

## Two new species of *Syzygium* (Myrtaceae) from Sri Lanka, with lectotypification and recircumscription of *Syzygium assimile*

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**ABSTRACT.** Two new species of *Syzygium* Gaertn. from Sri Lanka, *S. aureum* Jayasinghe and *S. hemachandrae* Jayasinghe, are described. *Syzygium aureum* is distinguished from *S. grande* (Wight) Walp. in having a thick ring of nectarial glands near the rim of the hypanthium and in having subglobose fruits tinged with red at ripening. *Syzygium hemachandrae* differs from *S. assimile* Thwaites in having a longer petiole, an elliptic to ovate-elliptic lamina with fewer lateral veins, a cylindrical to subcylindrical peduncle at its basal parts and approximately quadrangular secondary axes. *Syzygium aureum*, which was previously misidentified as *Syzygium firmum* Thwaites (= *S. grande*), is restricted to the southwestern lowland rainforests, while *S. hemachandrae* is confined to the moist monsoon forests of the intermediate zone of eastern Sri Lanka. Both new species were found to be included amongst the syntypes of *Syzygium assimile*. We therefore designate a lectotype and recircumscribe *Syzygium assimile*.

**Keywords.** Endemic, lowland mixed dipterocarp forest, *Syzygium batadamba*, *Syzygium kanneliyense*

### Introduction

*Syzygium* Gaertn. is the most species-rich genus of trees in the world (Beech et al., 2017; Low et al., 2022). Though absent from the Neotropics, it occurs throughout the Old World tropics and subtropics and tropical Oceania, from West Africa through the Arabian Peninsula, South Asia to Japan, New Zealand, and eastwards up to Hawaii and the Pacific Islands (Biffin et al., 2006; Govaerts et al., 2008; Craven & Biffin, 2010). The greatest diversity is in Southeast Asia and Papuasia (Camara-Leret et al., 2020; Low et al., 2022). Species of *Syzygium* exhibit substantial morphological diversity. This resulted in earlier authors attributing the various species to a number of different genera (De Candolle, 1828; Blume, 1849; Merrill & Perry, 1937, 1939; Hyland, 1983). Craven et al. (2006), however, in a study that included molecular phylogenetic analysis, concluded that *Syzygium* should be treated as a single morphologically diverse genus comprising c. 1200 species, a position supported by later authors such as Chen & Craven (2007), Govaerts et al. (2008), Christenhusz et al. (2018) and Low et al. (2022).

Although the vast majority of species of *Syzygium* occur in rainforests, the genus is also recorded from habitats ranging from littoral communities close to sea level, swamp forests, and subalpine vegetation. In rainforests, species of *Syzygium* occur as canopy-emergent trees, canopy trees, and also understorey trees (Biffin et al., 2006; Craven et al., 2006; Chen & Craven, 2007; Thulin, 2008; Low et al., 2022). Although a few species range widely, most have relatively small distributions (Govaerts et al., 2008). A handful of species are cultivated in tropical regions, both for their large edible fruits and for greening urban landscapes (Kochummen, 1978; Boo et al., 2003).

*Syzygium* is ranked amongst the most species-rich angiosperm genera in Sri Lanka (Wijesundara et al., 2020), a continental island separated from India by the shallow, c. 30 km wide, Palk Strait. The present-day island was, owing to lower sea levels, connected to India by the Palk Isthmus until the early Holocene (Pethiyagoda & Sudasinghe, 2021). The 65,525 km<sup>2</sup> island's topography is dominated by the central hills, which rise to 2524 m (Vithanage, 1997). The island benefits from two monsoons and hence, two seasons of inter-monsoonal rains. Its northern and eastern parts, the 'dry zone', constitute about two-thirds of the landmass. Rainfall in the dry zone is less than 2 m per year, reducing to around 0.5 m per year in the arid zones of the island's northwest and southeast. The climate of the dry zone is strongly seasonal: rainfall occurs mostly between December and February. The climate of the island's central and southwestern 'wet zone' is aseasonal, characterised by 2–5 m of rainfall annually and a dry period lasting less than three months (January–March). The wet zone is thus ecologically comparable to the perhumid eastern region of Madagascar and Peninsular Malaysia south of the 'Kangar-Pattani Line' (Whitmore, 1984), together with Borneo and the Philippines (Gunathilake, 2014). The perhumid southwestern part of Sri Lanka is ecologically isolated from the nearest rainforests in the Western Ghats by the dry zones of northwestern Sri Lanka and southeastern India, in addition to the Palk Strait, which created room for the evolution of more than 850 endemic angiosperm species (Gunathilake et al., 1987; Wijesundara et al., 2020). More than half of the 31 indigenous species of *Syzygium* in Sri Lanka are endemic to the island (Wijesundara et al., 2020), and the majority of the remainder is shared only with South India (Govaerts et al., 2008).

G.H.K. Thwaites was a pioneering scientist who described many of the Sri Lankan angiosperm species, including *Syzygium*. His Sri Lankan plant collections are included, together with the accessions of other collectors, in the Ceylon Plants (C.P.) catalogue. These are now scattered among collections such as K, P, PDA and SING (herbarium codes follow Thiers, continuously updated). Thwaites was superintendent of the Royal Botanic Gardens at Peradeniya (PDA), Ceylon, from 1849 to 1857 and director from 1857 to 1880 (Stafleu & Cowan, 1986). During this time, he began to sort the unordered and unmounted specimens collected by previous superintendents. Based on provisional identifications, he sorted these specimens systematically. Each taxon was given a number, referred to as a 'Ceylon Plants' or C.P. number. To this compilation he also added his own collections made in Sri Lanka (Thwaites, 1859; Trimen, 1885). These C.P. numbers included several gatherings, and some of the gathering information is noted on the sheets when this was available from previous

collectors. In some cases, the information mentions more than a single gathering but with only a single specimen, and vice versa. Sometimes, more than one gathering was mounted on a single sheet, while at other times, a single gathering was mounted on more than one sheet. There are also some sheets with multiple specimens and multiple gathering notes, but with ambiguity regarding which note refers to which specimen. As such, the gathering information sometimes does not relate to the information relevant to the exact specimen. When describing these taxa, Thwaites (1859, 1864), in his *Enumeratio*, merged some of his C.P. numbers under a single species, considering that they were mere variations. Together with the Sri Lankan material, Thwaites referred to some non Sri Lankan specimens for some of his newly described species.

Although the genus *Syzygium* in Sri Lanka has benefitted from periodic revisions over the course of the past 150 years (Thwaites, 1859, 1864; Trimen, 1894; Alston, 1931; Ashton, 1981; Kostermans, 1981), new species continue to be found. Here we describe two new species, both from *Syzygium* subgenus *Syzygium* (Craven & Biffin, 2010), discovered in the course of recent exploration. Material of both species occurs amongst the syntypes of *Syzygium assimile* Thwaites, where the protologue referred to several C.P. numbers. We therefore also designate a lectotype for *Syzygium assimile* and provide it with a new diagnosis and description. The syntypes of *Syzygium firmum* Thwaites include material from Sri Lanka (C.P. collections) and a number of Continental Asian localities (Wallich's catalogue material). The continental material is *Syzygium grande* (Wight) Walp., while the C.P. collection is *Syzygium aureum* Jayasinghe.

## Methodology

Fieldwork was conducted mostly in 2019 and 2020. Some sites were visited more than once in order to obtain flowering and fruiting material. Data on distributional range, morphological variation, and their different microhabitats were obtained for each species in the course of this fieldwork. Flowering and fruiting branches were collected as herbarium vouchers. In addition, flowers and fruits were also preserved in Formalin-Aceto-Alcohol (FAA) solution (1:1:18 of formalin (37% formaldehyde): 99.9 % acetic acid: 100% ethanol) for further study.

Collected specimens were photographed using a Canon 100 mm IS macro lens fitted to Canon 7D Mark II camera. Morphometrics of the vegetative parts were measured from dried herbarium specimens, while the measurements of flowers and fruits were taken from material preserved in FAA. All measurements of leaves, twigs, inflorescences and fruits were taken to the nearest 0.1 mm using a digital vernier calliper. Measurements of flowers were taken using a ZEISS Stemi 508 digital microscope connected to a computer. Descriptive terminology is based on Beentje (2010). Distribution maps of the species were generated based on (i) geographic coordinates taken in the field using a Garmin 64S GPS and (ii) approximate coordinates taken from herbarium labels.

Specimens gathered in the field were deposited at PDA. All specimens preserved at PDA and SING were physically examined, while those at other herbaria were examined through their relevant websites and using JSTOR Global Plants (<https://plants.jstor.org>). The new species described here have been compared to all other Sri Lankan and South Indian species of *Syzygium* based on Shareef & Kumar (2020). Nomenclature follows the World Checklist of Selected Plant Families (WCSP, 2022), and Tropicos (<https://tropicos.org>), aided by Turland et al. (2018). Abbreviations of author names and publications follow IPNI (2022).

### Taxonomic treatment

#### 1. *Syzygium aureum* Jayasinghe, **sp. nov.** (Fig. 1)

*Syzygium assimile* auct. non Thwaites: Thwaites, Enum. Pl. Zeyl. 116 (1859), p.p.; Alston in Trimen, Handb. Fl. Ceylon, 6: 115 (1931), p.p.; Ashton in Dassanayake, Revis. Handb. Fl. Ceylon 2: 451 (1981), p.p.

*Syzygium montanum* Thwaites, Enum. Pl. Zeyl. 116 (1859), nom. nud.

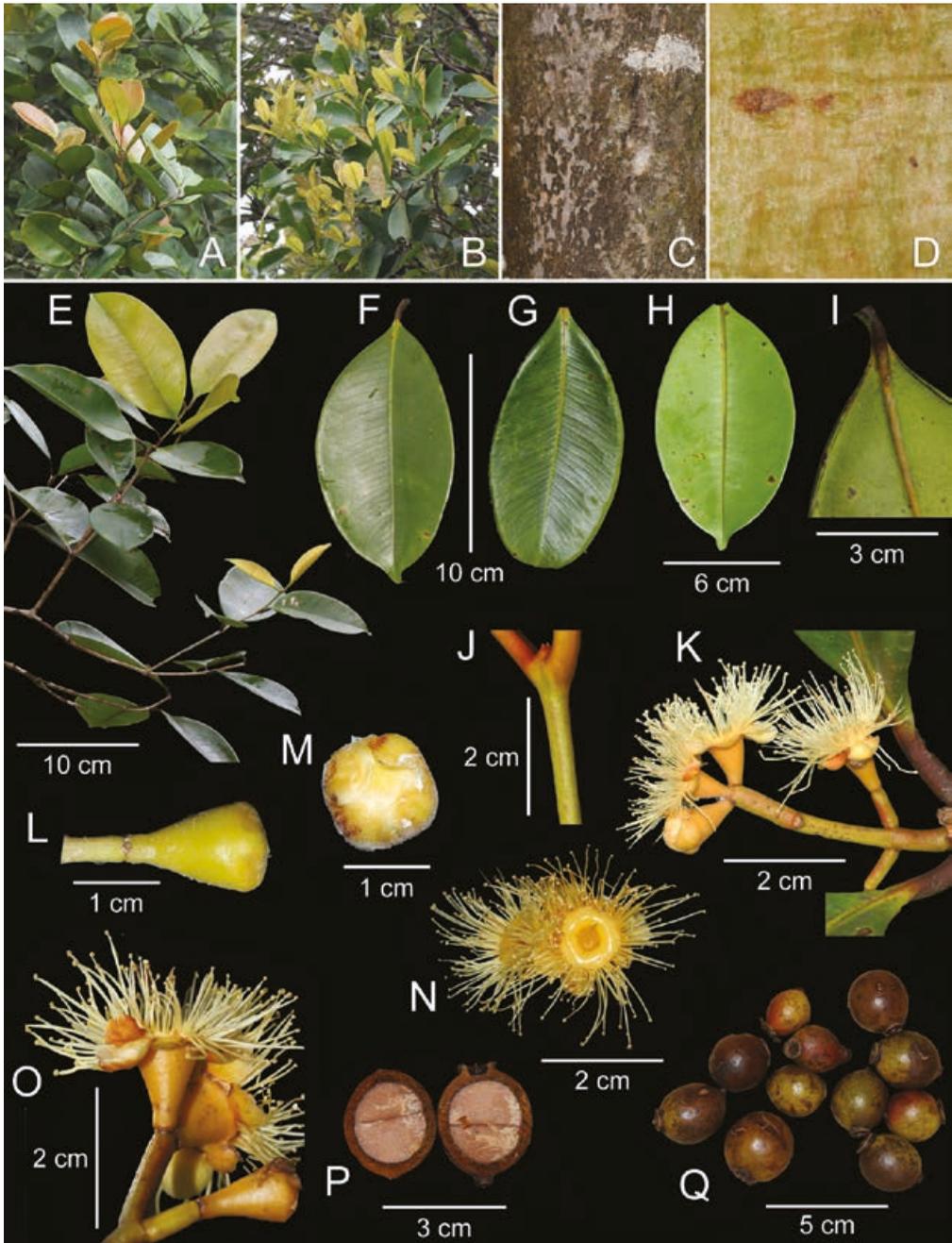
*Syzygium firmum* auct. non (Blume) Thwaites: Thwaites, Enum. Pl. Zeyl. 417 (1864), p.p.; Ashton in Dassanayake, Revis. Handb. Fl. Ceylon 2: 426 (1981), p.p.; Kosterm., Quart. J. Taiwan Mus. 34 (3,4): 132 (1981), p.p.

*Eugenia assimilis* auct. non (Thwaites) Bedd.: Beddome, Fl. Sylv. S. India Anal. Gen. CVII (1869), p.p.; Duthie in Hooker, Fl. Brit. India 2: 493 (1878), p.p.; Trimen, Handb. Fl. Ceylon, 2: 176 (1894), p.p.

*Eugenia grandis* auct. non Wight: Duthie in Hooker, Fl. Brit. India 2:490 (1878), p.p.; Trimen, Handb. Fl. Ceylon, 2: 170 (1894).

*Syzygium amphoraecarpus* auct. non Kosterm.: Kostermans, Quart. J. Taiwan Mus. 34 (3,4): 129 (1981), p.p.

*Syzygium aureum* is distinguished from *S. grande* in having thick coriaceous leaves with invisible venation on the lamina below in fresh material, often with slightly revolute margins (vs chartaceous leaves with distinct venation on both sides of the lamina in fresh material, in addition to a flat lamina margin), a thickened ring of nectaries which, together with the rim of the hypanthium, are dark golden inside in fresh material (vs nectar glands not thickened as a ring, pale yellow inside in fresh material) and subglobose fruit with a tinge of red when ripe (vs ellipsoid fruit remaining green when ripe). *Syzygium aureum* differs from *Syzygium assimile* in having larger, non-pseudocalyptrate flowers (vs pseudocalyptrate), slightly raised secondary veins on lamina above in fresh material (vs indistinct), three (vs one) intramarginal veins,

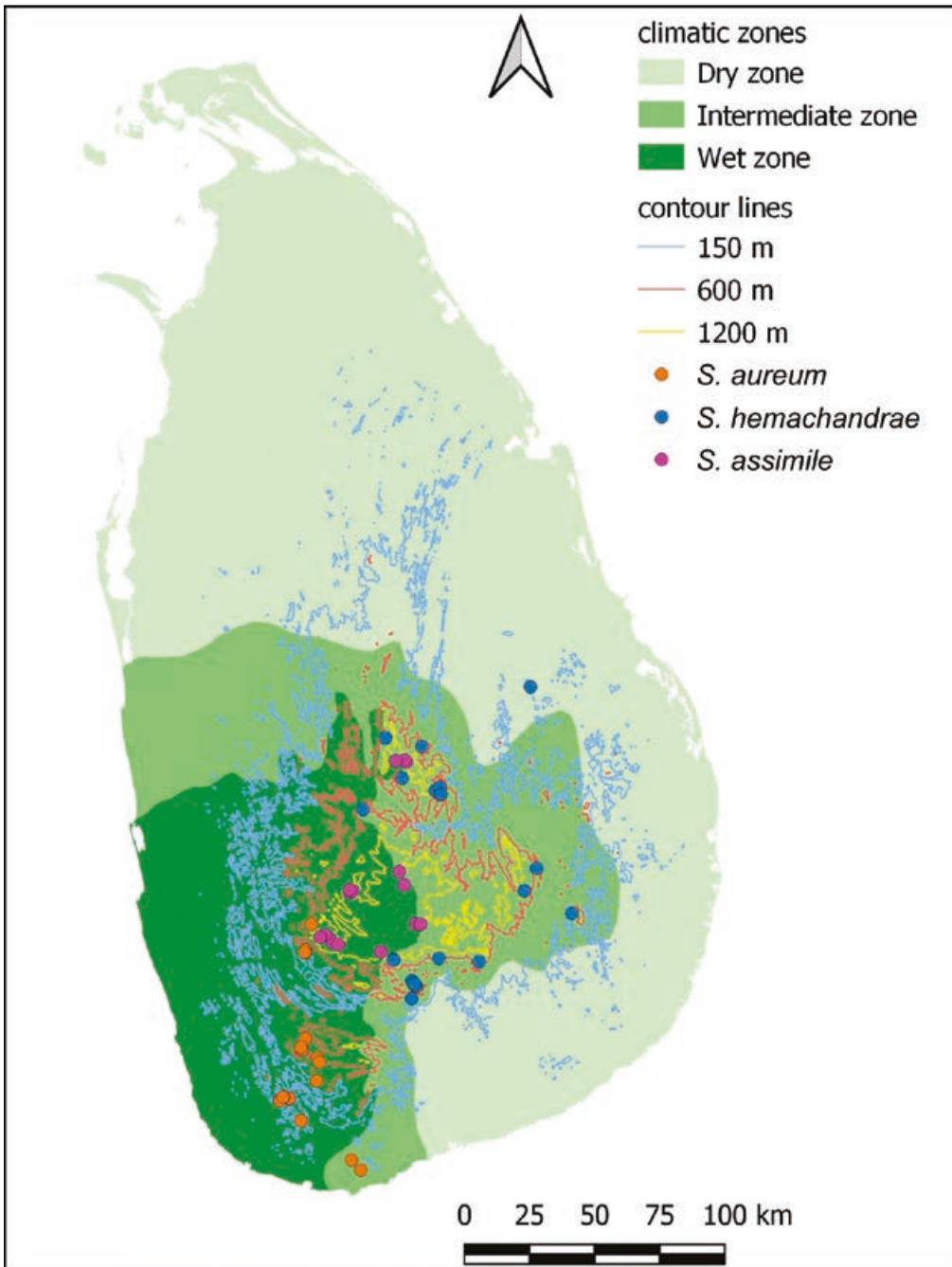


**Fig. 1.** *Syzygium aureum* Jayasinghe. Typical form: **A.** Foliage. **C.** Outer bark. **D.** Inner bark. **G.** Lamina above. **I.** Lamina below. **J.** Young stem. **K.** Inflorescence. **L.** Lateral view of flower bud. **M.** Dorsal view of flower bud. **N.** Dorsal view of the flower. **O.** Lateral view of the flower. **P.** Longitudinal section of a fruit kept in FAA. **Q.** Ripe fruits. Smaller leaved form: **B,** **E.** Foliage. **F.** Lamina above. **H.** Lamina below. (Photos: H.D. Jayasinghe)

and by attaining a greater height (c. 40 m vs c. 7 m). It is distinguished from *Syzygium amphoraecarpus* Kosterm. by having long petioles in vegetative material, while the floral material is markedly smaller (hypanthium 7–11.3 mm long vs 15.4–27 mm long) and differs in colour (golden yellow vs bright pink). Sterile small-leaved individuals of *Syzygium aureum* resemble *Syzygium kanneliyense* Kosterm., but lack the latter's sharp ridge along the midrib ventrally. – TYPE: Galle District, Kanneliya forest near Hiniduma, 150 m, November 1978, *Kostermans 27120* (holotype PDA [PDA00119942]; isotypes L [L.2530342, L.2530343, L.2530344, L0708362 (wood sample)], PDA [PDA00101586]).

Trees to 40 m tall with a straight bole; branches spreading from upper trunk except in trees growing in forest margins, which produce branches from the lower trunk; buttresses up to 2 m in old trees; outer bark pale brown to grey-brown, smooth in young trees, irregularly fissured to longitudinally flaky in old trees; inner bark pale pinkish brown to yellow-brown; young stems cylindrical, laterally flattened, smooth, golden yellow; new flush of leaves golden yellow with red petioles, erect, sometimes spreading. **Leaves:** petiole 11–17 mm long, often dull red; lamina highly coriaceous, dark green, paler beneath with a yellow midrib, margin strongly revolute and thickened, 87–162 × 41–102 mm, elliptic, apex almost rounded or even retuse (since the short apiculate tip bends downwards), base cuneate, tapering to the petiole; midrib slightly channelled above, strongly raised below; secondary veins invisible below but slightly raised above in fresh material, 14–23 pairs, at an angle of 54°–70° to midrib, almost straight; intermediates none; intramarginal veins 3, regular, 5–8 mm from the margin, tertiary venation indistinct. **Inflorescence** pseudo-terminal or in upper leaf axils; 3–10 flowered, lax; peduncle golden yellow or greenish yellow, 36–91 mm long, 2.4–3.6 mm wide at the base, cylindrical to obscurely quadrangular at base, 1st order branching, up to 3 primary nodes; each branch topped with a single flower except for a pair at the top of the main peduncle. **Flowers** sessile; hypanthium obconical, gradually widening towards top or with an abrupt minute bend near the base, 7–11.3 mm long, 6.1–8.9 mm diam. at the rim, cavity 1.7–3.2 mm deep, distinctly raised, broad ring of nectarial gland just inside the stamens, outside and inside unicolorous, dark golden yellow; calyx lobes 4, imbricate in bud, orbicular, rounded at tip, 2.7–5.3 mm long, 7.6–3.2 mm wide, dark golden yellow; petals not pseudocalyprate, retained during anthesis, pale golden brown; stamens c. 130; filaments to 19.1 mm long, straight, pale golden brown; anthers pale brownish yellow; style 9.9–15.1 mm long. **Fruits** subglobose, with a short persistent residual hypanthium at top together with remnants of nectarial gland, and sometimes with reflexed calyx lobes, 22.7–29.4 mm long, 18.8–27.2 mm diam., apical cavity 2.2–3.2 mm deep, yellowish brown suffused with red when ripe; pericarp 2.6–4.1 mm thick; seeds subglobose, 14.8–19.2 mm long, 13.5–18.6 mm diam.

*Distribution.* Endemic to perhumid southwestern Sri Lanka (Fig. 2).



**Fig. 2.** Distribution map of *Syzygium assimile* Thwaites, *S. aureum* Jayasinghe and *S. hemachandrae* Jayasinghe.

*Habitat and ecology.* Lowland rainforests between 50–450 m above sea level. The species is abundant in forest reserves such as Kanneliya (Galle District) and Gilimale (Ratnapura District) but occurs only occasionally in others such as Sinharaja (Ratnapura and Galle Districts). *Syzygium aureum* is probably the tallest *Syzygium* in Sri Lanka; it attains heights of up to 40 m at Kanneliya.

*Etymology.* The specific epithet of this species is an allusion to its golden flush and flowers.

*Vernacular names.* Daambu (දාඹු), in Sinhala.

*Specimens examined.* SRI LANKA: **Ratnapura District:** REEK\_Sinharaja, 10 Mar 2019, *Jayasinghe & Danushka HDJ 313* (PDA); Sinharaja Forest, near Weddagala, Nov 1978, *Kostermans 27157* (L [L.2530381, L.2530382], PDA); Sinharaja forest, Weddagala entrance, 5 Oct 1979, *Kostermans s.n.* (PDA); Sinharaja Forest, 23 Feb 1977, *Bremer & Bremer 897* (PDA, US [US03057504]); Sinharaja Forest, Wathurawa, Mar 1982, *N.D. de Zoysa 450 WTAU* (PDA); *ibidem*, 488 *WTAU* (PDA); Weddagala, 13 Feb 1976, *Waas 1475* (PDA); Bambarabotuwa FR, 14 May 2018, *Gangathilaka et al. NBS/2018/BAM/007* (PDA); *ibidem*, 27 Aug 2018, *Gamage et al. NBS/2018/BAM/144* (PDA); Gilimale, 9 Nov 2020, *Jayasinghe & Samarasinghe HDJ 942* (PDA); *ibidem*, *Jayasinghe & Samarasinghe HDJ 943* (PDA); *ibidem*, *Jayasinghe & Samarasinghe HDJ 945* (PDA); Gilimale FR, 24 Jul 1970, *Meijer 487* (PDA); *ibidem*, 28 Sep 1973, *Ashton 2253* (PDA). **Galle District:** Kanneliya, 5 Mar 2019, *Jayasinghe & Danushka HDJ 288* (PDA); *ibidem*, *Jayasinghe & Danushka HDJ 289* (PDA); *ibidem*, 9 Aug 2008, *Jayasuriya & Abayawardana 9776* (PDA); *ibidem*, 7 Oct 2020, *Sanjeewani et al. HDJ 923* (PDA); *ibidem*, *Sanjeewani et al. HDJ 924* (PDA); Kanneliya Forest, near Hiniduma, Nov 1978, *Kostermans 27136* [L.2530345], PDA); *ibidem*, *Kostermans 27120* (L [L.2530342, L.2530343, L.2530344]); *ibidem*, 6 May 1979, *Kostermans 27621* (L [L.2530385], PDA); *ibidem*, 6 Apr 1970, *Balakrishnan NBK 272* (PDA); KDN BR, Kanneliya, 4 km from entrance, 10 Aug 2008, *Jayasuriya & Abayawardana 9800* (PDA); Kanneliya FR, 26 Jul 1976, *Jayasuriya & Kostermans 2340* (PDA); *ibidem*, May 1979, *Gunathilake & Gunathilake 360x* (PDA); *ibidem*, 26 Jul 1971, *W. Meijer 1021* (PDA); *ibidem*, 15 Jul 1992, *Jayasuriya & Wijesinghe 6526* (PDA); Hiniduma, 24 Nov 1969, *Cramer 2768* (PDA); Dellawa PR, Dangala-Dellawa Nawalahena, 30 Mar 1992, *Jayasuriya & Wijesinghe 6300* (PDA). **Matara District:** Oliyagankele, 25 Jan 1945, *Kamburupitiya 680* (PDA [PDA00002507, PDA00002508]). **Kandy District:** Ambagamuwa, Dec 1852, *s.coll. s.n.* [C.P. 2694] (PDA [PDA00002604]). **Without precise locality:** s.l., s.d., *s.coll. s.n.* (PDA [PDA00002606]); *ibidem*, *s.coll. s.n.* [C.P. 2694] (PDA [PDA00002605]); *ibidem*, *s.coll. s.n.* [C.P. 46] (PDA [PDA00002583, upper left branch and lower branch, PDA00002584, lower two branches]).

*Nomenclatural notes.* Specimens now assigned to *Syzygium aureum* were available to Thwaites (1859), who assigned them doubtfully to ‘*Syzygium montanum*’ after comparing them to Wight’s (1846) drawing of *Eugenia montana* Wight, while noting that the material before him was imperfect. Later, Thwaites examined specimens mentioned under the catalogue name ‘*Eugenia firma*’ in the catalogue of Wallich’s herbarium. He considered these to be conspecific with his material (supplemented

by newly collected perfect specimens) of the species he had earlier identified as '*Syzygium montanum*'. Thwaites (1864) then went on to describe *Syzygium firmum* based on a part (EIC 3603A) of Wallich's series of '*Eugenia firma*' and his own series of specimens of '*Syzygium montanum*' (the latter are now catalogued as 'Ceylon Plants [C.P.] 2694'). However, Blume (1849) had already published the name *Jambosa firma* Blume based on Wallich's specimens (EIC 3603, inclusive of EIC 3603A) of '*Eugenia firma*', hence Thwaites's *Syzygium firmum* is to be treated as a new combination (article 41.4) based on *Jambosa firma*. Kostermans (1981) designated a specimen of C.P. 2694 as a lectotype of the name *Syzygium firmum* (Blume) Thwaites but C.P. 2694 is not original material of *Jambosa firma* and hence is not available as type material. A valid lectotype for *Jambosa firma* Blume was made by Byng et al. (2015) from Wallich's EIC 3603, while considering the name to be a heterotypic synonym of *Syzygium grande*. This designation predates and has priority over Soh & Parnell (2015) who typified *Jambosa firma* with a different specimen of Wallich's collection.

Many previous enumerations of species of Sri Lankan *Syzygium* did not distinguish *S. aureum* from the cultivated *S. grande*. In PDA, specimens of *Syzygium aureum* collected in the wild, *S. grande* planted at the Royal Botanic Garden, Peradeniya, and specimens received from foreign collections, are identified either as *S. grande* [= *Eugenia grandis* Wight] or *S. firmum*. Although Duthie (1878) and Trimen (1894) previously noted the differences, they did not describe the new taxon. Since the Sri Lankan material is not *Syzygium grande* (lectotype K [K000821429]) and differs from all other species, it is described here as a new species.

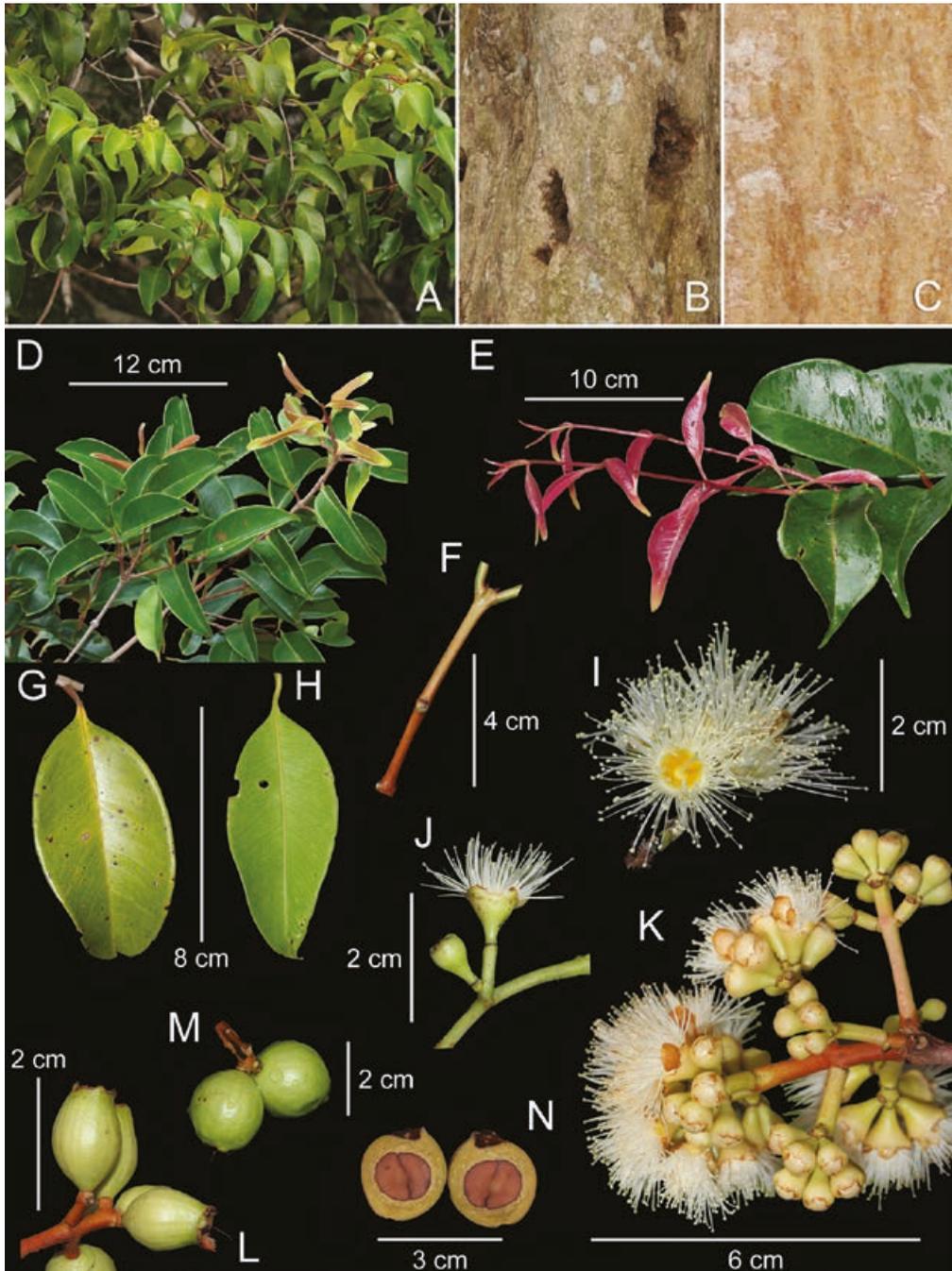
We note in passing that Kostermans (1981) erroneously considered the specimen that Thwaites placed in *Syzygium montanum* (Ambagamuwa, 4000 ft, C.P. 2694 [PDA00002604]) to belong to *S. amphoraecarus* Kosterm.

*Taxonomic notes.* Vegetative parts of the saplings of *Syzygium aureum* are quite similar to *S. grande* by having narrowly elliptic leaves with acute tips. However, the former can be distinguished by their less prominent venation in fresh material, slightly revolute lamina margin and by their golden flush.

## 2. *Syzygium hemachandrae* Jayasinghe, **sp. nov.** (Fig. 3)

*Syzygium assimile* auct. non Thwaites: Thwaites, Enum. Pl. Zeyl. 116 (1859), p.p.; Alston in Trimen, Handb. Fl. Ceylon, 6: 115 (1931), p.p.; Ashton in Dassanayake, Revis. Handb. Fl. Ceylon 2: 451 (1981), 'as subsp. *assimile*', p.p.

*Eugenia assimilis* auct. non (Thwaites) Bedd.: Beddome, Fl. Sylv. S. India Anal. Gen. CVII (1869), p.p.; Duthie in Hooker, Fl. Brit. India 2: 493 (1878), p.p.; Trimen, Handb. Fl. Ceylon, 2: 176 (1894), p.p.



**Fig. 3.** *Syzygium hemachandrae* Jayasinghe. **A.** Foliage. **B.** Outer bark. **C.** Inner bark. **D, E.** Flush. **F.** Young stem. **G.** Lamina above. **H.** Lamina below. **I.** Dorsal view of flower. **J.** Lateral view of flower. **K.** Inflorescence. **L.** Immature fruit. **M.** Mature fruit. **N.** Longitudinal section of a fruit kept in FAA. (Photos: H.D. Jayasinghe)

*Syzygium hemachandrae* is distinguished from *S. assimile* by having a longer petiole, an elliptic to ovate-elliptic lamina with an obtuse to acute apex (vs obovate to obovate-elliptic lamina with a rounded or retuse apex), fewer lateral veins, visible venation in fresh material (vs invisible), cylindrical to subcylindrical peduncle at its base, and barely quadrangular secondary axes (vs strongly quadrangular peduncle and secondary axes). Further, this species inhabits drier habitats at a lower elevation than *Syzygium assimile*. The profile of the tree resembles large-leaved *Syzygium cumini* (L.) Skeels but has entirely different venation (almost no reticulation vs distinct reticulation) and inflorescences (pseudo-terminal vs cauliflorous). Although the shape and venation of the lamina are quite similar to *Syzygium alubo* Kosterm., they differ in their flowers (hypanthium 5.5–8.9 mm long vs 2.3–2.7 mm long; calyx cup yellow vs red) and fruit morphology (20–23.8 × 18.3–22.9 mm vs 6.8–10 × 7.1–10.5 mm, pale yellowish green vs blackish purple at ripening). *Syzygium hemachandrae* differs from the Indian *S. montanum* Gamble by having larger flowers and a cylindrical (vs quadrangular) young stem. – TYPE: Sri Lanka, Samanala Wewa, 17 September 2019, *Himesh Jayasinghe & Sarath Rajapakse HDJ 11* (holotype PDA [PDA00101587 with immature fruits, PDA00101588 with flowers – a single specimen over two sheets]).

Trees to 20 m tall, with spreading, lax branches; no buttresses; outer bark smooth with sparse, small, irregular flakes, pale yellowish brown; inner bark pale brown; young stems cylindrical, widened at nodes, laterally flat, thick, smooth, green, soon becoming reddish brown; new flush of leaves red, turning golden brown, spreading. **Leaves:** petiole 9–17 mm long; lamina coriaceous to semi-chartaceous, flat or slightly undulate, yellowish green or green, paler beneath, with venation marked in thin darker-green lines, distinct in young leaves but becoming obscure in mature leaves, margin slightly revolute, strongly so near the base, 68–118 × 33–59 mm, elliptic to ovate-elliptic, apex obtuse to acute with a blunt tip, acuminate in young plants, base broadly cuneate, then abruptly tapering to petiole; midrib slightly channelled above, raised below; secondary veins 8–13 pairs, at an angle of 46°–68° to midrib, almost straight; intermediates irregular, some reaching the intramarginal vein; intramarginal vein 1, regular, 1–2 mm from margin; tertiary venation laxly reticulate. **Inflorescence** pseudo-terminal, occasionally emerging from upper leaf axils, 30–120 flowered; peduncle pale green, brownish yellow to reddish brown, 35–58 mm long, 1.4–2.1 mm wide at base, cylindrical to almost quadrangular, 2nd order branching, up to 4 branching nodes; apex of terminal branches with 2–3 flowers, congestion giving the appearance of more, lateral axes highly reduced. **Flowers** sessile; hypanthium conical to broadly infundibuliform, 5.5–8.9 mm long, 6.8–7.9 mm diam. at the rim, cavity 2.5–3.2 mm deep, outside pale brownish yellow to pale greenish yellow, inside bright golden yellow; calyx lobes 4, broadly triangular, obtuse, valvate, 0.8–2.1 mm long, 2.8–4.2 mm wide; petals pseudocalyprate, pale yellowish white to greenish white in bud; stamens c. 210; filaments to 8–10 mm long, straight, white; anthers pale brownish yellow; style 8.4–12.8 mm long. **Fruits** initially prolate, then becoming globose, no persistent remains of hypanthium at maturity, calyx lobe remnants sometimes retained

but mostly withered, 20–23.8 mm long, 18.3–22.9 mm diam., apical cavity 1.4–3.9 mm deep, remaining pale yellowish green even when ripe; pericarp 3.1–4.6 mm thick; seeds subglobose, 11.4–17 mm long, 10–14.5 mm diam.

*Distribution.* Southern, eastern and northern foothills of the Central and Knuckles Hills (Fig. 2). Endemic to Sri Lanka.

*Habitat and ecology.* Common in moist forests of the eastern intermediate zone, from 450 m to 850 m above sea level.

*Etymology.* This species is named in memory of the late Hemachandra Jayasinghe (1946–2021), father of the first author, who played a significant role in moulding him to be a passionate lover of nature.

*Vernacular names.* None known.

*Specimens examined.* SRI LANKA: **Badulla District:** Hopton, 23 Jan 2021, *Jayasinghe et al.* HDJ 1044 (PDA); Diyaluma, 17 May 1975, *Cramer* 4493 (PDA). **Monaragala District:** Sirigala Forest, Monaragala, 30 Apr 2004, *Fernando & Abeywardhana* M2,P7/9 (PDA); *ibidem*, 1 Oct 2004, *Suranjan Fernando & U. Tiran Abeywardhana* M2,P8/8 (PDA). **Polonnaruwa District:** Danigala FR, 30 Jul 2005, *Wijesundara & Jayasinghe* 32 (PDA). **Rathnapura District:** Hawagala, 9 Sep 2020, *Jayasinghe & Gopallawa* HDJ 888, flowers collected in FAA (private collection); *ibidem*, *Jayasinghe & Gopallawa* HDJ 889, fruits collected in FAA (private collection); Samanala Wewa, 12 Nov 2019, *Jayasinghe & Rajapakse* HDJ 699 (PDA); *ibidem*, 17 Sep 2019, *Jayasinghe & Rajapakse* HDJ 11 (PDA); Thalawagodella OSF, 17 Dec 1993, *Jayasuriya & Wijesinghe* 7819 (PDA); *ibidem*, *Jayasuriya & Wijesinghe* 7812 (PDA); Mulgama OSF, Balangoda Range, 17 Mar 1994, *Jayasuriya* 8118 (PDA). **Kandy District:** Bopana, Udu Dumbara, 22 Sep 2019, *Jayasinghe & Samarasinghe* HDJ 552 (PDA); *ibidem*, *Jayasinghe & Samarasinghe* HDJ 556 (PDA); *ibidem*, 12 Jan 2019, *Jayasinghe* HDJ 193 (PDA); *ibidem*, 21 Jun 2020, *Jayasinghe et al.* HDJ 839 (PDA); Thalagune, 21 Jun 2020, *Jayasinghe et al.* HDJ 838 (PDA); *ibidem*, 22 Sep 2019, *Jayasinghe & Samarasinghe* HDJ 558 (PDA); *ibidem*, *Jayasinghe & Samarasinghe* HDJ 559 (PDA); Madugoda, 18 Oct 1973, *Ashton* 2316 (PDA); Hantana, 16 Mar 1998, *Rathnayake s.n.* (PDA); *ibidem*, 8 Feb 1997, *Rathnayake s.n.* (PDA). **Matale District:** Uyangamuwa, trail to Lakegala from Narangamuwa, 7 Mar 1995, *Jayasuriya* 8806 (PDA). **Without precise locality:** s.l., s.d., s.coll. s.n. [C.P. 46] (PDA [PDA00002574, left-hand side branch and uppermost branch of the right-hand side]); Delthota, Mar 1851, s.coll. s.n. [C.P. 46] (PDA [PDA00002576, lower two branches]: gathering information may not be attributed to these samples).

*Nomenclatural notes.* Part of the mixed original material of *Syzygium assimile* under Thwaites's taxon number C.P. 46 (mentioned above in the specimens examined) belongs to *S. hemachandrae*.

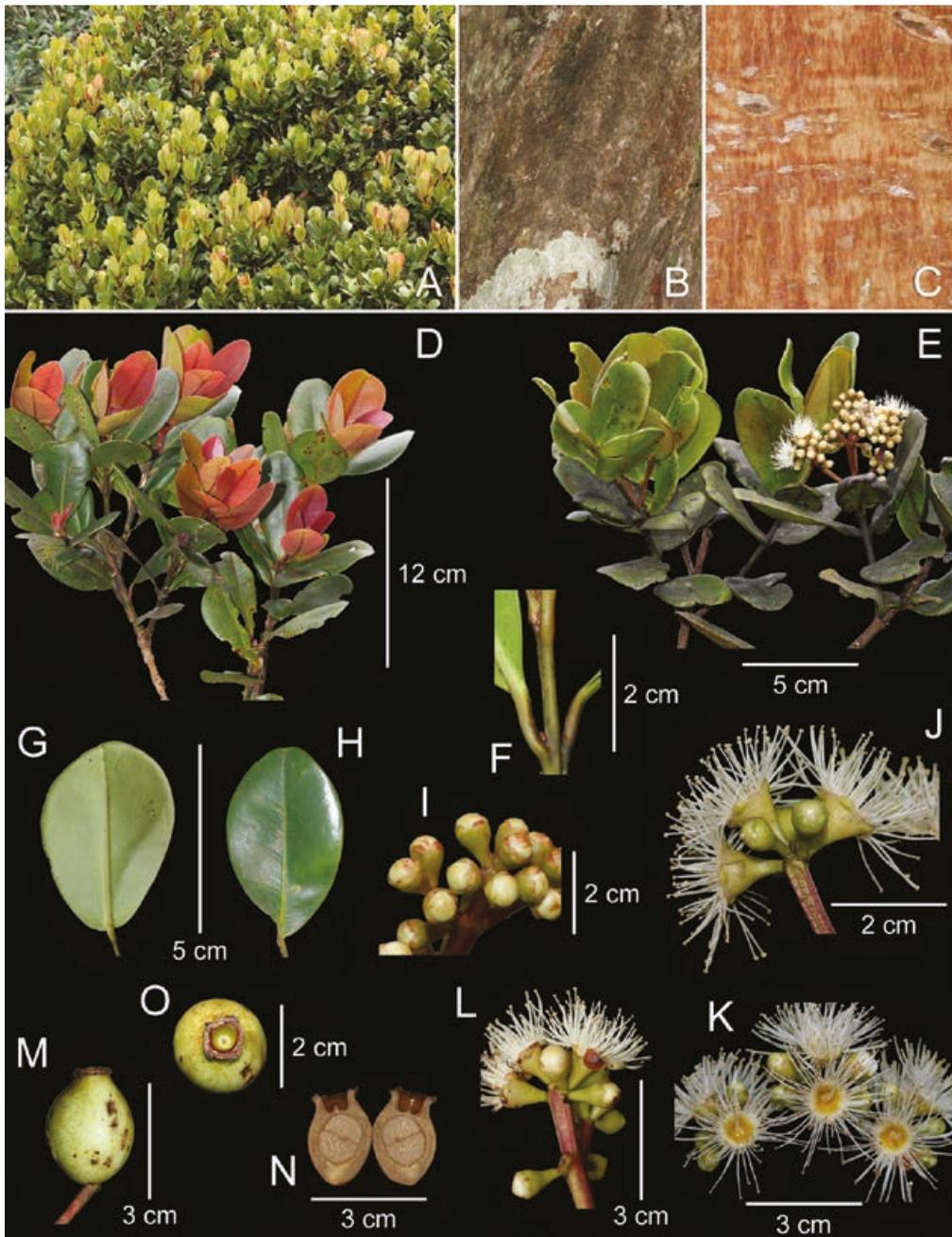
### Lectotypification and recircumscription of *Syzygium assimile*

*Syzygium assimile* Thwaites, Enum. Pl. Zeyl. 116 (1859), p.p.; Alston in Trimen, Handb. Fl. Ceylon, 6: 115 (1931), p.p.; Ashton in Dassanayake, Revis. Handb. Fl. Ceylon 2: 451 (1981), p.p.; Kostermans, Quart. J. Taiwan Mus. 34 (3,4): 131 (1981). – *Eugenia assimilis* (Thwaites) Bedd., Fl. Sylv. S. India Anal. Gen. CVII (1869), p.p.; Duthie in Hooker, Fl. Brit. India 2: 493 (1878), p.p.; Trimen, Handb. Fl. Ceylon, 2: 176 (1894), p.p. – TYPE: s.l., s.d., *s.coll. s.n.* [C.P. 46] (lectotype PDA [PDA00002584, uppermost branch with flowers]), designated here). (Fig. 4)

Trees to 7 m tall, with erect, congested branches, occasionally somewhat spreading; no buttresses; outer bark smooth with short, sparse, irregular longitudinal fissures, not flaky, often covered with lichens and mosses; inner bark pinkish brown to yellowish brown; young stems cylindrical, smooth, green, often suffused with red; new flush of leaves reddish, turning to golden brown, erect. **Leaves:** petiole 4–6 mm long; lamina coriaceous, green, paler beneath, margin revolute, occasionally flat, slightly thickened, 43–66 × 33–40 mm, obovate to obovate-elliptic, apex rounded, obtuse or retuse, base broadly cuneate, tapering to petiole; midrib slightly channelled above, strongly raised below; secondary veins invisible in fresh material, 16–20 pairs, at an angle of 54°–68° to midrib, almost straight; intermediates none; intramarginal vein 1, regular, 1–1.5 mm from margin. **Inflorescence** pseudo-terminal, 30–70 flowered, lax; peduncle red, rarely green, 25–76 mm long, 1.9–3.2 mm wide at base, distinctly quadrangular at base, 2nd order branching, up to 3 primary nodes; each terminal branch topped with 3–5 flowers. **Flowers** sessile; hypanthium infundibular to pyriform, upper part semi-spherical, 6.2–8.3 mm long, 5.7–6.5 mm diam. at rim, cavity 1.9–3.1 mm deep, outside yellowish green, regularly suffused with red, inside bright yellow; calyx lobes 4, valvate, broadly triangular, obtuse at tip, 1.2–2.3 mm long, 3.1–4.8 mm wide, yellowish green or red; petals pseudocalyptrate, greenish white in bud; stamens c. 130; filaments to 13.8 mm long, straight, white; anthers pale brownish yellow; style 9.7–11.4 mm long. **Fruits** ovoid to prolate with a short collar at top, 15.5–25.7 mm long, 10.3–22.9 mm diam., apical cavity 1.6–4.4 mm deep, calyx lobe remnants often obscure, pale greenish yellow suffused with red when ripe; pericarp 1.6–5.1 mm thick; seeds subglobose, 14.9–22.4 mm long, 12.5–17.6 mm diam.

**Distribution.** Endemic to Sri Lanka (Fig. 2). Although this species is listed as occurring in India (Govaerts et al., 2008), its existence on the mainland appears to be based on misidentified herbarium specimens of *Syzygium cumini* (Rajiv Kumar Singh, pers. comm.).

**Habitat and ecology.** Submontane forests on the western slopes of the central massif at 1400–1900 m elevation, in the wet zone. They form part of the forest canopy in these short (5 to 10 m tall) forests.



**Fig. 4.** *Syzygium assimile* Thwaites. **A.** Foliage. **B.** Outer bark. **C.** Inner bark. **D.** Flush. **E.** Foliage with strongly undulate leaves. **F.** Young stem. **G.** Lamina below. **H.** Lamina above. **I.** Flower buds. **J, L.** Lateral view of flowers. **K.** Dorsal view of flowers. **M.** Lateral view of fruit. **N.** Longitudinal section of a fruit kept in FAA. **O.** Dorsal view of fruit. (Photos: H.D. Jayasinghe)

*Vernacular names.* Damba (දඹ), in Sinhala.

*Specimens examined.* SRI LANKA: **Nuwara Eliya District:** Sri Pada, 2 Apr 2019, *Jayasinghe et al. HDJ 348* (PDA); Pattipola, 31 Aug 2019, *Jayasinghe & Danushka HDJ 529* (PDA); *ibidem*, *Jayasinghe & Danushka HDJ 530* (PDA); Moray estate, Adam's peak jungle, near fishing hut, 1 Jun 1975, *Kostermans 24926* (L [L.2514624, L.2514623], PDA, US [US03057503]); Maskeliya above Moray estate, 14 Sep 1977, *Nooteboom & Huber 3130* (L [L.2514639]); Peak Wilderness, above Gartmore estate, 13 Dec 1980, *Werner 184* (PDA); Rilagala PR, 29 Mar 1995, *Jayasuriya 8971* (PDA); Pedro PR Approach Waterfield drive off St. Andrews Drive, 27 Sep 1994, *Jayasuriya 8371* (PDA); Pattipola-Ambewela PR, 17 Oct 1994, *Jayasuriya 8440* (PDA); Kabaragala, Piduruthalagala, 4 Sep 2017, *Dahanayake KB 4-4* (PDA); Above Moray estate, near Fishing hut, 14 Nov 1978, *Kostermans 27054* (L [L.2528543, L.2528544], PDA); Bomburu Ella, Kandapola-Sita Eliya FR, Jun 2018, *Thenuwara et al. NBS/2018/SK/012* (PDA); Kandapola-Seetha Eliya FR, 8 Aug 2018, *Ekanayake et al. NBS/2018/KTL/006* (PDA); Bogawanthalawa-Balangoda road, 24 Jul 2020, *Jayasinghe et al. HDJ 862* (PDA). **Ratnapura District:** Sri Pada, 3 Apr 2019, *Jayasinghe et al. HDJ 387* (PDA); *ibidem*, *Jayasinghe et al. HDJ 388* (PDA). **Kandy District:** Queensberry estate, 11 May 2019, *Jayasinghe et al. HDJ 474* (PDA); *ibidem*, 12 May 2019, *Jayasinghe et al. HDJ 477* (PDA); Knuckles, Apr 1887, *Ferguson s.n.* (PDA [PDA00002578]); Hunnasgiriya, Apr 1857, *s.coll. s.n.* [C.P. 2449] (PDA [PDA00002582]); Kalupahana, 26 Apr 2021, *Jayasinghe et al. HDJ 1150* (PDA); *ibidem*, *Jayasinghe et al. HDJ 1152* (PDA); *ibidem*, *Jayasinghe et al. HDJ 1153* (PDA); *ibidem*, 21 Jul 2020, *Jayasinhge et al. HDJ 843* (PDA); *ibidem*, *Jayasinhge et al. HDJ 844* (PDA); *ibidem*, *Jayasinhge et al. HDJ 847* (PDA); Campbells Lane FR, 10 Feb 2020, *Gopallawa et al. NBS/2020/CMP07* (PDA). **Matale District:** Kalupahana, Knuckles, 19 May 2017, *Attanayake et al. KP 17* (PDA). **Without precise locality:** s.l., s.d., *s.coll. s.n.* [C.P. 46] (BR [BR0000005230990], PDA [PDA00002574, two sterile branches; PDA00002584, uppermost branch]); s.l., 1885, *Ferguson s.n.* (PDA [PDA00002580, PDA00002581]); s.d., *Thwaites s.n.* [C.P. 2449] (K [K000821402]); 6 Jun 1980, *Kostermans 28531* (L [L.2540101], PDA).

*Nomenclatural notes.* The syntypes of *Syzygium assimile* Thwaites consist of several gatherings under several of Thwaites's taxon numbers: C.P. 46, 291, 634, 1582, 2449 and 2495. A search of the likely herbaria resulted in the discovery of two sheets of C.P. 2449 [K000821402, PDA00002582] and fourteen sheets of C.P. 46 [PDA00002574, PDA00002576, PDA00002583, PDA00002584, BR0000005230709, BR0000005230990, FR0036199, GH00071325, MEL2435620, MEL2435621, MEL2435622, P05209189, P05209194, P05209197]. These 16 sheets contain at least four different species: one of these was later described as *Syzygium batadamba* Kosterm. Kostermans (1981), under the description of *Syzygium assimile*, remarked that '...all C.P. in PDA have disappeared and I saw only a duplicate of C.P. 46 in BO, ...', but apparently arbitrarily nominated 'C.P. 46 (PDA)' as the lectotype. Kostermans's conclusion that these specimens were no longer extant at PDA was in error. Four C.P. 46 sheets (PDA00002574, PDA00002576, PDA00002583, PDA00002584) are still available at PDA. They too, contain the aforementioned four taxa (*S. assimile*, *S. aureum*, *S. batadamba* and *S. hemachandrae*), which differ in both their vegetative (leaf shape and venation) and floral (size and pseudocalyptrate nature) morphology. Since Kostermans (1981) didn't specify the exact C.P. 46 sheet among the four at PDA

and these specimens certainly do not belong to a single gathering, his lectotypification is to be disregarded (article 8.2). Lectotypification is therefore made here according to articles 9.3 and 9.14. The general description in the protologue mostly addresses the range of variation in the specimens quoted for his description. He compared his new species *S. assimile* against Wight's (1843) plate 999 – *Eugenia arnottiana* (Wight & Arn) Wight [= *Syzygium densiflorum* Wall. ex Wight & Arn.; original material: K001119795, K001119796; a pseudocalyptrate species] and found some differences in flowers and fruits. However, some of his syntypes contained a non-pseudocalyptrate species. For this reason, material of the non-pseudocalyptrate species is eliminated from consideration for lectotypification, while newly describing it here as *S. aureum*. One of the remaining three taxa is found to be within the concept of *Syzygium batadamba* (Kostermans, 1981) and original material is hence excluded from consideration for selection as the lectotype of *S. assimile*. Out of the remaining two, a specimen of the species that is mostly consistent with the habitat details provided in the protologue is here selected as the lectotype, while the remainder is newly described here as *S. hemachandrae*.

*Taxonomic notes.* Some plants of this species have a narrower lamina with a slightly acute apex and obscurely visible secondary venation in fresh material. These bear some resemblance to *Syzygium batadamba* in vegetative characters. However, *Syzygium assimile* has larger flowers than *S. batadamba*. Individuals of the two species can also be distinguished by vegetative material in their dried state: *S. assimile* specimens are reddish brown, while those of *S. batadamba* are blackish brown.

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