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An infrageneric classification of *Syzygium* (*Myrtaceae*)

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Abstract An infrageneric classification of *Syzygium* based upon evolutionary relationships as inferred from analyses of nuclear and plastid DNA sequence data, and supported by morphological evidence, is presented. Six subgenera and seven sections are recognised. An identification key is provided and names proposed for two species newly transferred to *Syzygium*.

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INTRODUCTION

Syzygium Gaertn. is a large genus of *Myrtaceae*, occurring from Africa eastwards to the Hawaiian Islands and from India and southern China southwards to southeastern Australia and New Zealand. In terms of species richness, the genus is centred in Malesia but in terms of its basic evolutionary diversity it appears to be centred in the Melanesian-Australian region. Its taxonomic history has been detailed in Schmid (1972), Craven (2001) and Parnell et al. (2007) and will not be further elaborated here.

Relative to its fellow genera in Malesian *Myrtaceae*, there is more than a little truth in the statement that *Syzygium* is a 'Cinderella' genus, being at best neglected by systematists. The seeming lack of nonvariable characters that may serve to break the group into smaller, more easily managed units for detailed study is one reason that has been advanced to explain the unwillingness of researchers to undertake studies on *Syzygium*. Perhaps the long-standing confusion with the New World-centred, speciose genus *Eugenia* L. has also contributed. Additionally, it seems that the large number of species in the *Syzygium* complex has created an impression that the genus is difficult. Certainly, the relatively small number of publications on *Syzygium* and its closer generic segregates is indicative of a lack of attention by botanists. A search of the Kew Record of Taxonomic Literature database (Anonymous 2007) pulled out c. 100 publications (an idiosyncracy of the database is that sometimes an article is listed more than once but this occurs across the database and we have not attempted to weed out the duplicate records). Given that *Syzygium* s.l. probably comprises somewhere between 1 200 and 1 500 species this is disappointing, especially when contrasted with *Rhododendron* L. (*Ericaceae*) which has, depending upon one's species concepts, between 600 to 1 000 species; a search of *Rhododendron* in the Kew Record database came up with c. 960 articles involving this genus. In their concluding remarks, Parnell et al. (2007) drew attention to some of the positives from researching such a diverse and widespread taxon as *Syzygium*. Due to its size, it is unlikely that the genus will be monographed in the foreseeable future. Yet there are many rewarding and worthy floristic and other scientific projects that await attention and are feasible in the shorter time frame that is a feature of the current research philosophies of short-sighted institutions.

One impediment to undertaking studies of natural groups of species of *Syzygium*, as opposed to floristic studies per se, has been the lack of a framework or context within which a set of species can be the focus of specialised research. Below is proposed an infrageneric classification based upon phylogenies derived from analyses of molecular sequence data. The relative relationships of the supraspecific taxa recognised are depicted in Fig. 1. Harrington & Gadek (2004) used sequence data from the nuclear ITS and ETS regions and Biffin et al. (2006, In press) used sequence data from the chloroplast *matK* and *ndhF* genes and *rpl*16 intron in their investigations into the relationships of species and genera within the complex. These researchers found that the evolutionary relationships of the lineages recovered by analyses of the nuclear and chloroplast data were not congruent with contemporary taxonomic groups. Given the extent of homoplasy in morphological characters and the difficulty in circumscribing genera, Craven (2001) and Craven et al. (2006) concluded that *Syzygium* is better circumscribed broadly with the various segregate genera merged with it. Based upon the results of Biffin et al. (2006, In press), a system of classification for *Syzygium* is proposed below; this is supported by morphological evidence as far as this is possible given that much of the genus still remains to have its critical morphological features recorded. With this caveat in mind, we believe that to present a classification now will benefit research in that the subgeneric and sectional concepts can be tested with other, especially molecular, datasets. In Fig. 1, there are several instances in which species are associated with a named clade but for which there is not strong support for their being included in that clade, e.g., *S. ingens* is associated with the *S. acuminatissimum-S. smithii* clade and *S. hedraiophyllum* is associated with the *S. mulgraveanum-S. unipunctatum-S. floribundum* clade. The morphological features of the relevant species, however, group them strongly with their associated clades and accordingly we place these species in the indicated sections and/or subgenera. Several clades are monospecific as far as is known, e.g., the Australian *S. glenum*, *S. monimioides* and *S. gustavioides* clades, and these are given sectional recognition due to their divergent morphologies.

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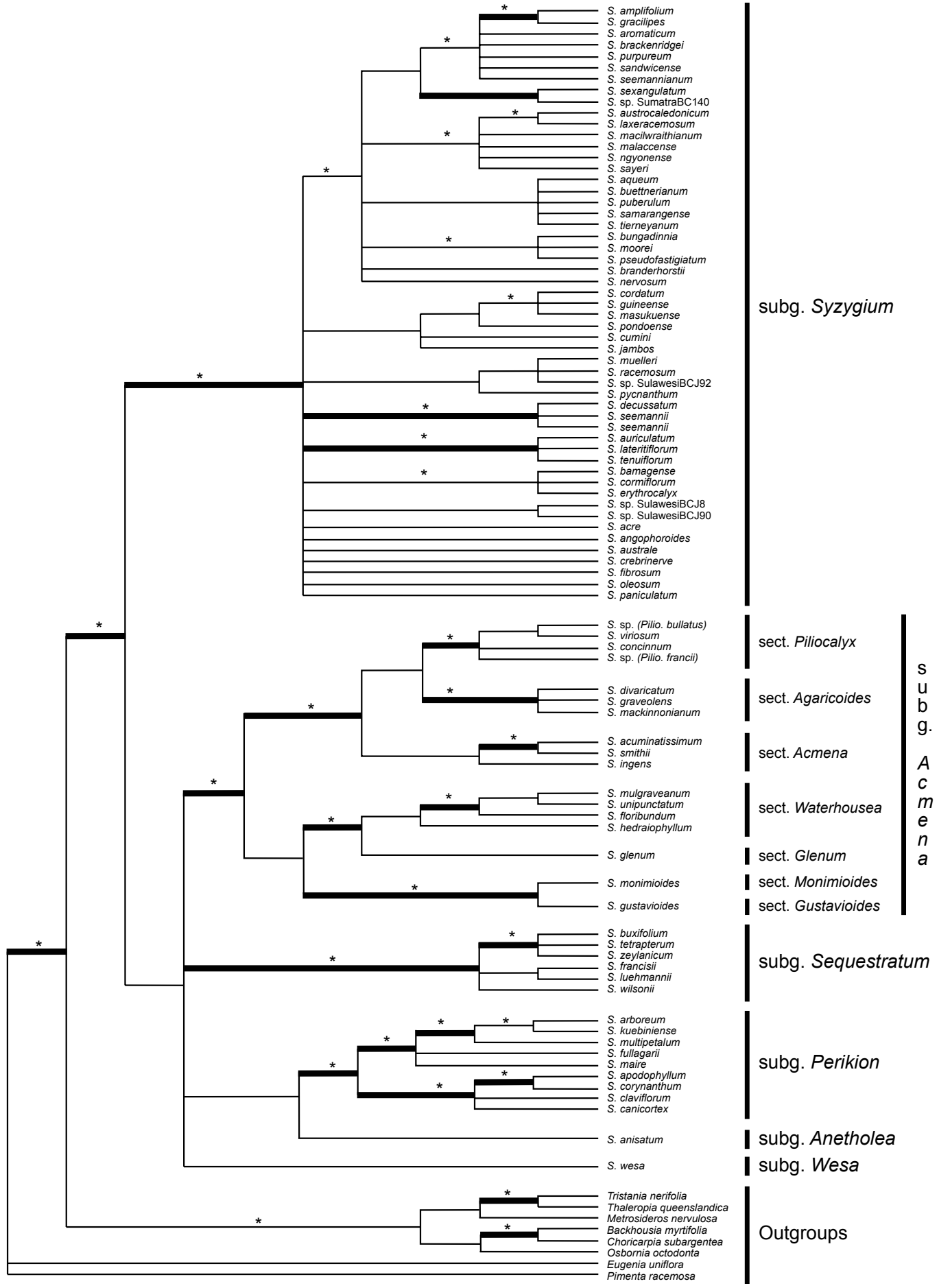

Fig. 1 Cladistic relationships of the subgenera and sections of *Syzygium*. The cladogram is a strict consensus tree of 1 000 most parsimonious trees found in analysis of a combined chloroplast dataset (*matK*, *ndhF* and *rpl16*). **Bold** branches represent those receiving 90 % or greater bootstrap support, and asterisks indicate branches with Bayesian posterior probability of 95 % or greater. Based on Biffin et al. (In press).

Future revisionary and floristic researchers are encouraged to collect and publish information on some important characters that currently are largely neglected. Such characters as the presence-absence of numerous fibre bundles in the hypanthium wall, the position of the placenta, the orientation and arrangement of the ovules on the placenta, the presence-absence of a testa, and the nature of the tissues developed in fruit from the chalaza, are all important for classification but are presently poorly recorded perhaps due in part to difficulties in interpretation of some characters. The readily observed states of the hypanthium bundle character can be determined in both flowering and fruiting stages of development, and is a useful key character to separate the species of subg. *Perikion* from those of subg. *Syzygium*. Some contemporary authors (Parnell 1999, Ashton 2006) have indicated the distinctiveness of the species that equate to the generic concept of *Jambosa* Adans. Indeed, first considerations of *Syzygium* s.s. (flowers typically small to medium-sized, 5-merous, petals coherent and caducous) vis-à-vis *Jambosa* (flowers typically large, 4-merous, petals fully free and deciduous) lead one to the thought that these are quite different plants. There are, however, sufficient species that are variable with respect to these character states that it seems one cannot place all the relevant species unambiguously in either grouping. The molecular evidence available clearly positions both generic concepts in the same clade, i.e., in subg. *Syzygium*.

We have not set out to typify all the relevant supraspecific names as in some cases it may be necessary to draw upon molecular data to determine their accurate placement. Given that 80–90 % of the genus belongs to subg. *Syzygium*, it is reasonable to assume that a similar proportion of the supraspecific names also are to be placed in that subgenus. We believe that future systematists working on subg. *Perikion*, *Sequestratum* and *Syzygium*, in western Malesia in particular, are in a better position than we to appropriately typify, and place, these names. Reference to Fig. 1 shows that the internal resolution of the clade equating to subg. *Syzygium* is poor. Before a final classification of subg. *Syzygium* can be achieved, further molecular work utilising novel genes insofar as *Syzygium* is concerned, is essential.

The derivation of the name *Syzygium* (literally meaning 'joined or yoked together') is generally regarded as unclear (Parnell et al. 2007). Browne (1756, as *Suzygium*) referred to the paired arrangement of the leaves and branchlets; this may well be the basis of the name and is our preferred derivation. The first author is indebted to his friend and colleague, Rhys Gardner, Auckland, for drawing our attention to McVaugh (1956) who discussed the nomenclatural issues surrounding the name *Syzygium* and gave another insight into its derivation. The generic name *Syzygium* (as *Suzygium*) was coined by Browne (1756) for a New World species that is now placed in *Calyptranthes* Sw. and, fide McVaugh (1956), refers to the calyptrate perianth possessed by that species. Gaertner (1788) adopted Browne's genus (with the spelling *Syzygium*) for four Old World species, some of which fide Gaertner also have calyptrate perianths.

Syzygium

Syzygium Gaertn. (1788) 166, nom. cons. — *Eugenia* subg. *Syzygium* (Gaertn.) Wight (1841) 12, 15. — *Jambosa* sect. *Eusyzygium* Miq. (1855) 447. — Type: *Syzygium caryophyllaeum* Gaertn.

1. *Syzygium* subg. *Syzygium*

Caryophyllus L. (1753) 515, nom. rej. — *Eugenia* subg. *Caryophyllus* (L.) Wight (1841) 12, 14. — Type: *Caryophyllus aromaticus* L. (*Syzygium aromaticum* (L.) Merr. & L.M.Perry).

Jambosa Adans. (1763) 88, 564 (as *Jambos*), nom. et orth. cons., nom. rej. — *Eugenia* subg. *Jambosa* Wight (1841) 12, 14. — *Eugenia* sect. *Jambosa* Miq. (1850) 17. — Type: *Jambosa vulgaris* DC., nom. illeg. (*Eugenia jambos* L., *Jambosa jambos* (L.) Millsp., *Syzygium jambos* (L.) Alston).

Myrthoides Wolf (1776) 73 (see Ross (1966) 159). — Type: *Myrtus caryophyllata* L. (*Syzygium caryophyllatum* (L.) Alston).

Malidra Raf. (1838) 107. — *Cerocarpus* Hassk. (1842) 36, nom. illeg. — *Jambosa* sect. *Cerocarpus* Blume (1850) 102. — Type: *Malidra aquea* (Burm.f.) Raf. (*Eugenia aquea* Burm.f., *Jambosa aquea* (Burm.f.) DC., *Cerocarpus aqueus* (Burm.f.) Hassk., *Syzygium aqueum* (Burm.f.) Alston).

Cleistocalyx Blume (1850) 84. — *Cleistocalyx* sect. *Eucleistocalyx* Merr. & L.M.Perry (1937) 325. — *Eugenia* sect. *Cleistocalyx* (Blume) M.R.Hend. (1949) 11, 17, 264. — Type (fide Merrill & Perry 1937: 333): *Cleistocalyx nitidus* Blume (*Eugenia cleistocalyx* Merr., *Syzygium cleistocalyx* (Merr.) P.S.Ashton).

Gelpkea Blume (1850) 88. — Lectotype (here designated): *Gelpkea stipularis* Blume (*Syzygium stipulare* (Blume) Craven & T.G.Hartley).

Acicalyptus A.Gray (1854) 127. — *Cleistocalyx* sect. *Acicalyptus* Merr. & L.M.Perry (1937) 325.— Type: *Acicalyptus myrtoides* A.Gray (*Calyptranthes myrtoides* (A.Gray) Seem., *Cleistocalyx myrtoides* (A. Gray) Merr. & L.M.Perry, *Syzygium myrtoides* (A. Gray) R. Schmid).

Cupheanthus Seem. (1865) 76. — Type: *Cupheanthus neocaledonicus* Seem. (*Syzygium neocaledonicum* (Seem.) J.W.Dawson).

Gaslondia Vieill. (1866) 96. — Type: *Gaslondia amphoricarpa* Vieill.

Pareugenia Turrill (1915) t. 3004. — Type: *Pareugenia imthurnii* Turrill (*Syzygium imthurnii* (Turrill) Merr. & L.M.Perry).

Sepals persistent or deciduous, caducous when calyptrate, free or fused into a calyptra. Petals free, whether or not cohering into a pseudocalyptra, in calyptrate species obsolete and falling with the calyptra. Anther sacs parallel. Placentation axile-median or rarely axile-basal; ovules (3–)8–60(–90), arranged irregularly or rarely in 2 longitudinal rows, spreading to ascending. Seed without intrusive tissue interlocking the cotyledons, the cotyledons free and not obvolute (the opposing faces often undulate but the cotyledons not obvolute per se).

Note — The name *Gelpkea* is typified above with *Gelpkea stipularis* Blume, a species that conforms well with Blume's generic circumscription. A new combination, *S. stipulare* (Blume) Craven & T.G.Hartley, is made in the following section for the species in *Syzygium*.

2. *Syzygium* subg. *Acmena* (DC.) Craven & Biffin, *comb. nov.*

Basionym: *Acmena* DC., Prodr. 3 (1828) 262. — *Lomastelma* Raf. (1838) 107. — *Eugenia* subg. *Acmena* (DC.) Wight (1841) 12, 14. — *Eugenia* sect. *Acmena* (DC.) Miq. (1850) 19. — Type: *Syzygium smithii* (Poir.) Nied. (*Eugenia elliptica* Sm., nom. illeg., non Lam. (1789) 206; *Eugenia smithii* Poir.; *Myrtus smithii* (Poir.) Spreng.; *Acmena floribunda* β *elliptica* DC.; *Lomastelma elliptica* (Sm.) Raf.; *Acmena elliptica* G. Don ex Steud., *Syzygium brachynemum* F.Muell., nom. illeg.; *Eugenia brachynema* F.Muell., nom. illeg.; *Acmena smithii* (Poir.) Merr. & L.M.Perry; *Lomastelma smithii* (Poir.) J.H.Willis).

Xenodendron Lauterb. & K.Schum. (1900) 461. — Type: *Xenodendron polyanthum* Lauterb. & K.Schum. (*Acmena polyantha* (Lauterb. & K.Schum.) Merr. & L.M.Perry).

Sepals deciduous or persistent, caducous when calyptrate, free or fused into a calyptra. Petals free (not cohering into a pseudocalyptra), in calyptrate species obsolete and falling with the calyptra. Anther sacs divergent or sometimes parallel. Placentation axile-apical, or axile-basal or axile-median; ovules c. 2–22, in 1 transverse row or arranged irregularly or rarely in 2 longitudinal rows, pendulous. Seed usually with intrusive tissue interlocking the cotyledons, or sometimes the intrusive tissue lacking and the cotyledons then free.

2a. *Syzygium* sect. *Acmena* (DC.) Craven & Biffin, *comb. nov.*

Basionym: *Acmena* DC., Prodr. 3 (1828) 262. — *Lomastelma* Raf. (1838) 107. — *Eugenia* subg. *Acmena* (DC.) Wight (1841) 12, 14. — *Eugenia* sect. *Acmena* (DC.) Miq. (1850) 19. — Type: *Syzygium smithii* (Poir.) Nied. (*Eugenia elliptica* Sm., nom. illeg., non Lam. (1789) 206; *Eugenia smithii* Poir.; *Myrtus smithii* (Poir.) Spreng.; *Acmena floribunda* β *elliptica* DC.; *Lomastelma elliptica* (Sm.) Raf.; *Acmena elliptica* G. Don ex Steud., *Syzygium brachynemum* F.Muell., nom. illeg.; *Eugenia brachynema* F.Muell., nom. illeg.; *Acmena smithii* (Poir.) Merr. & L.M.Perry; *Lomastelma smithii* (Poir.) J.H.Willis).

Sepals deciduous or persistent, free. Anther sacs divergent. Placentation axile-apical; ovules c. 5–22 per locule, in 1 transverse row or arranged irregularly, pendulous. Seed with ramifying (staghorn coral-like) intrusive tissue interlocking the cotyledons.

2b. *Syzygium* sect. ***Piliocalyx*** (Brongn. & Gris) Craven & Biffin, *comb. nov.*

Basionym: *Piliocalyx* Brongn. & Gris, Bull. Soc. Bot. France 12 (1865) 185, nom. cons. — Type (fide Mansfeld (1935) 449): *Piliocalyx robustus* Brongn. & Gris (1865) 185, non *Syzygium robustum* Miq. (1858) 1086 (*Syzygium viriosum* Craven & J.W.Dawson).

Sepals fused into a calyptra. Anther sacs divergent to subparallel. Placentation axile-apical; ovules in 1 transverse row, pendulous. Seed with ramifying (staghorn coral-like) intrusive tissue interlocking the cotyledons.

2c. *Syzygium* sect. ***Agaricoides*** Craven & Biffin, *sect. nov.*

A *Syzygio* sect. *Acmena* semine contexto fungiformi cotyledones interposito differt. — Typus: *Syzygium graveolens* (F.M.Bailey) Craven & Biffin (*Cryptocarya graveolens* F.M.Bailey, *Acmena graveolens* (F.M.Bailey) L.S.Sm.).

Sepals deciduous or persistent, free. Anther sacs divergent. Placentation axile-apical; ovules 4–6 per locule, in 1 transverse row, pendulous. Seed with non-ramifying, mushroom-like intrusive tissue interlocking the cotyledons.

Note — The epithet *Agaricoides* refers to the superficial similarity of the intrusive tissue to the fruiting body of *Agaricus*, a genus of mushrooms.

2d. *Syzygium* sect. ***Waterhousea*** (B.Hyland) Craven & Biffin, *comb. nov.*

Basionym: *Waterhousea* B.Hyland, Austral. J. Bot., Suppl. ser. 9 (1983) 138. — Type: *Syzygium floribundum* F.Muell. (*Waterhousea floribunda* (F.Muell.) B.Hyland).

Sepals deciduous or persistent, free. Anther sacs parallel. Placentation axile-basal, axile-median or axile-apical; ovules 2–10 per locule, in 1 transverse row or arranged irregularly, pendulous. Seed with ramifying intrusive tissue interlocking the cotyledons.

2e. *Syzygium* sect. ***Glenum*** Craven & Biffin, *sect. nov.*

A *Syzygio* sect. *Acmena* floribus calyptratis et semine contexto fungiformi cotyledones interposito differt. — Typus: *Syzygium glenum* Craven.

Sepals fused into a calyptra. Anther sacs parallel. Placentation axile-apical; ovules 3 or 4 per locule, in 1 transverse row, pendulous. Seed with non-ramifying, mushroom-like intrusive tissue interlocking the cotyledons.

2f. *Syzygium* sect. ***Monimioides*** Craven & Biffin, *sect. nov.*

A *Syzygio* sect. *Acmena* ovulis 2–3 in quoque loculo et semine contexto cotyledones interposito carenti differt. — Typus: *Syzygium monimioides* Craven.

Sepals persistent, free. Anther sacs parallel. Placentation axile-apical; ovules 2 or 3 per locule, in 1 transverse row, pendulous. Seed without intrusive tissue interlocking the cotyledons, the cotyledons free.

2g. *Syzygium* sect. ***Gustavioides*** Craven & Biffin, *sect. nov.*

A *Syzygio* sect. *Acmena* floribus calyptratis, ovulis ascendentibus et semine contexto cotyledones interposito carenti differt. — Typus: *Syzygium gustavioides* (F.M.Bailey) B.Hyland (*Eugenia gustavioides* F.M.Bailey, *Cleistocalyx gustavioides* (F.M.Bailey) Merr. & L.M.Perry).

Sepals fused into a calyptra. Anther sacs parallel to divergent. Placentation axile-basal; ovules 4–8 per locule, in 2 longitudinal rows or arranged irregularly, ascending. Seed without intrusive tissue interlocking the cotyledons, the cotyledons free.

3. *Syzygium* subg. ***Sequestratum*** Craven & Biffin, *subg. nov.*

A *Syzygio* subg. *Syzygio* foliis plerumque parvis et saepe glaucis (atque floribus fructibusque), inflorescenti saepe capitiformi, et floribus plerumque relative parvis hypanthio infundibuliformi differt. — Typus: *Syzygium wilsonii* (F.Muell.) B.Hyland (*Eugenia wilsonii* F.Muell.).

Eugenia sect. *Erythronema* F.Muell. (1865) 12. — Type: *Syzygium wilsonii* (F.Muell.) B.Hyland (*Eugenia wilsonii* F.Muell.).

Leaves usually small, often glaucous (as are the flowers and fruits). Inflorescence often head-like. Flowers usually relatively small. Hypanthium funnel-shaped. Sepals free. Petals free (not cohering into a pseudocalyptra). Anther sacs parallel. Placentation axile-median; ovules c. 10–25 per locule, in 2 longitudinal rows, spreading to ascending. Seed without intrusive tissue interlocking the cotyledons.

Notes — 1. The name *Eugenia* sect. *Erythronema* F.Muell. is validated by a sectio-specific description as Mueller (1865) treated just the single species, i.e., *E. wilsonii* F.Muell., in the section.

2. The new subgeneric epithet is derived from the Latin *sequestro*, set apart, remove, separate, and refers to the well supported segregation of this lineage from the others of the genus based on molecular evidence (Biffin et al. 2006).

4. *Syzygium* subg. ***Perikion*** Craven & Biffin, *subg. nov.*

A *Syzygio* subg. *Syzygio* hypanthio fibris-fascibus numerosis, petalis 4–8, et ovulis pendulis vel ascendentibus differt. — Typus: *Syzygium claviflorum* (Roxb.) Wall. ex Steud. (*Eugenia claviflora* Roxb., *Acmena claviflora* (Roxb.) Walp., *Acmenosperma claviflorum* (Roxb.) Kausel).

Acmenosperma Kausel (1957) 609. — Type: *Acmenosperma claviflorum* (Roxb.) Kausel (*Eugenia claviflora* Roxb., *Acmena claviflora* (Roxb.) Walp., *Syzygium claviflorum* (Roxb.) Wall. ex Steud.).

Syzygium ser. *Claviflora* Hung T.Chang & R.H.Miao (1982) 18. — Type: *Syzygium claviflorum* (Roxb.) Wall. ex Steud. (*Eugenia claviflora* Roxb., *Acmena claviflora* (Roxb.) Walp., *Acmenosperma claviflorum* (Roxb.) Kausel).

Hypanthium wall with numerous fibre bundles. Sepals deciduous or persistent. Petals 4–8. Anther sacs parallel. Placentation axile-median; ovules c. 8–22 per locule, in 2 (rarely 4) longitudinal rows or sometimes arranged irregularly, pendulous or sometimes ascending. Seed without intrusive tissue interlocking the cotyledons, or sometimes with ramifying interlocking tissue.

Notes — 1. The epithet *Perikion* is derived from the Greek *kion*, column, pillar and refers to the numerous, well-developed fibre bundles in the hypanthium that are such a distinctive feature in the species of this taxon.

2. The intrusive tissue between the cotyledons that occurs in all members of the species complex of which *S. claviflorum* is the most widespread and common member does not occur in the other species of the subgenus as far as we are aware.

5. *Syzygium* subg. ***Anetholea*** (Peter G.Wilson) Craven & Biffin, *comb. nov.*

Basionym: *Anetholea* Peter G.Wilson, Austral. Syst. Bot. 13 (2000) 434. — Type: *Syzygium anisatum* (Vickery) Craven & Biffin (*Backhousia anisata* Vickery, *Anetholea anisata* (Vickery) Peter G.Wilson).

Sepals persistent, free. Petals free (not cohering into a pseudocalyptra). Anther sacs parallel. Placentation axile-basal; ovules c. 6 or 7 per locule, arranged irregularly, ascending. Seed without intrusive tissue interlocking the cotyledons, the cotyledons free and distinctly obvolute.

6. *Syzygium* subg. ***Wesa*** Craven & Biffin, *subg. nov.*

A *Syzygio* subg. *Syzygio* ovulis 6–8 per loculo, pendulis et biserialibus longitudinalibus vel insertis irregulariter, et cellulis antherarum parallelidivergentibus usque divergentibus differt. — Typus: *Syzygium wesa* B.Hyland.

Anther sacs parallel-divergent to divergent. Placentation axile-median to axile-apical; ovules 6–8 per locule, in 2 longitudinal rows or arranged irregularly, pendulous. Seed without intrusive tissue interlocking the cotyledons.

NEW NAMES FOR *SYZYGIUM* SPECIES

1. *Syzygium stipulare* (Blume) Craven & T.G.Hartley, *comb. nov*.

Basionym: *Gelpkea stipularis* Blume, Mus. Bot. 1 (1850) 88; *Eugenia stipularis* (Blume) Miq. (1855) 441.

2. *Syzygium viriosum* Craven & J.W.Dawson, *nom. nov.*

Replaced synonym: *Piliocalyx robustus* Brongn. & Gris, Bull. Soc. Bot. France 12 (1865) 185, non *Syzygium robustum* Miq. (1858) 1086.

Note — The epithet *robustus* is preempted in *Syzygium* by *S. robustum* Miq., necessitating a new epithet in *Syzygium* for *P. robustus* Brongn. & Gris. The replacement epithet is derived from the Latin *viriosus*, robust, strong.

UNPLACED TAXA

Aphanomyrtus Miq. (1855) 480. — Type: *Aphanomyrtus rostrata* Miq.

Calyptranthus

This generic epithet is sometimes attributed to Blume (1826: 1089), however, it appears that Blume was using an orthographic variant of *Calyptranthes* Sw. (Swartz 1788: 79) and was not intending to publish a new name. *Calyptranthes* belongs in *Myrteae*, as this tribe is defined by Wilson et al. (2005).

Clavimyrtus Blume (1850) 113, t. 49. — *Jambosa* sect. *Clavimyrtus* (Blume) Miq. (1855) 427. — Type (fide Merrill & Perry (1939) 141): *Clavimyrtus glabrata* Blume (*Myrtus glabrata* Blume (1826) 1033, nom. illeg., non *M. glabrata* O.Swartz (1788) 78).

Clavimyrtus sect. ***Symphytocarpus*** Blume (1850) 117. — Type: not designated.

Eugenia sect. ***Fissicalyx*** M.R.Hend. (1947) 333. — Type (lectotype, here designated): *Eugenia symingtoniana* M.R.Hend. (*Stereocaryum symingtonianum* (M.R.Hend.) A.J.Scott, *Syzygium symingtonianum* (M.R.Hend.) I.M.Turner).

The species designated as lectotype of *Eugenia* sect. *Fissicalyx* is one of two species treated by Henderson (1947) in the section. Henderson's circumscription of *Eugenia symingtoniana* is more ample than that of the other species, *E. watsoniana* M.R.Hend., and adequately agrees with his circumscription of sect. *Fissicalyx*.

Jambosa sect. ***Ascojambosa*** Blume (1850) 106. — Type: not designated.

Jambosa sect. ***Bostrychode*** Miq. (1855) 438. — *Bostrychode* (Miq.) O.Berg (1859) 634. — Type: not designated.

Jambosa sect. ***Leptomyrtus*** Miq. (1855) 436. — *Leptomyrtus* (Miq.) O.Berg (1859) 635. — Type: not designated.

Jambosa sect. ***Porphyrosa*** Blume (1850) 105. — Type: not designated.

Jambosa sect. ***Sterrojambosa*** Blume (1850) 108. — Type: not designated.

Macromyrtus Miq. (1855) 439. — Type: *Macromyrtus javanica* Miq. (*Eugenia macromyrtus* Koord. & Valeton, *Syzygium macromyrtus* (Koord. & Valeton) Merr. & L.M.Perry).

Microjambosa Blume (1850) 117. — Type (fide Merrill & Perry (1939) 141): *Microjambosa conferta* (Korth.) Blume (*Jambosa conferta* Korth., *Syzygium confertum* (Korth.) Merr. & L.M.Perry).

Pseudoeugenia Scort. (1885) 153. — Type: *Pseudoeugenia perakiana* Scort.

Strongylocalyx Blume (1850) 89, t. 54. — Type (fide Merrill & Perry (1939) 141): *Strongylocarpus leptostemon* (Korth.) Blume (*Jambosa leptostemon* Korth., *Eugenia leptostemon* (Korth.) Blume, *Syzygium leptostemon* (Korth.) Merr. & L.M.Perry).

Syllysium Meyen & Schauer (1843) 334. — Type: *Syllysium buxifolium* Meyen & Schauer.

Syzygium sect. ***Jambolana*** Miq. (1855) 458. — Type: not designated.

Syzygium sect. ***Laevigatae*** Miq. (1855) 456. — Type: not designated.

Syzygium sect. ***Symphysion*** Miq. (1855) 460. — Type: not designated.

Syzygium ser. ***Balsamea*** Hung T.Chang & R.H.Miao (1982) 18. — Type: *Syzygium balsameum* (Wight) Walp. (*Eugenia balsamea* Wight).

Syzygium ser. ***Oblata*** Hung T.Chang & R.H.Miao (1982) 18. — Type: *Syzygium oblatum* (Roxb.) Wall. ex Steud. (*Eugenia oblata* Roxb.).

Tetraeugenia Merr. (1917) 230. — Type: *Tetraeugenia caudata* Merr.

PRELIMINARY ARTIFICIAL KEY TO THE SUBGENERA AND SECTIONS OF *SYZYGIUM*

1. Hypanthium with numerous fibre bundles *S.* subg. *Perikion*
1. Hypanthium without fibre bundles 2
2. Seed with intrusive tissue interlocking the cotyledons . . . 3
2. Seed without intrusive tissue interlocking the cotyledons 7
3. Intrusive interlocking tissue ramifying and staghorn coral-like 4
3. Intrusive interlocking tissue non-ramifying and mushroom-like 6
4. Flowers calyptrate . . . . . *S.* sect. *Piliocalyx*
4. Flowers not calyptrate 5
5. Anther sacs divergent . . . . . *S.* sect. *Acmena*
5. Anther sacs parallel . . . . . *S.* sect. *Waterhousea*
6. Flowers calyptrate . . . . . *S.* sect. *Glenum*
6. Flowers not calyptrate . . . . . *S.* sect. *Agaricoides*
7. Cotyledons distinctly obvolute . . . . . *S.* subg. *Anetholea*
7. Cotyledons not obvolute (whether or not somewhat undulate on the opposing faces). 8

8. Ovules pendulous 9
8. Ovules spreading to ascending 10
9. Ovules 6–8 per locule; anther sacs parallel-divergent to divergent . . . . . *S.* subg. *Wesa*
9. Ovules 2 or 3 per locule; anther sacs parallel . . . . . *S.* sect. *Monimioides*
10. Sepals free 11
10. Sepals calyptrate 12
11. Inflorescence usually open, rarely congested and head-like; ovules c. (3–)8–60(–90) per locule, arranged irregularly or rarely in two longitudinal rows . . . . *S.* subg. *Syzygium*
11. Inflorescence often head-like; ovules c. 10–25 per locule, in two longitudinal rows (Leaves usually small, often glaucous as are the flowers and fruits) . . . . *S.* subg. *Sequestratum*
12. Placentation axile-median or rarely axile-basal; ovules c. (3–)8–60(–90) per locule, arranged irregularly or rarely in two longitudinal rows, ascending or spreading; anther sacs parallel . . . . . *S.* subg. *Syzygium*
12. Placentation axile-basal; ovules 4–8 per locule, in two longitudinal rows or arranged irregularly, ascending; anther sacs parallel to divergent . . . . . *S.* sect. *Gustavioides*

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