

Three new records of *Syzygium* Gaertn. in Thailand and lectotypification of 19 taxa of *Eugenia* L. (Myrtaceae)

PRANOM CHANTARANOTHAI¹

ABSTRACT. Three species, *Syzygium chloroleucum* (King) Masamune, *S. kemamanense* (M.R.Hend.) I.M.Turner and *S. vestitum* Merr. & L.M.Perry, are newly recorded from Thailand. Lectotypes for 19 *Eugenia* taxa are here designated.

KEY WORDS: *Syzygium*, *Eugenia*, Myrtaceae, lectotypification.

INTRODUCTION

Syzygium Gaertn. is the largest genus in the family Myrtaceae with approximately 1,200 species, the majority of which occur in the Old World. The most comprehensive revision of the genus in Thailand was made by Parnell & Chantaranothai (2005) who treated 84 species (97 taxa). Visits to the Forest Herbarium, Bangkok (BKF), the Natural History Museum, London (BM) and the Herbarium of the Royal Botanic Gardens, Kew, Richmond, Surrey (K) in late 2013, and to the Herbarium of the Singapore Botanic Gardens (SING) in April 2014, allowed many unidentified specimens from mainland SE Asia to be examined and the publications of King (1901) and Turner (1996) to be consulted. Previously unknown records of *S. chloroleucum*, *S. kemamanense* and *S. vestitum* from Thailand were found and 19 lectotypes, proposed here, were identified. Nearly all specimens cited here have been seen, those that have not been seen are indicated by *n.v.*

NEW RECORDS

Syzygium chloroleucum (King) Masam., Enum. Phan. Born.: 526. 1942; I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 17. 1996.— *Eugenia chloroleuca* King, J. Asiat. Soc. Bengal 70(2): 113. 1901;

Ridley, Fl. Malay Penins. 1: 744. 1922; Henderson, Gard. Bull. Singapore 12: 189. 1949; Kochummen in Ng, Tree Fl. Malaya 3: 186. 1978.

Tree to 6 m tall; young twigs 4-angled, becoming terete; bark brownish. *Leaves* with petiole 1–2 cm long; lamina coriaceous, 11.5–15 by 2.9–4.5 cm, narrowly elliptic or oblanceolate, base attenuate or narrowly cuneate, apex acuminate or acute; midrib impressed adaxially, prominent or slightly keeled abaxially; secondary veins 12–20 pairs; intramarginal vein, 2–3 mm from margin. *Inflorescence* up to 4.5 cm long, terminal, rarely axillary; peduncle to 1.5 cm long, rachis and branches rather stout. *Flowers* white, in triads, subtended by two bracteoles, the outer two flowers with a pedicel 2 mm long, the central flower sessile; bracteoles 1 by 1 mm, triangular, persistent. *Hypanthial cup* ca. 3 mm long, funnel-shaped. *Pseudostipe* absent. *Sepals* 4, 2 by 1 mm, semi-orbicular, persistent. *Petals* 4, 1.5–1.8 mm diam., pseudo-calyptate, orbicular, membranous, 30–50 pellucid gland dots per petal. *Outer stamens* ca. 4 mm long; anthers ca. 0.5 mm long, ovate to oblong. *Style* ca. 2.5 mm long, stout. *Ovary* 2-locular, 10–12 ovules per locule. *Fruits* ca. 1 cm long, ellipsoid, rugose when dry.

Thailand.— PENINSULAR: Phangnga [Mueang Phangnga, Ton Pariwat Wildlife Sanctuary, 2006,

¹ Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen 40002, Thailand.

Corresponding author: email: chantaranothai@gmail.com

D.J. Middleton, C. Hemrat, S. Lindsay, S. Suddee & S. Suwanachat 3966 (K)].

Distribution.—Sumatra, Peninsular Malaysia (type collection from Perak-type).

Ecology.—In disturbed evergreen forest, alt. 450 m.

Vernacular.—Wa khiao (หัวเขียว).

Note.—An unidentified specimen seen at K undoubtedly belongs to *S. chloroleucum*. The species is morphologically similar to *S. fastigiatum* (Blume) Merr. & L.M.Perry in having persistent bracts and bracteoles. The former has shorter inflorescences (up to 4.5 cm long), leaves less than half as long as the latter, with more widely spaced secondary veins that are more conspicuous than the tertiary veins, while the inflorescence of the latter is more than half as long as the leaves (up to 12 cm long) and secondary and tertiary veins are more or less similarly conspicuous.

Additional material examined.—PENINSULAR MALAYSIA:

PERAK: Larut, 2,000 feet, June 1881, *King's Collection 1901 (K)*, 1,500–2,000 feet, Sept. 1883, 4951 (K) Feb. 1885, 7307 (young fruits, K); Taiping Hills, Feb. 1904, *Ridley 11920 (K)*; Tea Gardens, Larut, no date, *Scortechini 45* (young floral buds, K); Maxwell's Hill, by Tea Garden, 18 Nov. 1969, *T.C. Whitmore FRI 12887 (K)*; 30 Oct. 1969, *K.M. Kochummen 2895 (K)*; 4 March 1965, *Hardial & Samsuri FRI 294 (K)*.

PAHANG: Stateland Raub, 23 March 1971, *Z. Sohadi FRI 14681 (K)*.

SELANGOR: Kepong, 23 Dec. 1946, *J. Wyatt-Smith 60640 (K)*; Sg. Buloh FR, 31 March 1967, *K.M. Kochummen FRI 2264 (K)*.

Syzygium kemamanense (M.R.Hend.) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 20. 1996.—*Eugenia kemamanensis* M.R.Hend., Gard. Bull. Singapore 11(4): 303, fig. 3. 1947 & 12: 93, fig. 19a. 1949; Kochummen in Ng, Tree Fl. Malaya 3: 198. 1978 (as *kemamensis*).

Tree to 8 m tall; twigs whitish grey. *Leaves* with petioles 3–4 mm long; lamina thinly coriaceous, elliptic to elliptic-lanceolate or obovate, 11.5–18 by 4.5–7.5 cm, apex acute or acuminate, base

cuneate, rarely rounded, pale brown on both surfaces when dry; midrib impressed adaxially; secondary veins 8–11 pairs, impressed above; inner intramarginal vein 5–10 mm from margin, outer intramarginal vein faint, near margin. *Inflorescence* up to 10 cm long, in the axils of fallen leaves, paniculate, with several pairs of spreading decussate branches; peduncle up to 1 cm long, compressed. *Flowers* white; pedicel 0.5–1 mm long. *Hypanthial cup* 3.5–4.5 mm long, funnel-shaped. *Pseudostipe* 1.8–2 mm long. *Sepals* 4, 3–3.5 x 4 mm, semi-orbicular. *Petals* 4, 4–5 by 5–6 mm, free, orbicular, 70–100 pellucid gland dots per petal. *Outer stamens* ca. 4 mm long; anthers ca. 0.5 mm long, ovate to oblong. *Style* 4–5 mm long, longer than the stamens. *Ovary* 2-locular, 19–23 ovules per locule. *Fruit* globose to depressed-globose, up to 3 cm diam., with persistent calyx lobes.

Thailand.—PENINSULAR: Narathiwat [Waeng, Sirindhorn Waterfall, 19 June 1997, *P. Puudjaa 414, BKF-2* sheets; Bala-Hala, 4 Aug. 1999, *P. Puudjaa & S. Cholkulchana 635 (BKF)*].

Distribution.—Peninsular Malaysia (type).

Ecology.—Tropical rain forest.

Vernacular.—Wa nara (หัวนารา).

Note.—*S. kemamanense* is distinctive in having obovate or elliptic leaves with strongly sunken and widely spaced secondary veins and inflorescences in the axils of fallen leaves. The Thai specimen extends the range of this species from peninsular Malaysia northward to southern Thailand.

Additional material examined.—PENINSULAR MALAYSIA:

TRENGGANU: Kemaman, Ulu Ayam, Kajang, 9 Nov. 1935, *E.J.H. Corner SFN 30352 (K isotype)*.

Syzygium vestitum Merr. & L.M.Perry, J. Arn. Arb. 19(2): 110. 1938; Chen Jie & Craven in Wu Zhengyi & Raven, Fl. China 13: 348. 2007.

Tree ca. 8 m tall; twigs terete, densely reddish brown villous; branchlets, petiole, peduncle, rachis, bracts and bracteoles reddish brown villous. *Leaves* with petiole 2–3 mm long; lamina 12–22 by 4–7 cm, elliptic, oblong or oblong-lanceolate, coriaceous, base obtuse or rounded, apex acuminate

or acute; adaxial black when dry, with scattered, minute, punctuate pellucid gland dots; abaxial brown when dry; midrib and secondary veins lightly villous above, densely below; midrib raised adaxially; secondary veins 17–22 pairs; intramarginal vein 1.5–2 mm from margin. *Inflorescence* to 10 cm long, both terminal and in the upper axils, paniculate, solitary or several fasciculate with several pairs of spreading decussate branches; peduncle up to 8 cm long, compressed; bracts 5–7 mm long, linear, persistent; bracteoles 2–3 mm long, linear, persistent. *Flowers* white, sessile. *Hypanthial cup* 3.7–4.5 mm, funnel-shaped, villose. *Pseudostipe* 0.6–0.8 mm long, villosulous. *Sepals* 4, 0.7–0.9 by 1.8 mm, transversely oblong. *Petals* 4, 3–3.5 by 3 mm, free, orbicular, 30–50 gland dots per petal. *Outer stamens* 8–10 mm long; anthers 0.4 mm long, oblong-elliptic. *Style* 10–13 mm long, exceeding the stamens. *Ovary* 2-locular, 6–8 ovules per locule. *Fruits* globose or subglobose, sparsely hairy, 4–5 cm in diam.

Thailand.—NORTH-EASTERN: Nakhon Phanom [Ban Phaeng, Phu Langka National Park, Tat Kham Fall, 25 Aug. 2001, R. Pooma, W.J.J.O. de Wilde & B.E.E. Duyffjes, V. Chamchumroon & K. Phattarahirankanok 2613 (BKF)].

Distribution.—China (SE Yunnan), Laos (Vientiane, Bolikhamxai), Vietnam (type).

Ecology.—In dry evergreen forest, ca. 150 m.

Vernacular.—Wa daeng (หัวแดง).

Note.—*S. vestitum* has distinct reddish brown indumentum on inflorescences, branchlets and leaf veins and several pairs of spreading decussate and stout branches of inflorescence. The Thai specimen extends the range of the species from Laos westward to northeastern Thailand.

Additional material examined.—LAOS: VIENTIANE: *P. Souladeth* 86 (Forestry herbarium-Lao PDR, **KKU**), 91 (Forestry herbarium-Lao PDR, **KKU**-2 sheets).

VIETNAM: ANNAM: Mount Bani, May–June 1927, J. & M.S. Clemens 3296 (**K** isotype), 4453 (**K**).

NEW LECTOTYPIFICATIONS

King (1901) published 97 *Eugenia* species from the Malayan peninsula, 51 of which were new

species. He described and cited syntypes for some species and therefore, it is necessary to select one to stand as the lectotype. The following 19 lectotypes are selected from the available syntypes cited by King (1901). The designated sheet is that which best matches the protologue. These taxa are now accepted in *Syzygium* and are presented here in alphabetical order.

Syzygium burkillianum (King) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 16. 1996.—*Eugenia burkilliana* King, J. Asiat. Soc. Bengal 70(2): 94. 1901.

Syntypes: *King's Collector* 4719 (**K**) & 6186 (**BM**-2 sheets, **K**) and *L. Wray* 2785 (**K**, **SING**-3 sheets) & 3070 (**K**, **SING**).

Lectotype: Peninsular Malaysia, Perak, Taiping, *L. Wray* 3070 (**K**, barcode K000786911, isolectotype **SING**, barcode 0055849, selected here).

Syzygium chloroleucum (King) Masamune, Enum. Phan. Born.: 526. 1942.—*Eugenia chloroleuca* King, J. Asiat. Soc. Bengal 70(2): 113. 1901.

Syntypes: *King's Collector* 1901 (**BM**, **K**), 4951 (**K**), 7307 (**BM**, **K**); *Scortechini* 45 (**K**) and *L. Wray* 2917 (**P**).

Lectotype: Peninsular Malaysia, Perak, Larut, June 1881, *King's Collector* 1901 (**K**, barcode K000800004, isolectotype **BM**, barcode BM000944150, selected here).

Syzygium curtisii* var. *minus (King) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 18. 1996.—*Eugenia curtisii* var. *minor* King, J. Asiat. Soc. Bengal 70(2): 129. 1901.

Syntypes: *Harvey s.n.*, n.v. and *L. Wray* 194 (**K**).

Lectotype: Peninsular Malaysia, Perak, *L. Wray* 194 (**K**, barcode K000786923, selected here).

Syzygium dyerianum (King) P. Chantaranothai & J.Parn., Kew Bull. 48: 596. 1993.—*Eugenia dyeriana* King, J. Asiat. Soc. Bengal 70(2): 88. 1901. (lectotype selected by Chantaranothai & Parnell, 1993).—*Eugenia clarkeana* King, J. Asiat. Soc. Bengal 70(2): 93. 1901.

Syntype: *King's Collector* 781 (**K**), 3349 (**K**), 3491 (**K**), 3493 (**BM**), 3573 (**K**), 6822 (**BM**, **K**, **SING**) & *Scortechini* 205 (**K**-2 sheets, **SING**).

Lectotype: Peninsular Malaysia, Perak, Larut, *King's Collector Scortechini* 3349 (**K**, barcode K001005975, selected here).

— *Eugenia corrugata* King, J. Asiat. Soc. Bengal 70(2): 93. 1901.

Syntypes: *King's Collector* 5298 (**K**, **SING**-2 sheets), 6987 (**K**),

Lectotype: Peninsular Malaysia, Perak, Larut, December 1883, *King's Collector* 5298 (**K**, barcode K000786894, isolectotypes **SING**, barcode SING0055769, **SING**, barcode SING0055770, selected here).

Syzygium garcinifolium (King) Merr. & L.M. Perry, Mem. Amer. Acad. Arts & Sci. 18: 167. 1939.— *Eugenia garciniifolia* King, J. Asiat. Soc. Bengal 70(2): 90. 1901.

Syntypes: *King's Collector* 4541 (**CAL** *n.v.*, **K**), 6974 (**CAL** *n.v.*, **K**, **SING**) & *Scortechini* 365 (**CAL** *n.v.*, **FI** *n.v.*, **K**; *Beccari* 365 *vide* Ashton, 2011).

Lectotype: Peninsular Malaysia, Perak, December, 1884, *King's Collector* 6974 (**K**, barcode K000786879, isolectotype **CAL** *n.v.*, **SING**, barcode SING00555787, selected here).

Syzygium griffithii (Duthie) Merr. & L.M. Perry, Mem. Amer. Acad. Arts & Sci. 18: 174. 1939.— *Eugenia griffithii* Duthie in Hook.f., Fl. Brit. India 2: 481. 1878. Type: Peninsular Malaysia, Malacca, *Griffith KD* 2375 (holotype **CAL** *n.v.*, isotype **K**, barcode K000786904).

— *Eugenia valettoniana* King, J. Asiat. Soc. Bengal 70(2): 112. 1901.

Syntypes: *King's Collector* 5982 (**BM**, **K**) & 6090 (**K**-3 sheets).

Lectotype: Peninsular Malaysia, Perak, Larut, April 1884, *King's Collector* 5982 (**K**, barcode K000786902, isolectotype **BM**, selected here).

Syzygium hoseanum (King) Merr. & L.M. Perry, Mem. Amer. Acad. Arts & Sci. 18: 150.

1939.— *Eugenia hoseana* King, J. Asiat. Soc. Bengal 70(2): 106. 1901.

Syntypes: *King's Collector* 3407 (**BM**, **K**, **SING**); *Scortechini* 163 (**K**, **SING**-2 sheets) & *L. Wray* 2952 (**K**, **SING**).

Lectotype: Peninsular Malaysia, Perak, Maxwell Hill, Taiping, *L. Wray* 2952 (**K**, barcode K00086862, isolectotype **SING**, barcode SING0055800, selected here).

Syzygium inasense (King) I.M. Turner, J. Sing. Nat. Acad. Sci. 22–24: 20. 1996.— *Eugenia inasensis* King, J. Asiat. Soc. Bengal 70(2): 120. 1901.

Syntypes: *L. Wray* 4144 (**K**), 4150 (**BM**, **K**, **SING**) & 5154 (**K**).

Lectotype: Peninsular Malaysia, Gunong Inau, May 1892, *L. Wray* 4144 (**K**, barcode K001005774, selected here).

Syzygium inophyllum DC., Prodr. 3: 260. 1928. var. *bernadi* (King) I.M. Turner, J. Sing. Nat. Acad. Sci. 22–24: 20. 1996.— *Eugenia bernadi* King, J. Asiat. Soc. Bengal 70(2): 115. 1901.

Syntypes: *Curtis* 975 (**K**), 2845 (**BM**, **K**), *H.N. Ridley* 8617 (**P**) & *Scortechini* 326 **BM**, **K**-2 sheets)

Lectotype: Peninsular Malaysia, Government hill, June 1892, *Curtis* 2845 (lectotype **K**, barcode K000786961, isolectotype **BM**, selected here).

Syzygium koordersianum (King) I.M. Turner, J. Sing. Nat. Acad. Sci. 22–24: 20. 1996.— *Eugenia koordersiana* King, J. Asiat. Soc. Bengal 70(2): 128. 1901.

Syntypes: *King's Collector* 6208 (**K**), 6233 (**BM**, **K**, **SING**), 6385 (**K**-2 sheets) & *Scortechini* 257 (**K**)

Lectotype: Peninsular Malaysia, Perak, Larut, July 1884, *King's Collector* 6385 (**K**, barcode K000786976, isolectotype **K**, barcode K000786975, selected here).

Syzygium kunsteri (King) Bahadur & R.C. Gaur, Ind. J. For. 1: 349. 1978.— *Eugenia kunsteri* King, J. Asiat. Soc. Bengal 70(2): 127. 1901.

Syntypes: *Curtis 179* (CAL *n.v.*, K) & *King's Collector 3310* (K) & *3680* (K, SING-3 sheets).

Lectotype: Peninsular, Malaysia, Penang, July 1885, *Curtis 179* (K, barcode K000786981, isolectotype CAL *n.v.*, selected here).

Syzygium leptostemon (Korth.) Merr. & L.M.Perry, Mem. Amer. Acad. Arts & Sci. 18: 156. 1939.— *Jambosa leptostemon* Korth., Nederl. Kruidk. Arch. 1: 201. 1847. Type: Borneo, Kalimantan, without locality, *Korthals s.n.* (holotype L *n.v.*, barcode L0062755).

— *Eugenia urceolata* King, J. Asiat. Soc. Bengal 70(2): 101. 1901, non *Jambosa urceolata* Korth.

Syntypes: *King's Collector 713 n.v.*, 1908 (K), 2317 *n.v.*, 3345 (K), 4262 (K), 6600 (BM), 6665 (BM, K), 6682 (K), 10677 (K) & 10780 *n.v.*; *H.N. Ridley 256 n.v.*, 4975 *n.v.*, 7736 (K), *s.n.* (Malacca) *n.v.* & *L. Wray 2423* (BM), 2609 (BM), 2928 (K), 3134 *n.v.*, 3248 *n.v.*

Lectotype: Peninsular Malaysia, Perak, Larut, Oct. 1884, *King's Collector 6665* (lectotype K, barcode K001006675, isolectotype BM, selected here).

Syzygium linocieroides (King) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 21. 1996.— *Eugenia linocieroides* King, J. Asiat. Soc. Bengal 70(2): 118. 1901.

Syntypes: *King's Collector 4580* (K-2 sheets), 7980 (K), 8094 (K-2 sheets, SING) & *L. Wray 1898* (K, SING) & 2595 (SING).

Lectotype: Peninsular Malaysia, Perak, August 1885, *King's Collector 8094* (lectotype K, barcode K000786942, isolectotype K, barcode K000786941, SING, barcode SING0055812, selected here).

Syzygium perryiae (perryae) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 22. 1996.— *Eugenia ben-gamina* King, J. Asiat. Soc. Bengal 70(2): 106. 1901, non *Syzygium benjaminum* Diels, Bot. Jahrb. 57: 411. 1922.

Syntypes: *Forbes 2046 n.v.*; *King's Collector 7306* (K) & *L. Wray 2623* (K), 2797 (K, SING) & 3204 (SING-2 sheets).

Lectotype: Peninsular, Malaysia, Maxwell Hill, Taiping, *L. Wray 2797* (K, barcode K000786950, isolectotype SING, barcode SING0055761, selected here).

Syzygium setosum (King) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 24. 1996.— *Eugenia setosa* King, J. Asiat. Soc. Bengal 70(2): 120. 1901.

Syntypes: *King's Collector 5266* (BM, K, SING), 6601 *n.v.*, 6793 *n.v.* & *L. Wray 2704* (K, SING).

Lectotype: Peninsular Malaysia, Taiping, August 1888, *L. Wray 2704* (K, barcode K000800015, isolectotype SING, barcode SING0056121, selected here).

Syzygium stapfianum (King) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 25. 1996.— *Eugenia stapfiana* King, J. Asiat. Soc. Bengal 70(2): 119. 1901.

Syntypes: *Scortechini 336* (BM, K) & *L. Wray 216* (P), 1582 (K, SING), 1619 (K, SING).

Lectotype: *Scortechini 336* (K, barcode K000800056, isolectotype BM, selected here).

Syzygium subdecussatum (Wall. ex Duthie) I.M.Turner var. **montanum** (King) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 25. 1996.— *Syzygium subdecussatum* Wall. Cat., nom. nud.— *Eugenia subdecussta* Duthie var. *montana* King, J. Asiat. Soc. Bengal 70(2): 121. 1901.

Syntypes: *King's Collector 8030* (BM, K); *Scortechini 294 n.v.* & *L. Wray 217* (K), 3840 *n.v.*

Lectotype: Peninsular Malaysia, Perak, August 1886, *King's Collector 8030* (K, barcode K001005735, isolectotype BM, selected here).

Syzygium wrayi (King) I.M.Turner, J. Sing. Nat. Acad. Sci. 22–24: 26. 1996.— *Eugenia wrayi* King, J. Asiat. Soc. Bengal 70(2): 119. 1901.

Syntypes: *Scortechini 313 n.v.* & *L. Wray 321* (BM), 1504 (K) & 3859 (SING).

Lectotype: Peninsular Malaysia, Ulu Bantung, Padang, *L. Wray 1504* (K, barcode K000786867, selected here).

ACKNOWLEDGEMENTS

This work is the result of partial support to visit the Royal Botanic Gardens, Kew, UK from the Faculty of Science, Khon Kaen University. I am grateful to the keepers and staff of BKF, BM, K and SING for making the specimens available for this study. I thank Dr Wu-Kuang Soh for providing photos of the syntypes from P and the anonymous reviewers for their valuable suggestions.

REFERENCES

- Aston, P.S. (2011). Myrtaceae. In: Tree Flora of Sabah and Sarawak. E. Soepadmo, L.G. Saw, R.C.K. Chung & R. Kiew (Eds.) vol 7, pp. 87–330, Straits Digital Sdn. Bhd., Selangor.
- Bahadur, K.N. & Gaur, R.C. (1978). New Combination/ New Name Under *Syzygium*. Indian Journal of Forestry 1: 349.
- Chantaranothai, P. & Parnell, J. (1993). New taxa and combinations in *Cleistocalyx* and *Syzygium* (Myrtaceae) in Thailand. Kew Bulletin 48: 589–610.
- Chen, J. & Craven, L.A. (2007). Myrtaceae. In: Flora of China. Wu Zhengyi & P.H. Raven (Eds.), vol. 13, 321–359, Missouri Botanical Garden Press.
- Duthie, J.F. (1878). Myrtaceae. In: The Flora of British India. J.D. Hooker (Ed.), vol. 2: pp. 462–506, L. Reeve & Co., Ltd., London.
- Henderson, M.R. (1947). New species of *Eugenia* Linn. (Myrtaceae). The Gardens' Bulletin Singapore 11: 299–338.
- Henderson, M.R. (1949). The genus *Eugenia* (Myrtaceae) in Malaya. The Gardens' Bulletin Singapore 12: 1–293.
- King, G. (1901). V. Materials for a Flora of the Malayan Peninsula. Journal of the Asiatic Society of Bengal 70: 66–142.
- Kochummen, K.M. (1978). Myrtaceae. In: Tree Flora of Malaya. F.S. Ng (Ed.), vol. 3, pp. 169–254, Kuala Lumpur, Longman Malaysia.
- Korthals, P.W. (1847). Nederlandsch Kruidkundig Archief. Vol. 1. Verslagen en mededeelingen du Nederlandsche botanische Vereeniging, Leiden.
- Masamune, G. (1942). Enumeratio Phanerogamarum Bornearum. Taihoku University, Taihoku, Formosa.
- Merrill, E.D. & Perry, L.M. (1939). The Myrtaceous Genus *Syzygium* Gaertner in Borneo. Memoirs of The American Academy of Arts and Science 18: 135–202.
- Parnell, J.A.N. and Chantaranothai, P. (2005). Myrtaceae. In: Flora of Thailand. K. Larsen & T. Santisuk (Eds.), vol. 7, part 4, Prachachon Co. Ltd., Bangkok.
- Ridley, H.N. (1922). The Flora of the Malay Peninsula. vol. 1, L. Reeve & Co., Ltd., London.
- Turner, I.M. (1996). What should the kelat trees of Malaya be called? Journal of the Singapore National Academy of Science 22–24: 15–27.