

FOUR NEW SPECIES OF SYZYGIUM (MYRTACEAE) FROM AUSTRALIA

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SUMMARY

The following new species of *Syzygium* are described from Queensland, Australia: *S. fratris*, *S. glenum*, *S. monimioides* and *S. monospermum*. Notes are provided as to their putative relationships.

Key words: *Acmena*, *Cleistocalyx*, *Piliocalyx*, *Syzygium*, Myrtaceae, Australia.

INTRODUCTION

The Australian species of *Syzygium* Gaertn. and its closer generic relatives were recently revised by Hyland (1983). Hyland accepted five genera within the complex, *Acmena* DC., *Acmenosperma* Kausel, *Eugenia* L., *Syzygium*, and *Waterhousea* B. Hyland, treating the Australian species at that time referred to *Cleistocalyx* Blume within his concept of *Syzygium* (Hyland, 1983). During work on an account of the generic complex for Flora of Australia (Craven & Matarczyk, in press) it became apparent that to accept the genera recognised by Hyland would require the description of several new genera to accommodate anomalous species. These species were either unknown or inadequately collected when Hyland's work was published but at least one species treated by Hyland, *S. wesa* B. Hyland, is incongruent within the genus to which he assigned it.

Eugenia and *Syzygium* often have been treated as congeneric (e.g. Henderson, 1949; Kochummen, 1978) whereas others have maintained them as distinct genera (e.g. Merrill, 1950; Kostermans, 1981). Schmid's studies of morphological and anatomical data indicated that two separate lineages were involved (Schmid, 1972a, b) and this view has been supported by some recent molecular work. Analyses of *matK* sequence data and non-molecular data have shown that *Syzygium* and *Acmena* form a clade with four other Australasian genera (*Anetholea* Peter G. Wilson, *Osbornia* F. Muell., *Backhousia* Hook. & Harv. and *Choricarpia* Domin) that is sister to a clade containing both Old and New World genera (*Archirhodomyrtus* (Nied.) Burret, *Pilidiostigma* Burret, *Rhodamnia* Jack, *Calyptranthes* Sw., *Eugenia* and *Xanthomyrtus* Diels, Wilson et al., 2001).

While the accumulated evidence that *Eugenia* and the *Syzygium* generic complex represent distinct evolutionary lineages may now have resolved that particular issue, there remains considerable uncertainty as to the circumscription of *Syzygium*. In publications of world-wide scope, Merrill (1950) accepted seven (and tentatively an eighth) genera that belong to the *Syzygium* complex, Airy Shaw (1966) three, Kausel (1957) ten, and Briggs & Johnson (1979) eight. In more geographically restricted works, often there has

been considerable variation as to which generic segregates are accepted. In a study of Australian species, Hyland (1983) recognised *Acmena*, *Acmenosperma*, *Syzygium* (incl. *Cleistocalyx*) and a fourth genus, *Waterhousea*, an Australian endemic. In contrast, in an account of the syzygioid species in Fiji, Smith (1985) recognised *Cleistocalyx* as a genus distinct from *Syzygium*, together with *Syzygium* and *Piliocalyx* Brongn. & Gris, the last named genus occurring in New Caledonia, Vanuatu and Fiji. Chantaranothai & Parnell (1994a, b) and Parnell (1999), in dealing with Thai species of the syzygioid group, recognised *Acmena*, *Cleistocalyx* and *Syzygium* (incl. *Acmenosperma*). For Malaya, Turner (1997) preferred to recognise *Syzygium* only (incl. *Acmena*, *Acmenosperma*, *Cleistocalyx*). The issue was discussed by Craven (2001) who concluded that recognition of a single genus, i.e. *Syzygium*, was the only practicable solution in the light of present knowledge.

As a result of the work towards the accounts of the syzygioid genera for Flora of Australia mentioned above, four undescribed species were identified from north-eastern Queensland; these are newly described below and placed in *Syzygium*. Where relevant, notes are given on the placement of the species relative to genera accepted by other workers.

The reproductive seasonal growth unit that is described for each of the four species in this paper is defined as the shoot or flush of growth that includes the inflorescence. This growth unit may have a leafy zone in addition to the inflorescence per se or may consist entirely of the inflorescence.

1. *Syzygium fratris* Craven, *spec. nov.* — Fig. 1a

A *S. canicortex* B. Hyland floribus sepalis discretis et petalis perfecte evolutis differt.
— Typus: L.A. Craven, R. Jensen & W. Cooper 10421 (holo BRI; iso A, BO, CANB, L, LAE, MEL, P), Australia, Queensland, Mt Bartle Frere, NW Peak, 2 December 2001.

Tree to 10 m tall, to 10 cm dbh. *Bark* nondescript. *Branchlets* compressed or quadrangular, winged, the wings not joined at the base, 0.5–1 mm diam.; bark dull, smooth or cracked. *Leaf lamina* elliptic, broadly elliptic or ovate, 3.5–8.5 by 1.3–3.4 cm, 1.9–2.9 times as long as wide, base cuneate or attenuate, apex long acuminate (tip of the acumen rounded or obtuse), acumen plane or recurved, margin revolute, entire, midrib rounded on the abaxial surface, primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein, primary veins 10–14 on each side of the midrib, divergence angle more or less uniform, in the median part of the lamina the veins at an angle of 55–70° and 1–3.5 mm apart, intramarginal vein present and 0.5–1.4 mm from the margin, secondary intramarginal vein present (obscure and only visible after the removal of lamina surface tissues), oil dots visible to the unaided eye in transmitted light, the dots small, sparse. *Petiole* 2–4.5 by 0.6–0.8 mm, axillary enations often present, 0.4–1.4 mm long. *Reproductive seasonal growth unit* leafless. *Inflorescence* among the leaves, terminal, few-flowered and then cymose or spicate or 1-flowered, main axis straight and rigid, 0.5–1.6 by 1–2 cm, 0.5–1 mm thick at the mid point; bracteate, the bracts deciduous; bracteoles subtending each flower, or subtending the lateral flowers of a triad with the terminal flower ebracteolate, deciduous. *Flowers* not calyptrate. *Hypanthium* dull, obscurely gland dotted, stipitate, stipitately narrowly funnel-shaped or elongated-goblet-shaped, 5.5–7.5 by 2.5–4.5 mm, the stipe 1.5–2 mm



Fig. 1. A. *Syzygium fratris* Craven, flowering branchlets; B. *Syzygium monimioides* Craven, flowering branchlets (A: Craven, Jensen & Cooper 10421 (CANB); B: Forster, Sankowsky & Tucker 10750 (QRS)). — Scale bars = 1 cm.

long. *Sepals* 4, uniform in size or nearly so, transversely semicircular or transversely narrowly semi-elliptic, persistent, not accrescent, 0.1–0.5 mm long. *Petals* 4, deciduous, not coherent, 2 by 2–2.5 mm, margin entire or lacerate. *Staminal disc* unmodified or prominent. *Stamens* all fertile, outermost stamens 2–4 mm long; anther sacs parallel; anthers oblong, 0.3–0.5 mm long, dehiscing by longitudinal slits, connective not glandular. *Style* 4–6.5 mm long at anthesis. *Placentation* axile-median, the placenta

weakly developed, narrowly oblong or sublinear (more or less flange-like). *Ovules* 4–6 per locule, pendulous, arranged in two longitudinal rows. *Immature fruit* smooth or glandular-verruculose, barrel-shaped, perhaps less than 12 by 7 mm at maturity, with the calyx rim not appreciably expanding in fruit, pericarp distinctly free from the seed and without peg-like intrusions into the seed. *Seed* 1, spheroidal, perhaps c. 4 mm diam. at maturity, testa absent, uni-embryonic; embryo with the cotyledons readily separable and with no interlocking placental tissue present, equal in size or nearly so.

Distribution — Australia (Queensland, Mt Bartle Frere, NW Peak).

Habitat — Rain forest; 1400–1500 m altitude.

Notes — 1. Flowers have been recorded in May and December. Fruits have been recorded in March.

2. The most closely related species to *S. fratrīs* may be *S. canicortex* B. Hyland. In both species the placentation is axile-median, the ovules are pendulous in two longitudinal rows in each locule, and the leaves are fairly similar in shape and size. However, the two species may be distinguished as follows: *S. canicortex*: flowers calyptrate (the calyptra is sepaline in origin and the petals adhere to and fall with the calyptra) and the fruit consequently lack sepals, leaves with axillary enations 0.2–0.5 mm long; *S. fratrīs*: flowers with 4 sepals and petals, the sepals persistent through to the mature fruit, leaves often with axillary enations, these 0.4–1.4 mm long.

3. The epithet is derived from the Latin *frater*, brother, in reference to the locality Mt Bartle Frere which itself was named in honour of Henry Bartle Edward Frere, a former Governor of Bombay and a former president of the Royal Geographical Society.

Specimens studied:

Cooper & Cooper 1735; Craven, Jensen & Cooper 10419, 10420, 10421 (type); Gray 3949; Gray in Hyland 25917RFK; Hyland 12923; Jensen 805.

2. *Syzygium glenum* Craven, *spec. nov.* — Fig. 2c, d

A S. gustavioides (F.M. Bailey) B. Hyland ovario placentis axialiapicalibus, et seminibus cotyledonibus coalitis et contexto fungiformi intruso differt. — *Typus*: *W. Cooper & W. Cooper 979* (holo CANB; iso QRS), Australia, Queensland, Daintree River region, Turpentine Road (N of Cow Bay), 21 June 1996.

Tree to 25 m tall, to 70 cm dbh. *Bark* reddish-brown-grey; flaky. *Branchlets* terete or rounded-compressed, 1.3–2.2 mm diam.; bark dull, smooth or slightly striate. *Leaf lamina* narrowly elliptic, elliptic or narrowly ovate, 8.4–17.9 by 3.2–6.7 cm, 2.4–3.4 times as long as wide, base cuneate, obtuse or attenuate, apex acuminate (tip of acumen acute or occasionally rounded), acumen plane, margin revolute, entire, midrib angled or rounded on the abaxial surface, primary and secondary venation distinctly different with the secondaries relatively little developed and not joining the intramarginal vein, primary veins 19–42 on each side of the midrib, divergence angle more or less uniform or with the distal veins more acute than the proximal, in the median part of the lamina the veins at an angle of 55–70° and 3–11 mm apart, intramarginal vein present and 1.6–6 mm from the margin, secondary intramarginal vein present and a third is usually present, oil dots visible to the unaided eye in transmitted light, the dots small, sparse. *Petiole* 7.5–16 by 1.3–2 mm, stipules and/or axillary enations absent. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones or

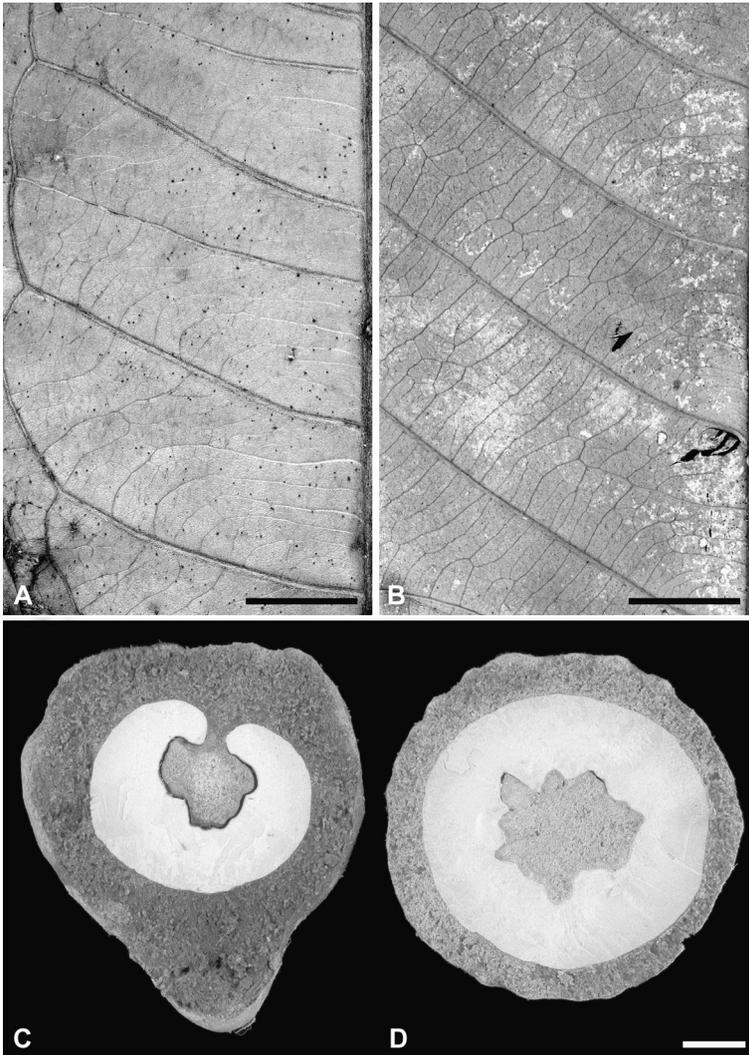


Fig. 2. A. *Syzygium monospermum* Craven, abaxial leaf surface; B. *Syzygium erythrocalyx* (C.T. White) B. Hyland, abaxial leaf surface; C, D. *Syzygium glenum* Craven. C. Longitudinal section through a fruit showing pericarp, embryo (the white tissue) and the intrusive mushroom-shaped tissue; D. transverse section through a fruit (A: Hyland 2960RFK (CANB); B: Webb 945 (CANB); C & D: Cooper & Cooper 979 (CANB)). — Scale bars = 1 cm.

with a reproductive zone only. *Inflorescence* leafless, among the leaves, terminal or distal axillary, few- to many-flowered, paniculate, main axis straight and rigid, 3–40 by 1.5–17 cm, 1–2 mm thick at the mid point; bracteate, the bracts deciduous; bracteoles subtending the lateral flowers of a triad but with the terminal flower ebracteolate, deciduous. *Flowers* calyprate (the calyptra formed from fused sepals only, the petals cohere to the calyptra and fall with it), the calyptra 0.75–1.5 mm long. *Hypanthium*

dull-glossy, not visibly gland dotted, stipitate, cup-shaped, 6–7 by 4.5–5.5 mm, the stipe 1.5–2 mm long. *Petals* 4, caducous, obsolete. *Staminal disc* unmodified. *Stamens* all fertile, outermost stamens 5–8 mm long, filaments inflexed in bud; anther sacs parallel, oblong; anthers 0.2–0.3 by 0.3–0.4 mm, dehiscent by longitudinal slits, connective glands small, few. *Style* 5 mm long at anthesis. *Placentation* axile-apical, the placenta a small, anvil-shaped structure, lobing and compitum not seen. *Ovules* 3 or 4 per locule, pendulous, arranged radially in one row. *Mature fruit* rusty-brown, costate, obovoid (flattened at the distal end), 45–70 by 45–70 mm, with the calyx rim appreciably expanding in fruit, pericarp relatively dry (subwoody) and distinctly free from the seed, without peg-like intrusions into the seed. *Seed* 1, napiform, 35–53 mm diam., testa absent, with a mushroom-shaped structure that intrudes between the cotyledons and interlocks them, uni-embryonic; embryo with the cotyledons fully fused to each other or sometimes almost so (the epi- and hypocotyl at the outer edge of the embryo).

Distribution — Australia (Queensland, the Cape Tribulation-Daintree River region where it occurs in a single stand of relatively few mature trees).

Habitat — Rain forest; c. 20 m altitude.

Notes — 1. Flowers have been recorded in March and May. Fruits have been recorded in February, June, August and November.

2. With calyptrate flowers, axile-apical placentation, pendulous ovules arranged radially in one row on each placenta, and the seeds having intrusive tissues between the fused cotyledons, *S. glenum* has many of the diagnostic features of *Piliocalyx*, a genus so far known only from New Caledonia, New Hebrides (Vanuatu) and Fiji (Smith, 1985). The present species differs from *Piliocalyx* in having parallel anther sacs and unbranched intrusive tissue between the cotyledons, the sacs in *Piliocalyx* being divergent (Smith, 1985) and the intrusive tissue in the *Piliocalyx* seed being strongly ramified as in *Syzygium smithii* (Poir.) Nied. (*Acmena smithii* (Poir.) Merr. & Perry). If the narrow generic circumscriptions adopted for the *Syzygium* group of genera by some authors were applied to the present species, the combination of character states possessed by *S. glenum* would have resulted in it being classified in a monotypic genus. Considering the other Australian syzygioid species, however, the species has strong similarities to *S. gustavioides* (F.M. Bailey) B. Hyland in its foliage and the possession of a floral calyptra and parallel anther sacs. *Syzygium gustavioides* has anther sacs that are parallel to divergent, and the placentation, ovular arrangement, and seed/embryo characters typical of *Syzygium* s.s. Despite the considerable differences between the two species in the last three features, I consider that these two species are more closely related to each other than they are to any other so far known species.

3. The dry pericarp and its fibrous, subwoody texture prompts speculation as to how the fruits of *S. glenum* are dispersed. There is no aromatic or fleshy tissue that would induce a bird or mammal to eat the fruit. Also, the large size of the fruit would preclude ingestion of the fruit by all extant frugivores in the north-eastern Queensland rain forests with the exception of the Double-wattled cassowary, *Casuarius casuarius*. If indeed *S. glenum* has no extant dispersal agent, its very restricted distribution and very small population is more understandable given the apparent inedibility of its fruit.

4. The specific epithet is derived from the Greek *glenos*, thing to stare at, wonder, in reference to the fruit and seed that are such striking features in this species.

Specimens studied:

Cooper & Cooper 781, 831, 979 (type); *Ford 1794, 1796; Sankowsky 1186, 1189, 1419, 1555; Small s.n.*

3. *Syzygium monimioides* Craven, *spec. nov.* — Fig. 1b

A. S. wesa B. Hyland hypanthio depresso stiptatinapiformi, sepalis petalisque 5, et ovulis 2–3 insertis radialiter uniseriatis differt. — Typus: *P.I. Forster, G. Sankowsky & M.C. Tucker 10750* (holo BRI; iso L, MEL, QRS), Australia, Queensland, East Normanby River, 24 June 1992.

Tree to 20 m tall, sometimes a treelet, to 40 cm dbh. *Bark* red; flaky to scaly. *Branchlets* terete or compressed, rounded, 0.6–1.3 mm diam.; bark dull, slightly striate or smooth. *Leaf lamina* ovate, narrowly ovate, elliptic or narrowly elliptic, 3.7–10.6 by 1.2–4.3 cm, 2–3.6 times as long as wide, base attenuate, cuneate or narrowly cuneate (occasionally approaching rounded), apex long acuminate or acuminate (tip of acumen acute, obtuse or rounded), acumen plane, margin revolute or flat (often appearing undulate but it is unknown if this is an artefact caused by drying), entire, midrib angled or rounded on the abaxial surface, primary and secondary venation distinctly different with the secondaries relatively little developed and not joining the intramarginal vein, primary veins 14–27 on each side of the midrib, the divergence angle more or less uniform or with the distal veins more acute than the proximal, in the median part of the lamina the veins at an angle of 55–65° and 1–5 mm apart, intramarginal vein present and 0.7–3.3 mm from the margin, secondary intramarginal vein present, oil dots visible to the unaided eye in transmitted light, the dots small, dense. *Petiole* 3.5–9.7 by 0.5–1.2 mm, axillary enations often present. *Reproductive seasonal growth unit* usually with a reproductive zone only (rarely with a pair of leaves subtending the proximal branches of the inflorescence). *Inflorescence* usually leafless, among the leaves, terminal or distal axillary, few- to many-flowered, paniculate, racemose or spicate, main axis straight and rigid, 1–6 by 0.5–2 cm, 0.4–0.6 mm thick at the mid point; bracteate, bracts usually deciduous (rarely a few persisting); bracteoles subtending the lateral flowers of a triad but with the terminal flower ebracteolate, or subtending the flower of a monad (monads apparently result from the abortion of lateral buds of triads), usually persisting or sometimes deciduous. *Flowers* cream, not calyprate. *Hypanthium* dull, visibly gland dotted, stipitate, depressed-napiform, 3.1–3.8 by 1.3–2.3 mm, stipe 1.6–2.1 mm long. *Sepals* 5, papillate, 4 uniform in size or nearly so but with 1 sepal much larger than the others and almost petaloid, transversely narrowly oblong, transversely oblong or subcircular, ‘petaloid’ sepal subcircular, persistent, not accrescent, 0.2–0.4 mm long. *Petals* 5 (sometimes imperfectly developed), papillate, deciduous, not coherent, 0.8–1.1 by 0.8–1.1 mm, the margin entire or lacerate. *Staminal disc* apparently slightly ascending (fully open flowers not seen). *Stamens* all fertile, outermost stamens c. 1 mm long, the filaments inflexed in bud; anther sacs parallel, transversely oblong or semi-subcircular; anthers 0.2 by 0.3 mm, dehiscing by longitudinal slits; connective glands large, solitary. *Style* 2 mm long at anthesis. *Placentation* axile-apical, the placenta a peg-like protrusion from the apex of the locule into the locule. *Ovules* 2 or 3 per locule, pendulous, arranged radially in one row. *Mature fruit* apparently light green or green, glandular-verrucose, napiform, 10–12 by 11–15 mm, with the calyx rim not appreci-

ably expanding in fruit, pericarp distinctly free from the seed and without peg-like intrusions into the seed. *Seed* 1, napiform, 10 mm diam., testa absent, uni-embryonic; embryo with the cotyledons readily separable and no interlocking placental tissue present, distinctly unequal in size.

Distribution — Australia (Queensland, East Normanby River-Mt Misery region).

Habitat — Rain forest; 150–600 m altitude.

Notes — 1. Flowers have been recorded in June, September and October. Fruits have been recorded in March.

2. This species has some floral similarities with *S. wesa*, e.g. acmenoid gestalt, papillae on the petals and sepals, reduced anthers (the anther sacs parallel in *S. monimioides* and parallel or divergent in *S. wesa*). It differs from *S. wesa* in its axile-apical and peg-like placenta with 2 or 3 pendulous ovules per locule. *Syzygium wesa* has an axile-apical or axile-median, semi-obovoid or almost flange-like placenta with 6–8 pendulous ovules per locule. As far as the essential generic features are concerned, *S. monimioides* has two syzygioid character states (parallel anther sacs, seed without intrusive tissue between the two cotyledons) and 2 acmenoid states (axile-apical placenta, pendulous ovules). If one ascribes to the view that *Piliocalyx*, *Waterhousea*, *Acmena*, etc. are valid genera, then *S. monimioides* should be placed in a new genus.

3. The specific epithet is derived from the superficial resemblance of the inflorescence to that of some members of the Monimiaceae.

Specimens studied:

Cooper & Cooper 520; Ford 1773; Forster, Sankowsky & Tucker 10750 (type), 15581; Gray 7848; Jessup, Guymmer & Dillewaard GJD2891; Sankowsky 1084, 1085, 1181, 1183; Sankowsky & Sankowsky 1131, 1132, 1133, 1134.

4. *Syzygium monospermum* Craven, *spec. nov.* — Fig. 2a

A S. erythrocalyx (C.T. White) *B. Hyland* planta semper cauliflora, foliis venis tertiariis obscure scalaribus, et fructu alba 1-seminali differt. — *Typus: B. Hyland 2960RFK* (holo CANB; iso QRS), Australia, Queensland, Noah [Creek], Vacant Crown Land, 7 Nov. 1973.

Tree to 17 m tall, to 25 cm dbh, the trunk with slits leading to hollows inhabited by ants. *Bark* reddish brown; smooth. *Branchlets* compressed or terete, rounded, 1.4–2.8 mm diam.; bark dull, smooth, slightly striate or cracked. *Leaf lamina* narrowly elliptic, narrowly obovate or elliptic, 10.2–24.1 by 4.5–9.3 cm, 1.6–3.2 times as long as wide, base cordate, apex short acuminate or obtuse (tip of acumen rounded, obtuse or retuse), acumen plane, margin flat or sometimes revolute, subentire or entire, midrib rounded on the abaxial surface, primary and secondary venation distinctly different with the secondaries relatively little developed and not joining the intramarginal vein, the primary veins 11–24 on each side of the midrib, the divergence angle more or less uniform, in the median part of the lamina at an angle of 65–80° and 6.5–24 mm apart, intramarginal vein present and 4–11.4 mm from the margin, secondary intramarginal vein present, tertiary venation obscurely ladder-like, oil dots visible to the unaided eye in transmitted light, the dots small, sparse to dense. *Petiole* 2.3–5 by 1.2–3.2 mm, stipules and/or axillary enations absent. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on warty outgrowths on the trunk, 2- to few-flowered,

cymose or racemose, main axis straight and rigid, 3.5–4 by 4–5 cm, 1.5–1.8 mm thick at the mid point, bracteate, bracts deciduous, bracteoles subtending each flower, deciduous. *Flowers* not calyprate, filaments yellow to yellowish cream. *Hypanthium* dull, visibly gland dotted, stipitate, narrowly campanulate or olliform, 12.5–14 by 7–12.5 mm, stipe 2–4 mm long. *Sepals* 4, inner pair larger than the outer, subcircular, semi-elliptic or transversely semi-elliptic, persistent, not accrescent, outer pair of sepals 3.8–6 mm long, inner pair 5.8–9.5 mm long. *Petals* 4, deciduous, not coherent, 16–20 by 14–21 mm, the margin lacerate or entire. *Staminal disc* unmodified (however the inner hypanthium wall creates a lip or flange that may be as wide as the staminal disc). *Stamens* all fertile, outermost stamens 17–30 mm long the filaments inflexed in bud; anther sacs parallel, narrowly elliptic or narrowly oblong; anthers 1.7–2.5 by 0.8–1.6 mm, dehiscent by longitudinal slits; connective glands small, solitary. *Style* 25–35 mm long at anthesis. *Placentation* axile-median, placenta semi-ovoid to hemispheroidal, distinctly appressedly lobed with the lobes bordering the compitum. *Ovules* 36–42 per locule, ascending, arranged irregularly. *Mature fruit* white, spherical, 38–40 by 36–41 mm, with the calyx rim not appreciably expanding in fruit, pericarp adhering to the seed and with peg-like intrusions into the seed. *Seed* 1, spheroidal, 30 mm diam., testa absent (or apparently so), uniembryonic; embryo with the cotyledons readily separable and no interlocking placental tissue present, equal in size or nearly so.

Distribution — Australia (Queensland, the Cape Tribulation-Mossman region).

Habitat — Rain forests; from sea level to 600 m altitude.

Notes — 1. Flowers have been recorded from June to August. Fruits have been recorded in July.

2. *Syzygium monospermum* appears closely related to *S. erythrocalyx* (C.T. White) B. Hyland and the specimens then available to Hyland were cited under the latter species in his revision (Hyland, 1983). The two species are distinguished as follows: *S. monospermum*: trunk with slits leading to hollows inhabited by ants (*Iridomyrmex gilberti*, N. Nicholson, pers. comm.), with warty outgrowths that carry the inflorescences; bark smooth, reddish brown; tertiary venation obscurely ladder-like (Fig. 2a); fruit white, 1-seeded; *S. erythrocalyx*: trunk without slits or warty outgrowths, inflorescences carried among the leaves, on the branchlets and/or on the branches; bark fibrous, mid grey-brown; tertiary venation distinctly ladder-like (Fig. 2b); fruit red, 3–7-seeded.

3. The specific epithet is derived from the Greek *mono-*, one-, and *-spermus*, -seeded, in reference to the 1-seeded fruit.

Specimens studied:

Cooper & Cooper 52; *Hyland* 2635RFK, 2960RFK (type), 6754, 9965; *Irvine* 637, 1368; *Moriarty* 2151; *Sanderson* 1132; *Webb & G. Tracey* s.n.

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REFERENCES

- Airy Shaw, H.K. 1966. J.C. Willis, A dictionary of the flowering plants and ferns. 7th ed. Cambridge University Press, Cambridge.
- Briggs, B.G. & L.A.S. Johnson. 1979. Evolution in the Myrtaceae – evidence from inflorescence structure. Proc. Linn. Soc. New South Wales 102: 157–256.
- Chantaranothai, P. & J. Parnell. 1994a. New taxa and combinations in *Cleistocalyx* and *Syzygium* (Myrtaceae) in Thailand. Kew Bull. 48: 589–610.
- Chantaranothai, P. & J. Parnell. 1994b. A revision of *Acmena*, *Cleistocalyx*, *Eugenia* s.s. and *Syzygium* (Myrtaceae) in Thailand. Thai Forest Bull., Bot. 21: 1–123.
- Craven, L.A. 2001. Unravelling knots or plaiting rope: What are the major taxonomic strands in *Syzygium* sens. lat. (Myrtaceae) and what should be done with them? In: L.G. Saw, L.S.L. Chua & K.C. Khoo, Taxonomy: the cornerstone of biodiversity. Proc. Fourth Fl. Males. Symp.: 75–85. Inst. Pen. Perhutanan Malaysia, Kuala Lumpur.
- Craven, L.A. & J.A. Matarczyk. In press. *Syzygium*. In: Flora of Australia.
- Henderson, M.R. 1949. The genus *Eugenia* (Myrtaceae) in Malaya. Gard. Bull. Singapore 12: 1–293.
- Hyland, B.P.M. 1983. A revision of *Syzygium* and allied genera (Myrtaceae) in Australia. Austral. J. Bot., Suppl. 9: 1–164.
- Kausel, E. 1957. Myrtaceae, no. 28. In: J. Angely, Catálogo e estatística dos gêneros botânicos fanerogâmicos. Instituto Paranaense de Botânica, Curitiba.
- Kochummen, K.M. 1978. Myrtaceae. In: F.S.P. Ng, Tree Flora of Malaya 3: 169–254. Longman, Malaysia, Singapore.
- Kostermans, A.J.G.H. 1981. *Eugenia*, *Syzygium* and *Cleistocalyx* (Myrtaceae) in Ceylon. A monographical revision. Quart. J. Taiwan Mus. 34: 117–188.
- Merrill, E.D. 1950. Readjustments in the nomenclature of Philippine *Eugenia* species. Philipp. J. Sci. 79: 351–430.
- Parnell, J. 1999. Numerical analysis of Thai members of the *Eugenia*–*Syzygium* group (Myrtaceae). Blumea 44: 351–379.
- Schmid, R. 1972a. A resolution of the *Eugenia*–*Syzygium* controversy (Myrtaceae). Amer. J. Bot. 59: 423–436.
- Schmid, R. 1972b. Floral anatomy of Myrtaceae. 1. *Syzygium*. Bot. Jahrb. Syst. 92: 433–489.
- Smith, A.C. 1985. Myrtaceae. In: A.C. Smith, Flora Vitiensis Nova 3: 289–377. Pacific Tropical Botanical Garden, Lawai, Hawaii.
- Turner, I.M. 1997 ('1996'). What should the kelat trees of Malaya be called? J. Singapore Natl. Acad. Sci. 22–24: 15–27.
- Wilson, P.G., M.M. O'Brien, P.A. Gadek & C.J. Quinn. 2001. Myrtaceae revisited: a reassessment of infrafamilial groups. Amer. J. Bot. 88: 2013–2025.