depressed obovate, 7–10 × 7–14 mm, white (*in vivo*), chartaceous, with many glands. Stamens more than 480, 2–10 mm long, anthers 1–1.2 mm long, filaments 1.8–9 mm long, glabrous. Style 1.1–1.3 cm long, glabrous (floral measurements were made from rehydrated flower buds). Ovary 2-locular, ovules 8–10 per locule. Fruits globose, ca. 3.2 cm in diam., Seed 1, subglobose, 2.2 cm in diameter.

Paratypes:—VIETNAM. Khanh Hoa Province: Mt. Hon Ba, 12°06'51.31"N, 108°58'23.34"E, elev. 890 m, 21 July 2013, *Tagane et al. V638* [fr.] (FU!, VNM, the herbarium of Hon Ba Nature Reserve); 12°06'46.88"N, 108°58'14.43"E, elev. 919 m, 20 Feb. 2014, *Toyama H., Dang V.S., Tagane S., Fuse K., Yahara T., Nagamasu H., Tran H., Nguyen V.N., Nguyen Q.C., Do N.T. & Ho N.P.H. V750* [ster.] (FU!, VNM, the herbarium of Hon Ba Nature Reserve).

Distribution:—Vietnam (so far only known from the type locality, Mt. Hon Ba).

Habitat and Ecology:—Hill evergreen forest, at 890–920 m elevation.

Phenology:—Flowering specimens collected in February.

Etymology:—This species is named after Dr. Alexandre Emile Jean Yersin (1863–1943), a Swiss-French, for his contributions to the exploration of the Hon Ba mountain.

Vernacular name:—Trâm yersin.

Preliminary conservation assessment:—Endangered (EN). According to our observations in the field in Mt. Hon Ba and its adjacent areas (six times, from lowland to the summit of Mt. Hon Ba (ca. 1560 m elev.) in 2013–2017), *Syzygium yersinii* is endemic to Mt. Hon Ba and known only from the narrow range of Mt. Hon Ba, around 900 m elevation. We estimate the number of mature individuals to be fewer than 150, suggesting the situation is qualified as EN according to IUCN Red List criteria D (IUCN 2012). The forest in Hon Ba Nature Reserve is currently well protected from anthropogenic activities and therefore the population is seemingly stable.

Note:—Lee *et al.* (2014: 398) identified this species as *Syzygium formosum* (Wallich 1831: 108) Mason (1851: 554) but *S. yersinii* is easily distinguished from *S. formosum* by its opposite leaves (vs. usually whorled in *S. formosum*) and terminal inflorescences (vs. in the axils of fallen leaves). The leaf texture and venation when dry is very similar to *S. grande* (Wight 1841: 17) Walpers (1843: 180), but differs from *S. grande* in its small habit (4 m tall vs. usually more than 20 m tall), subsessile leaves (vs. petiolate in *S. grande*) and more or less slightly cordate leaf base (vs. cuneate).

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