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RESEARCH ARTICLE

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Studies in Papuasian *Syzygium* (*Myrtaceae*): 2. The furfuraceous species of subg. *Syzygium*

L.A. Craven[1,†], K.Q. Damas[2], K.J. Cowley[1]

Key words

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Abstract The furfuraceous species of *Syzygium* subg. *Syzygium* in Papuasia are revised. The scurfy, furfuraceous epidermis that is a feature of the inflorescence branches and sometimes also of the hypanthium, the commonly chestnut brown colour of the dried leaves, and the reduced calyx that occurs in many species are characteristic features of the group. Within this subgenus, a new section *Furfuraceum* is described to accommodate these morphologically recognisable species. Descriptions are provided for each of the 40 species recognised, 28 of which are new. An identification key, distribution maps and an index to numbered exsiccatae are provided.

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INTRODUCTION

A concise background to recent research on the taxonomy of *Syzygium* P.Browne ex Gaertn. in Papuasia is given in the first paper in this series (Craven 2019). An infrageneric classification, an essential requirement in view of the size of the genus, was proposed by Craven & Biffin (2010). *Syzygium* contains perhaps 1 200 to 1 500 species and subg. *Syzygium* is the most speciose of the several subgenera, containing perhaps 1 100 to 1 400 species, and in Papuasia this subgenus similarly is very speciose. In view of its size, the development of a classification of the subgenus should be a priority for future research in *Syzygium*. There are insufficient morphological characters of diagnostic value to be able to propose even an interim classification for the whole subgenus based upon this class of data; major DNA studies involving a large sampling of species will be essential in developing an unambiguous classification. With this caveat in mind, it is possible to suggest certain assemblages of species that very likely will be proven by DNA studies to represent natural groups, i.e., monophyletic clades. The present group, the furfuraceous species, is one such assemblage.

Several morphological features warrant or require discussion. The seasonal flush of growth that comprises or includes the inflorescence of a *Syzygium* plant may include leaves or be leafless. This growth flush, termed 'reproductive seasonal growth unit' for descriptive purposes, has a form that is characteristic and often very consistent for the various species. It often is leafless but may have leaves, typical of vegetative seasonal growth units (i.e., growth flushes), in the proximal axils. Sometimes the leaves within the reproductive seasonal growth unit are very distinct in their size and form to those of the vegetative growth units. A characteristic feature of the furfuraceous species is that the leaves commonly dry a dark, chestnut brown and this is a useful spot character in the herbarium.

A furfuraceous, or scurfy, epidermis, shown in Fig. 1, is the character that most defines the group. It usually occurs on the branchlets of the inflorescence, persisting into the infructescence stage, and it also may occur on the hypanthium. In species with a calyptrate calyx, such as *S. megistophyllum* Merr. & L.M.Perry, the calyx also is furfuraceous. The vegetative branchlets are rarely furfuraceous. The structure of the furfuraceous layer is of interest. The outer epidermis cracks, forming small plates or scales (Fig. 1B1, C1), and these ultimately may fall, leaving a cellular, spongy-appearing tissue (Fig. 1B2, C2). A function for this tissue is unknown. Given the apparent geographic restriction of the furfuraceous species to Papuasia (with two of these species also extending to far north-eastern Australia and one to the Santa Cruz Islands), the correlation of the furfuraceous epidermis with the frequent possession of dark brown leaves in the dried state, a reduced calyx, and a coherent and caducous corolla, the first author considers this group of species represents a phylogenetically distinct clade that warrants taxonomic recognition. The new section *Furfuraceum* is described below to accommodate this species group.

For convenience in making comparisons between species, separate descriptions are not given for inflorescences and infructescences; the structures being described under the subheading 'Inflorescence'. Although in the fruiting stage the branchlets are stouter than in the flowering stage, the overall size seems not to vary significantly between the flowering and fruiting conditions.

The reduction of the calyx in the here newly described species *S. hartleyi* sp. nov., *S. frodinii* sp. nov., and other furfuraceous species, is analogous with the reduction in, or even complete

[1] Australian National Herbarium, Centre for Australian National Biodiversity Research, GPO Box 1700, Canberra ACT 2601, Australia.
[2] PNG Forest Research Institute, PO Box 314, Lae, Morobe Province, Papua New Guinea; corresponding author e-mail: kdamas@fri.pngfa.gov.pg, kippyson@gmail.com.

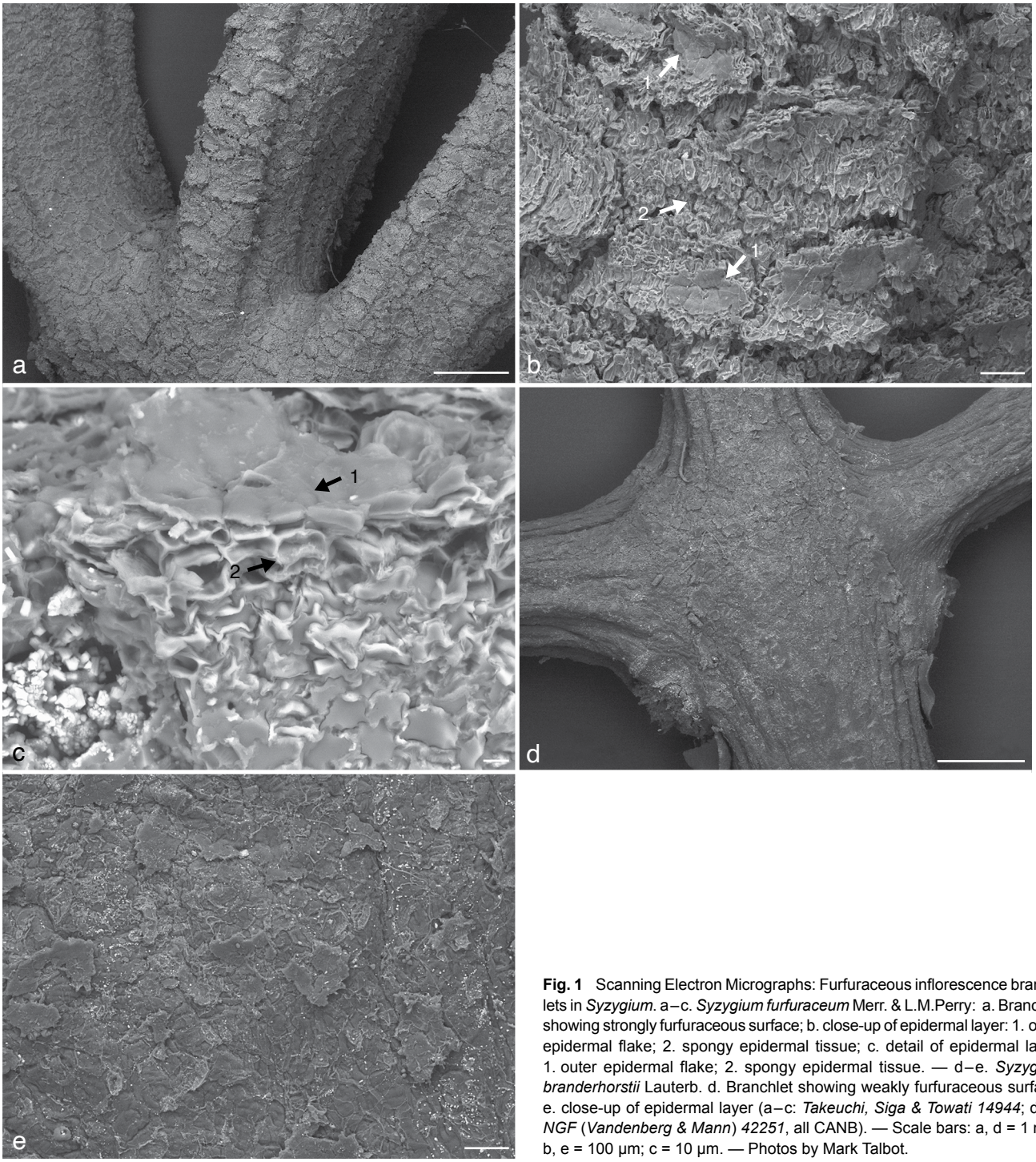


Fig. 1 Scanning Electron Micrographs: Furfuraceous inflorescence branchlets in *Syzygium*. a–c. *Syzygium furfuraceum* Merr. & L.M.Perry: a. Branchlet showing strongly furfuraceous surface; b. close-up of epidermal layer: 1. outer epidermal flake; 2. spongy epidermal tissue; c. detail of epidermal layer: 1. outer epidermal flake; 2. spongy epidermal tissue. — d–e. *Syzygium branderhorstii* Lauterb. d. Branchlet showing weakly furfuraceous surface; e. close-up of epidermal layer (a–c: *Takeuchi, Siga & Towati 14944*; d–e: *NGF* (*Vandenberg & Mann*) *42251*, all CANB). — Scale bars: a, d = 1 mm; b, e = 100 µm; c = 10 µm. — Photos by Mark Talbot.

loss of, the calyx that occurs occasionally in several other genera of *Myrtaceae*, e.g., *Melaleuca* L. (such as *M. ciliosa* Turcz. and *M. systena* Craven) and *Calytrix* Labill. (such as *C. ecalycata* Craven and *C. paucicostata* Craven). The inner pair of calyx lobes is larger than the outer pair. The inequality in size of the pairs of calyx lobes in *Syzygium* is common in species with a 4-merous calyx but this is not an obvious feature of the 4-merous furfuraceous species as the calyx in these species is usually very poorly developed. In 5-merous species, the calyx lobes are of equal size. The coherent, caducous petals are the major defining feature of the generic concept *Syzygium* s.str. Elsewhere in *Myrtaceae*, a similar petaline calyptra is also found in some species of *Melaleuca*, e.g., *M. calyptroides* Craven. *Syzygium frodinii* is unique within the genus for having an obsolete calyx and a fused corolla. The reverse condition, i.e., fused calyx and obsolete corolla, is the defining feature of the generic concept *Cleistocalyx* Blume for which there is no support with the species previously placed there nesting across the genus in analyses based on DNA sequence data (Craven et al. 2006).

Application of the term ‘calyptra’ to *Syzygium* is problematic as there are three distinct structures to which the term is being applied, i.e., a fused caducous calyx (as in *S. megistophyllum*), a fused caducous corolla (as in *S. frodinii*), and a coherent caducous corolla (as in *S. bowersiae* sp. nov.). It would enable precise, unambiguous reference if each of these three structures had their own name but due to the small number of species across the genus that have one or other of the two fused structures (one species has a fused corolla and perhaps around 50 species have a fused calyx) it is scarcely worthwhile.

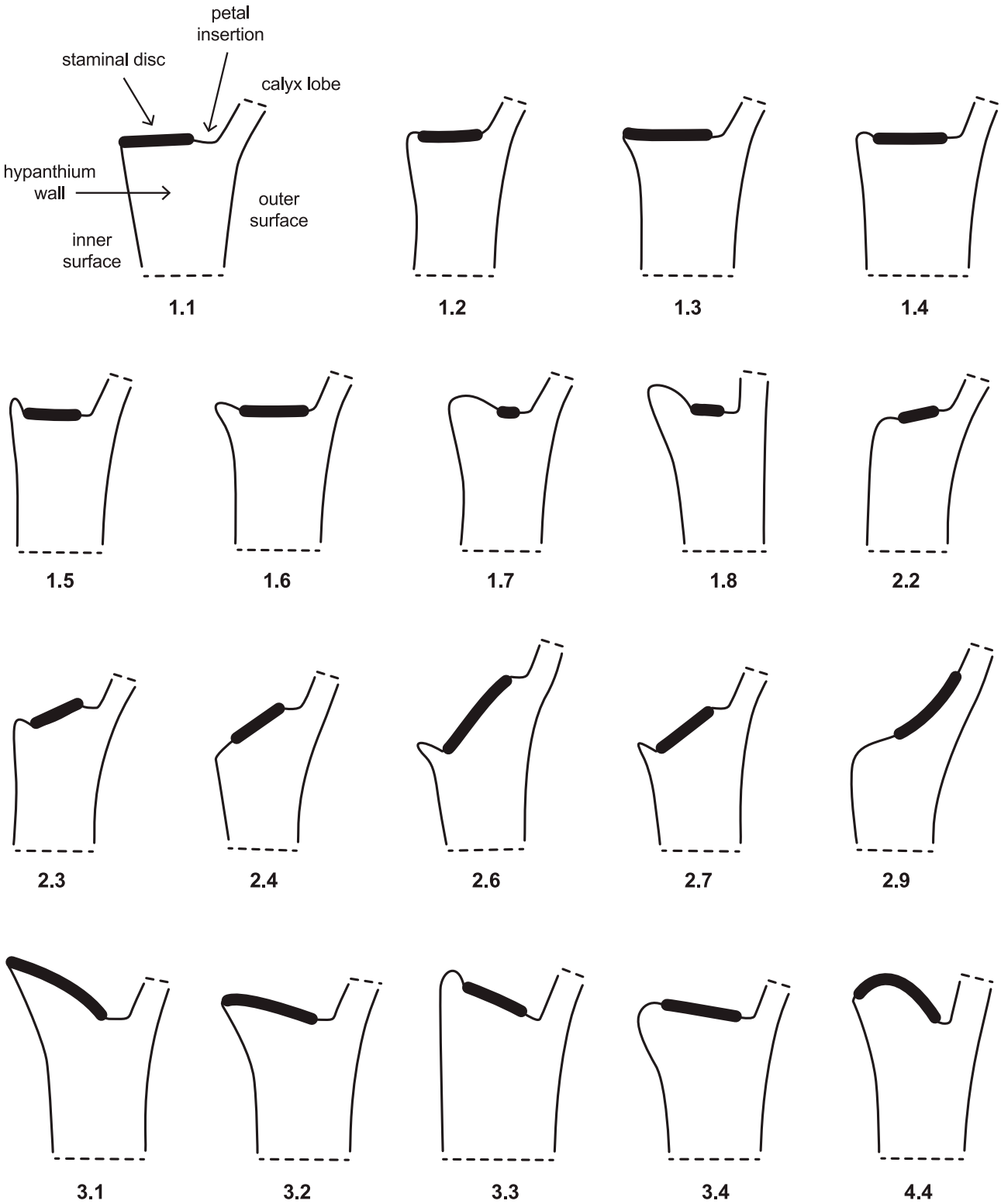


Fig. 2 Staminal disc types in *Syzygium* species. Series 1: Flat; series 2: descending; series 3: ascending; series 4: raised.

Consequently, the decision has been made to use the words calyptra, calyptrate, etc., throughout the descriptive work but specify the relevant form in each description.

The staminal disc is the tissue upon which the stamens are inserted. The form of the staminal disc and associated tissues is a valuable character state in the circumscription of species. The disc may be flat or variously ascending, descending or curved, and there may be a 'lip' at its inner edge, all of which combine to give a particular form to the disc and the adjacent tissues at the hypanthium apex. The staminal disc forms applicable to the species treated in the present paper are shown in diagrammatic form in Fig. 2 and the relevant diagrams indicated in the descriptions.

The conservation status of many of the species treated in this revision is Data Deficient according to the criteria of the IUCN Red List (IUCN 2012). Individual assignments of the several criteria are therefore not made to the species. Reference to the distribution maps provides a ready approximation of the likely conservation status of the species and it can be seen that the criterion of Least Concern most likely will apply to species such as *S. aporematum* sp. nov., *S. araucariarum* sp. nov., *S. bowersiae* sp. nov., *S. branderhorstii* Lauterb., *S. buettnerianum*

(K.Schum.) Nied., *S. furfuraceum* Merr. & L.M.Perry, *S. whitmorei* sp. nov. and so on. Even a species to date known from only a single locality, and warranting the criterion Vulnerable due to its limited range, etc., may in reality be of Least Concern if there are no threats to its habitat; in the interim, however, all such species should be classed as Data Deficient.

Examination of the distribution maps shows that many species are known from one or a few localities only and these can generally be taken as a reflection of the number of collections that have been made as there are not many instances in which repeated collections have been made from a single locality. Several comments relating to the paucity of collections are warranted. Firstly, it is rare that *Syzygium* plants are collected in both flower and fruit and usually a moderate number of collections are required so as to be able to draft a description that covers the major reproductive phases. Secondly, the more collections that are available for study the more likely it will be that the species' circumscriptions will be clear and that robust species concepts established. Thirdly, given the number of species presently known from only one or a few localities it is reasonable to expect that there are many species of sect. *Furfuraceum* yet to be collected. The section has undergone a major radiation in Papuasia and when thorough floristic surveys have been undertaken we expect that the number of *Furfuraceum* species will be considerably increased. It seems very likely that the section is significantly under-collected in the Indonesian half of New Guinea.

The term 'Papuasia' is applied in the conventional way, i.e., it encompasses the island of New Guinea, the Bismarck Archipelago, the Solomon Islands, the Aru Islands, and the associated smaller islands.

The morphological data for drafting the descriptions and keys were managed using Open DELTA (Anonymous 2013) which is based upon the DELTA package of Dallwitz et al. (1993).

Notwithstanding any possible interpretation to the contrary, all the new species in the present contribution are accepted as species insofar as the provisions of the International Code of Nomenclature (Turland et al. 2018) relating to acceptance of taxa by their authors are concerned.

TAXONOMY

Syzygium P.Browne ex Gaertn. subg. ***Syzygium*** sect. ***Furfuraceum*** Craven, *sect. nov.*

From all other sections of *Syzygium* distinguished by possession of a furfuraceous epidermis, usually on the inflorescence branchlets and/or on the outer surface of the hypanthium, and less commonly on the vegetative branchlets.

Type: *S. furfuraceum* Merr. & L.M.Perry.

Identification key to the Papuasian species of sect. Furfuraceum based on flowering material

Due to the lack of data, *S. debruijnii* sp. nov., *S. kutubuense* sp. nov., *S. montis-venetus* sp. nov. and *S. squamatum* Merr. & L.M.Perry are not included in the following key.

Usually *Syzygium* species are collected in either flower or in fruit; it is rare for both reproductive stages to be present at the same time. Consequently, it is desirable to draft two keys, one based on flowering material and one based on fruiting material, unless the species in question are few in number and there are sufficient characters to be found in vegetative and inflorescence features, etc. for a key to be drafted. Unfortunately, for about half of the species of sect. *Furfuraceum* fruits are unknown and it is not practicable to attempt an identification key based on fruiting specimens.

1. Leaf base cordate 2
1. Leaf base not cordate (cuneate, attenuate, obtuse, rounded or truncate) 4
2. Leaf lamina less than 40 cm long . . . . . 15. *S. gillisonii*
2. Leaf lamina more than 40 cm long 3
3. Inflorescence paniculate, up to 9 cm long; primary and secondary venation generally similar with a divergence angle of 70–80°; petiole absent or up to 3 mm long; petals obsolete . . . . . 25. *S. megistophyllum*
3. Inflorescence fasciculate, up to 2 cm long; primary and secondary venation different with a divergence angle of 30–40°; petiole 5–10 mm long; petals 5 . . . . . 30. *S. pseudomegistophyllum*
4. Hypanthium furfuraceous or sometimes so 5
4. Hypanthium not furfuraceous (smooth, wrinkled, glandular-verrucose, subspiculate, and/or glossy) 13
5. Placentation axile-median 6
5. Placentation axile-basal 8
6. Leaf primary veins 15–18 on each side of the midrib with divergence angle of 60–70°; inflorescences on branchlets below the leaves or on branches . . . . . 3. *S. bowersiae*
6. Leaf primary veins more than 19 on each side of the midrib with divergence angle of 70–80°; inflorescences cauline 7
7. Branchlet bark glossy; inflorescence 10–25 cm long; leaf lamina base attenuate, secondary intramarginal vein present. — Indonesia . . . . . 11. *S. folidorhachis*
7. Branchlet bark dull; inflorescence up to 3 cm long; leaf lamina base cuneate, secondary intramarginal vein absent. — Papua New Guinea . . . . . 21. *S. kui*
8. Calyx lobes 4, discrete or well distinguished on an undulating rim of tissue 9
8. Calyx lobes 5, or 2 on a rim of tissue, or absent with calyx reduced to a rim of tissue 11
9. Calyx an undulating rim of tissue with 4 well-distinguished lobes . . . . . 14. *S. furfuraceum*
9. Calyx lobes discrete, not on a rim of tissue 10
10. Leaf acumen recurved; leaf primary veins less than 20 on each side of the midrib; stamens 65–70 5. *S. bubuuense*
10. Leaf acumen flat; leaf primary veins more than 34 on each side of the midrib; stamens 130–140 31. *S. pyrocarpum*
11. Leaf primary veins 30–38 on each side of the midrib; flowers red; calyx lobes 5 . . . . . 35. *S. rubroalabastrum*
11. Leaf primary veins 16–29 on each side of the midrib; flowers cream, white or green; calyx lobes 2 on a rim of tissue, or absent with calyx reduced to a rim of tissue 12
12. Calyx lobes absent with calyx reduced to a rim of tissue; ovules c. 25 per locule; leaf base attenuate . . . . . 10. *S. fazangii*
12. Calyx lobes 2 on a rim of tissue; ovules c. 9 per locule; leaf base obtuse or rounded . . . . . 24. *S. maneauense*
13. Inflorescences terminal or sometimes distal axillary . . 14
13. Inflorescences not terminal or distal axillary, on branchlets below the leaves, on branches, on the trunk, or rarely on the roots 17
14. Leaf acumen flat . . . . . 40. *S. whitmorei*
14. Leaf acumen recurved 15
15. Calyx consisting of 5 discrete lobes . . . . 12. *S. foremanii*
15. Calyx is a rim of tissue, usually undifferentiated or with 4 or 5 lobes 16
16. Leaf lamina with the primary and secondary venation distinctly different with the secondaries relatively little deve-

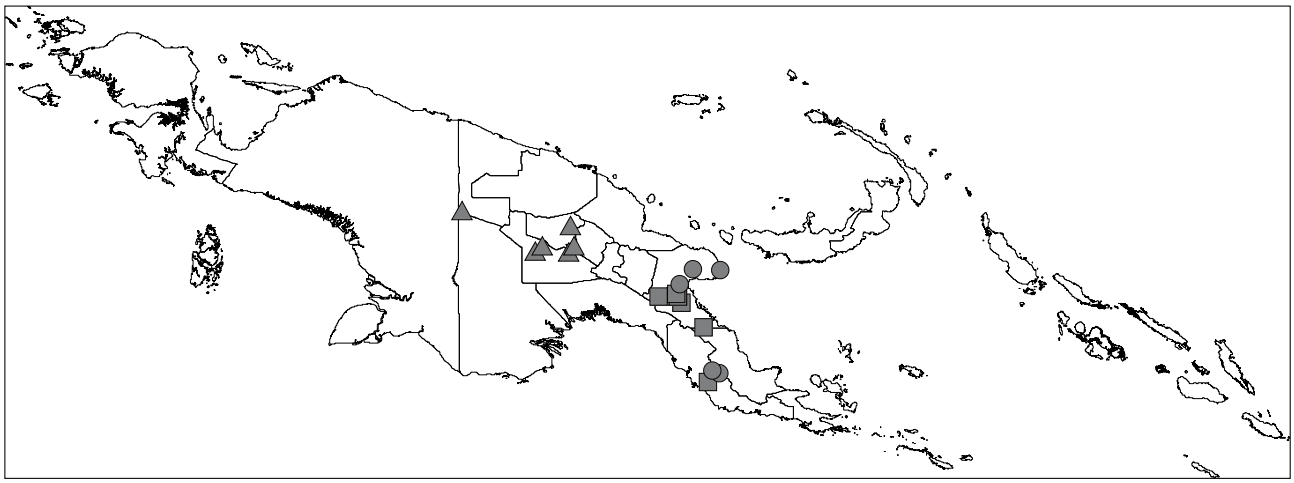
loped and not or rarely joining the intramarginal vein; ovules arranged irregularly . . . . . 6. *S. buettnerianum*
16. Leaf lamina with the primary and secondary venation generally similar with all or nearly all the secondaries joining the intramarginal vein; ovules arranged radially in one row . . . . . 18. *S. hooglandii*
17. Calyx is a rim of tissue, undifferentiated or with 4 or 5 lobes on its edge 18
17. Calyx consisting of 4 or 5 discrete lobes 26
18. Placentation axile-median 19
18. Placentation axile-basal 21
19. Leaves with 15–18 veins on each side of the midrib . . . . . 3. *S. bowersiae*
19. Leaves with 30–46 veins on each side of the midrib . 20
20. Hypanthium visibly gland-dotted, not ribbed; calyx of 5 lobes . . . . . 16. *S. hartleyi*
20. Hypanthium not visibly gland-dotted, ribbed; calyx a rim of tissue . . . . . 20. *S. kosteri*
21. Leaf acumen or apex recurved 22
21. Leaf acumen or apex flat or acute 24
22. Leaf lamina 14–19 cm long, divergence angle of veins c. 90°; petiole 4–5 mm long . . . . . 1. *S. aporematum*
22. Leaf lamina 9–13 cm long, divergence angle of veins 60–75°; petiole 5–10 mm long 23
23. Leaf apex obtuse, acumen lacking; hypanthium not ribbed . . . . . 19. *S. idanum*
23. Leaf apex acuminate, acumen recurved; hypanthium ribbed . . . . . 2. *S. araucariarum*
24. Primary veins 30–35 on each side of the midrib . . . . . 28. *S. novotnyi*
24. Primary veins 15–22 on each side of the midrib 25
25. Leaf lamina 7.5–11 cm long; primary and secondary venation generally similar; vein divergence angle 50–60°; flowers red-violet; hypanthium not visibly gland-dotted; staminal disc descending . . . . . 13. *S. frodinii*
25. Leaf lamina 5–6 cm long; primary and secondary venation distinctly different; vein divergence angle 70–80°; flowers cream; hypanthium visibly gland-dotted; staminal disc flat . . . . . 33. *S. rhysgardneri*
26. Leaves with both intramarginal and secondary intramarginal veins present 27
26. Leaves with intramarginal vein present and secondary intramarginal vein absent 30
27. Bark smooth; staminal disc flat . . . . . 36. *S. sambogense*
27. Bark flaky papery or fissured; staminal disc descending 28
28. Leaf apex long acuminate; hypanthium visibly gland-dotted, not ribbed . . . . . 38. *S. takeuchii*
28. Leaf apex short obtuse, acute or acuminate; hypanthium not visibly gland-dotted or if so then hypanthium also ribbed 29
29. Hypanthium minutely but distinctly wrinkled, goblet-shaped or funnel-shaped, 4.7–10 mm long, stipe 2.3–4.8 mm long; staminal disc descending (Fig. 2: 2.6) 4. *S. branderhorstii*
29. Hypanthium more or less smooth, stipitate-cup-shaped, broadly clavate, or stipitate-olliform, 4–6 mm long, stipe 1–2 mm long; staminal disc descending (Fig. 2: 2.9) . . . . . 23. *S. leptophlebioides*
30. Leaves 30–34 cm long, divergence angle of veins is 50–60°; calyx with 5 lobes; mature branchlets quadrangular . . . . . 7. *S. busuense*
30. Leaves less than 25 cm long; divergence angle of veins is 60–80°; calyx with 4 lobes; mature branchlets terete . 31
31. Bark smooth 32
31. Bark papery or flaky 34
32. Hypanthium glossy; staminal disc descending (Fig. 2: 2.6) . . . . . 8. *S. cheesmaniae*
32. Hypanthium dull; staminal disc flat (Fig. 2: 1.6) 33
33. Leaf primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein . . . . . 17. *S. hentyi*
33. Leaf primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein . . . . . 39. *S. thornei*
34. Leaf lamina 16–22 by 7–10.5 cm; veins 20–26 on each side of the midrib; divergence angle 60–70° . . . . . 32. *S. radiciflorum*
34. Leaf lamina 2.5–10 by 1.3–6 cm; veins 10–19 on each side of the midrib; divergence angle 70–80° 35
35. Staminal disc ascending; if leaves more than 3.2 cm wide, then usually less than 5.5 cm long and with 10–17 veins on each side of the midrib; reproductive seasonal growth unit with distinct vegetative and reproductive zones . . . . . 26. *S. millariae*
35. Staminal disc flat; if leaves more than 3.2 cm wide, then usually more than 4.5 cm long and with 17–19 veins on each side of the midrib; reproductive seasonal growth unit with a reproductive zone only 36
36. Leaf lamina 3.5–6 cm wide with 17–19 veins on each side of the midrib; petiole 3–4 mm long; placentation axile-median . . . . . 29. *S. prolatum*
36. Leaves 1.4–1.7 wide with 10–16 veins on each side of the midrib; petiole 5–7 mm long; placentation axile-basal . . . . . 34. *S. royenii*

1. *Syzygium aporematum* Craven & Damas, *sp. nov.* — Fig. 2: 1.8; Map 1

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina elliptic or obovate with the acumen recurved and the base attenuate or obtuse (broadly oblong or sometimes obovate, the acumen flat and the base obtuse in *S. furfuraceum*); inflorescences on branchlets below the leaves or on branches (cauline in *S. furfuraceum*); and the hypanthium not furfuraceous (furfuraceous in *S. furfuraceum*). — Type: *Clemens 9428* (holo L!; iso A!), Papua New Guinea, Morobe Province, Samanzing vicinity, mountain bush, 1830–2130 m, 1, 2 Dec. 1938.

Etymology. The specific epithet is derived from the Greek, *aporema*, doubt, question, perplexity, in reference to the issues we have had in arriving at its circumscription.

Tree to 25 m tall, to 75 cm dbh; bark light brown or rust red, papery flaky or flaking in small plates. *Vegetative branchlet* terete or compressed, rounded, 3–4 mm diam; bark dull-glossy or glossy, smooth or slightly glandular-verrucose, persistent (to cracking and then caducous). *Leaf lamina* elliptic or obovate, 14–16(–19) by 7–9 cm, 1.6–2.3 times as long as wide; base attenuate or obtuse; apex roundly acuminate, truncate or obtuse; acumen recurved; margin flat (to weakly revolute); cartilaginous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins c. 15–20 on each side of the midrib, in median part of lamina at a divergence angle of c. 90° and 6–10 mm apart; intramarginal vein present, weakly arched, 1.5–2.5 mm from margin, secondary intramarginal vein present. *Petiole* 4–5 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves or on branches, paniculate, up to 16–29 by 12–20 cm, major axis 3–6 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flowers* white. *Hypanthium* dull-glossy, glandular-verrucose; stipitate; broadly clavate, stipitate-cup-shaped or goblet-



Map 1 Distribution of *Syzygium aporematum* Craven & Damas (●), *S. araucariarum* Craven & Damas (■), *S. bowersiae* Craven & Damas (▲).

shaped, 5.5–6 by 4.5–5 mm; stipe 0.5–0.75 mm long. *Calyx lobes* 0 or 4, not or only weakly distinguishable on a rim of tissue c. 0.2 mm high, when distinguishable then lobes c. 0.3 mm long including the rim. *Staminal disc* flat (Fig. 2: 1.8 with a thinner lip). *Style* c. 5.5 mm long. *Placentation* axile-basal; placenta a small cushion. *Ovules* c. 15 per locule, ascending, arranged irregularly. *Petals*, *stamens* and mature *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Mid-mountain rainforest, edge of rainforest adjoining *Eucalyptus* grassland at top of hill, submontane rainforest. Altitude 520–2130 m.

Note — The inflorescence has also been recorded as cauline but this condition, usually given by collectors as 'inflorescence cauliflorous', is commonly misinterpreted and may not be applicable to *S. aporematum*. *Clemens 9428* is at the post anthesis-young fruit stage. The placentation is axile-basal in *NGF 34451* but is unclear in *Hartley 12455*. *Clemens 4831* (Ogeramnang, c. 1670 m, 28 December 1936) possibly does not belong to this species.

2. *Syzygium araucariarum* Craven & Damas, *sp. nov.* — Fig. 2: 1.6; Map 1

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina obovate, elliptic or broadly elliptic with the acumen recurved and the base attenuate or narrowly cuneate (broadly oblong or sometimes obovate, the acumen flat and the base obtuse in *S. furfuraceum*); inflorescences on branchlets below the leaves or on branches (cauline in *S. furfuraceum*); and the hypanthium not furfuraceous and usually with 4 obvious ribs (furfuraceous and unribbed in *S. furfuraceum*). — Type: *NGF (Floyd) 7460* (holo CANB!; iso LAE!), Papua New Guinea, Morobe Province, Bulolo, 1955 planting area, alt. c. 1100 m, 9 June 1955.

Etymology. The specific epithet is derived from *Araucaria*, a genus of *Araucariaceae*.

Tree to 42 m tall, to 150 cm dbh; bark red brown, flaky or fissured (often described as flaky or papery and scaly). *Vegetative branchlet* terete or compressed, rounded, 2–3 mm diam; bark dull-glossy, smooth, slightly or not glandular-verrucose, persistent. *Leaf lamina* obovate, elliptic or broadly elliptic, 10.5–13 by 5–8.5 cm, 1.5–2.6 times as long as wide; base attenuate or narrowly cuneate; apex roundly acuminate or short acuminate; acumen recurved; margin flat to minutely revolute; coriaceous or cartilaginous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein, or generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 15–16 on each side of the midrib, in median part of lamina at a divergence angle of 60–75° and 3–8 mm apart; intramarginal vein present, weakly arched, 1–3.5 mm from margin, secondary intramarginal vein present. *Petiole* 5–10 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves or on branches, paniculate, up to 18 by 20–22 cm, major axis c. 4 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white or cream. *Hypanthium* glossy or dull-glossy, smooth, visibly gland-dotted, usually with 4 obvious ribs; stipitate, goblet-shaped, c. 6 by 5 mm; stipe c. 1 mm long. *Calyx* is an irregular rim c. 0.1 mm high with 4 weakly developed lobes c. 0.25 mm long (lobe length includes the rim length). *Petals* 4, calyptrate (coherent or partly connate and falling as a cap). *Staminal disc* flat (Fig. 2: 1.6). *Stamens* c. 170. *Style* c. 3 mm long. *Placentation* axile-basal; placenta a cushion. *Ovules* c. 12–20 per locule, ascending, arranged irregularly. *Fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Upper mid-mountain forest, logging area with mostly *Fagaceae*, Class 1 rainforest on steep slopes with southern aspect. Altitude 910–2130 m.

Note — Many of the studied collections are noted by collectors to have been growing in areas that were either being logged for, or being cleared for planting, *Araucaria hunsteinii* K.Schum. (Klinki pine), an important timber tree in the Bulolo region of Papua New Guinea.

3. *Syzygium bowersiae* Craven & Damas, *sp. nov.* — Fig. 2: 1.6, 2.7, 3.2, 3.3; Map 1

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina broadly elliptic or elliptic with the base attenuate or cuneate (broadly oblong or sometimes obovate and the base obtuse in *S. furfuraceum*); inflorescences on branchlets below the leaves or on branches (cauline in *S. furfuraceum*); placentation axile-median with the ovules spreading (axile-basal and ascending in *S. furfuraceum*); and fruit obovoid and flat distally or olliform, 9–10 mm long (fruit depressedly spheroid and c. 15 mm long in *S. furfuraceum*). — Type: *NGF (Vandenberg, Katik & Kairo) 40090* (holo CANB!; iso LAE!, A, BISH, BO, BRI, K, L, NSW, PNH, SING, all n.v.), Papua New Guinea, Southern Highlands Province, Mendi Subprovince, Hagen-Mendi road, in rainforest c. 5 km from Kagaba camp site, alt. c. 2700 m, 22 Sept. 1968.

Etymology. This species is named in honour of Nancy Bowers (1928–2006), an American anthropologist, who carried out ethnobotanical research in the Upper Kaugel Valley of the then Western Highlands District (later Province) in Papua New Guinea for two main periods, 1961–1963 and 1968–1969, and many subsequent visits. Her extensive plant collections from there include a collection of the present species (*Bowers 795*).

Tree to 30 m tall, to 60 cm dbh; bark brown or orange brown, smooth or scaly. *Vegetative branchlet* terete or compressed, rounded, 2–2.5 mm diam; bark dull or dull-glossy, smooth, slightly glandular-verrucose, persistent. *Leaf lamina* broadly elliptic or elliptic, 8–17.5 by 4.5–10 cm, 1.7–1.8 times as long as wide; base attenuate or cuneate; apex short acuminate, retuse, or roundly acuminate; acumen flat; margin flat; cartilaginous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein, or generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 15–18 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 3–8 mm apart; intramarginal vein present, weakly arched, 1.5–5 mm from margin, secondary intramarginal vein present. *Petiole* 5–14 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves or on branches, paniculate, up to 11–20 by 10–20 cm, major axis 3–4 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white or yellowish. *Hypanthium* dull or dull-glossy, sometimes weakly furfuraceous ('platelets' readily caducous), minutely (but distinctly) wrinkled, weakly glandular-verrucose (rough), visibly gland-dotted or not, ribbed or not, sometimes angled laterally (i.e., 2-costate); stipitate or not (then tapering evenly to the base or truncate or rounded); stipitate-obconic, broadly clavate, stipitate-olliform or goblet-shaped, 5–7 by 3.5–5 mm; stipe 0–2 mm long. *Calyx* an irregular rim of tissue with 4 weakly developed lobes, lobes transversely semi-elliptic, very depressedly triangular or depressedly triangular, 0.25–1 mm long (including the rim). *Petals* 4; calyptrate (coherent and falling as a cap). *Staminal disc* variable, flat, descending or ascending (Fig. 2: 1.6, 2.7, 3.2, 3.3). *Stamens* 35–150, 4–12.5 mm long. *Style* 4.5–6 mm long. *Placentation* axile-median; placenta a small roundish cushion or a truncately narrowly obovate cushion. *Ovules* 15–20 or 25–30 per locule, spreading, arranged irregularly. *Mature fruit* dark red, obovoid and flat distally or olliform, 9–10 by 7–8 mm excluding the calyx, with the hypanthium rim appreciably expanding in fruit and 5–6 mm diam, glandular-verrucose, wrinkled; mature seeds not seen, cotyledons collateral.

Distribution — Papua New Guinea.

Habitat & Ecology — Rainforest, disturbed lower montane rainforest, forest on alluvial flats, mixed montane forest. Altitude 1350–2700 m.

Note — The staminal disc form and stamen number in *S. bowersiae* are quite variable and further collections are needed to ascertain if the differences are correlated with other morphological character states; if so, the circumscription of the species may require reconsideration with additional species being recognised.

4. *Syzygium branderhorstii* Lauterb. — Fig 1d, e, 2: 2.6; Map 2

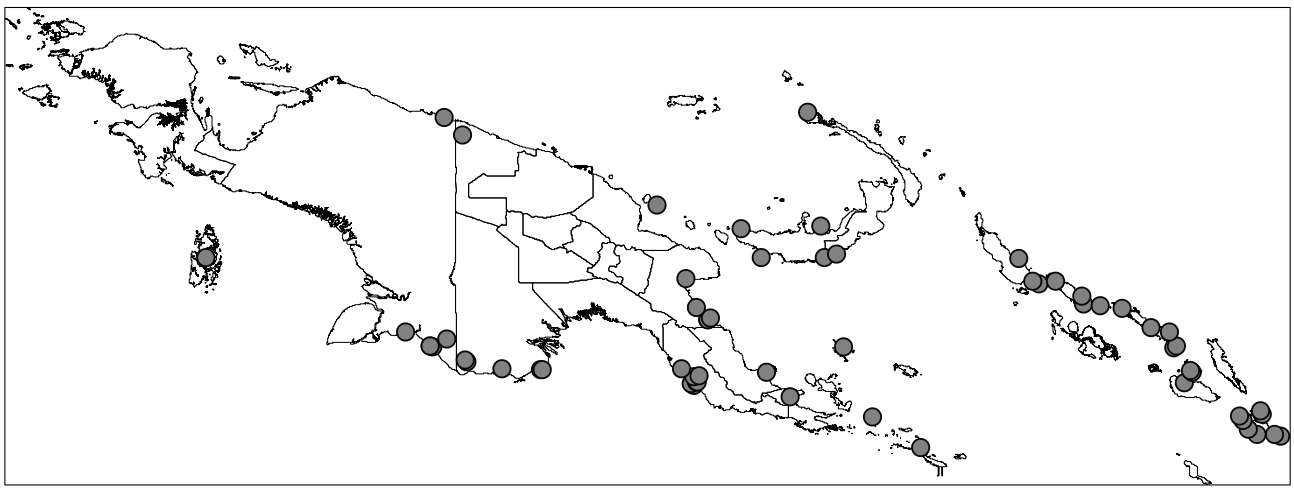
Syzygium branderhorstii Lauterb. (1910) 322. — Lectotype (designated here): *Branderhorst 129* (lecto L!), Indonesia, Papua Province, Okaba, 5 Oct. 1907.

Syzygium acetosum Merr. & L.M.Perry (1942) 280. — Type: *Brass 6267* (holo A n.v.; iso BRI!, LAE!), Papua New Guinea, Western (Fly River) Province, Daru Island, light rainforests, 3 Mar. 1936.

Syzygium kietanum Rech. (1912) 183. — Type: *Rechinger 4704* (holo W n.v., photo!), Papua New Guinea, Bougainville (North Solomons) Province, Kieta.

Syzygium peekelii Diels (1922) 414. — Type: *Peekel 671* (holo B†), Papua New Guinea, New Ireland Province, Namatanai, Liankankado, on the shore, Oct. 1910.

Tree to 25 m tall, to 50 cm dbh; bark brown, grey, grey-brown or light-brown, flaky, papery or fissured. *Vegetative branchlet* compressed or terete, rounded, 1.3–2.5 mm diam; bark dull, smooth, not or only slightly glandular-verrucose, persistent. *Leaf lamina* elliptic, broadly elliptic, narrowly elliptic or narrowly obovate (rarely ovate, occasionally approaching narrowly oblong, occasionally broadly obovate),7–27.3 by 3–14.2 cm, 1.3–3.1 times as long as wide; base attenuate, cuneate or rounded (occasionally truncate); apex short acuminate, acuminate, obtuse or rounded; acumen flat; margin flat; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 10–35 on each side of the midrib, in median part of lamina at divergence angle of 50–70° and 3–16 mm apart; intramarginal vein present, 1–7.6 mm from margin, secondary intramarginal vein present. *Petiole* 3.4–22 mm long. *Reproductive seasonal growth unit* with a reproductive zone only, or with distinct vegetative and reproductive zones (rarely the main axis proximally with up to 2 leafy nodes, rarely the inflorescences inserted at the nodes of short (up to c. 12 cm long) leafy shoots produced from the knobs from which the typical inflorescences arise). *Inflorescence* leafless; below the leaves or cauline, paniculate, up to 9–43 by 8–30 cm, major axis 2.5–6 mm thick at the midpoint, bark smooth, weakly furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white or cream (rarely crimson). *Hypanthium* dull, minutely (but distinctly) wrinkled, ribbed, not visibly gland-dotted; stipitate; goblet-shaped or funnel-shaped (when funnel-shaped, narrowly so); 4.7–10 by 2.8–6 mm; stipe 2.3–4.8 mm long. *Calyx lobes* 4, very depressedly triangular or transversely narrowly semi-elliptic, 0.5–1 mm



Map 2 Distribution of *Syzygium branderhorstii* Lauterb.

long. *Petals* 4 or sometimes 6, calyptrate (coherent and falling as a cap). *Staminal disc* descending (Fig. 2: 2.6). *Stamens* 6–12 mm long. *Style* 4–8 mm long. *Placentation* axile-median; placenta a semi-ellipsoid, semi-ovoid or hemispherical cushion, scarcely peltate. *Ovules* 13–18 per locule, ascending or spreading, arranged irregularly. *Mature fruit* red, black, purple, pink or white, plane or minutely and only slightly wrinkled, ellipsoid (sometimes almost spherical), 20–50 by 14–40 mm excluding the calyx; with the hypanthium rim not appreciably expanding in fruit and 3.5–5.5 mm diam; seed ellipsoid, up to 25 mm across.

Distribution — Indonesia (Aru Islands, Papua Province), Papua New Guinea, Solomon Islands, Santa Cruz Islands, Australia.

Habitat & Ecology — Gallery rainforest, coral seashore overhanging water, disturbed forest, poorly developed rainforest with intermixed scrub-woodland elements, primary rainforest, rainforest pocket in grassland area, edge of monsoon vine forest, steep foreshores, primary forest at beachside, lowland hill forest, forest on ultrabasic rock near sea, low scrubby forest on broken coral, associated with *Diospyros ellipticifolia* Bakh. (*Ebenaceae*) in limestone beach forest, well-drained secondary forest, well-drained primary forest at lake side, alongside dried-up creek beds on flats in mixed secondary rainforest skirted by savannah country, dipterocarp-dominated lowland rainforest on ridge, mangrove forest on coral sand and rubble. Altitude 0–600 m.

Notes — 1. In some collections, the inflorescence branches are furfuraceous only in a longitudinal band on each of two opposing faces of each internode. Inflorescences continue to be produced from the same site in successive seasons, leading to the development of distinct knobs (brachyblasts) on the trunk or branch.

2. As the lectotype designated by Diels (1922) apparently is no longer extant, the specimen in L is designated lectotype above. An isosyntype of *Versteeg 1899* has been seen from L, and L also has a specimen of *Koch 505*, a collection that Lauterbach (1910) tentatively ascribed to *S. branderhorstii* but which appears well placed in the species.

3. The description and figure of *S. peekelii* (Peekel 1984) is adequate for the species to be placed within the synonymy of *S. branderhorstii*. Similarly, the description of *S. kietanum* Rech. and the photographs available online confirm its placement with *S. branderhorstii*.

5. *Syzygium bubuuense* Craven, *sp. nov.* — Map 3

From *Syzygium maneauense* Craven & Damas it differs in having leaves that are elliptic to oblong-elliptic and truncately acuminate (broadly elliptic and roundly acuminate in *S. maneauense*), 4 calyx lobes (in *S. maneauense* the calyx is a rim of tissue on which 2 lobes are readily evident), and 65–70 stamens (35–40 in *S. maneauense*). — Type: *James, Damas, Emai & Purui 556* (holo CANB!; iso BISH n.v.), Papua New Guinea, Morobe Province, Bubuu Valley, vicinity of Lamgotak (Camp 2), S of camp, 2187 m, 24 Feb. 2012.

Etymology. The specific epithet is derived from the locality Bubuu Valley.

Shrub to 2.4 m tall. *Vegetative branchlet* terete proximally and compressed distally, rounded, 3–3.5 mm diam; bark dull, smooth, very slightly glandular-verrucose, persistent. *Leaf lamina* elliptic to oblong-elliptic, 17–21 by 8–9 cm, 2–2.4 times as long as wide; base broadly cuneate; apex truncately acuminate; acumen recurved; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein, or generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 15–19 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 7–15 mm apart; intramarginal vein present, weakly arched, 2.5–4 mm from margin, secondary intramarginal vein present but often partly obscure. *Petiole* 5–10 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, few-flowered, paniculate, up to c. 1.5 by 1.5 cm, major axis c. 2 mm thick at the midpoint; bracts caducous; bracteoles subtending each flower. *Flower buds* with the apex rounded to obtuse. *Hypanthium* dull, furfuraceous, ribbed to angled laterally (i.e., 2-costate); stipitate. *Calyx lobes* 4. *Petals* calyptrate (apparently coherent and falling as a cap). *Stamens* 65–70. *Placentation* axile-basal; placenta small cushion. *Ovules* 10–15 per locule, ascending, arranged irregularly. Open *flowers* and *fruit* not seen.

Distribution — Papua New Guinea.

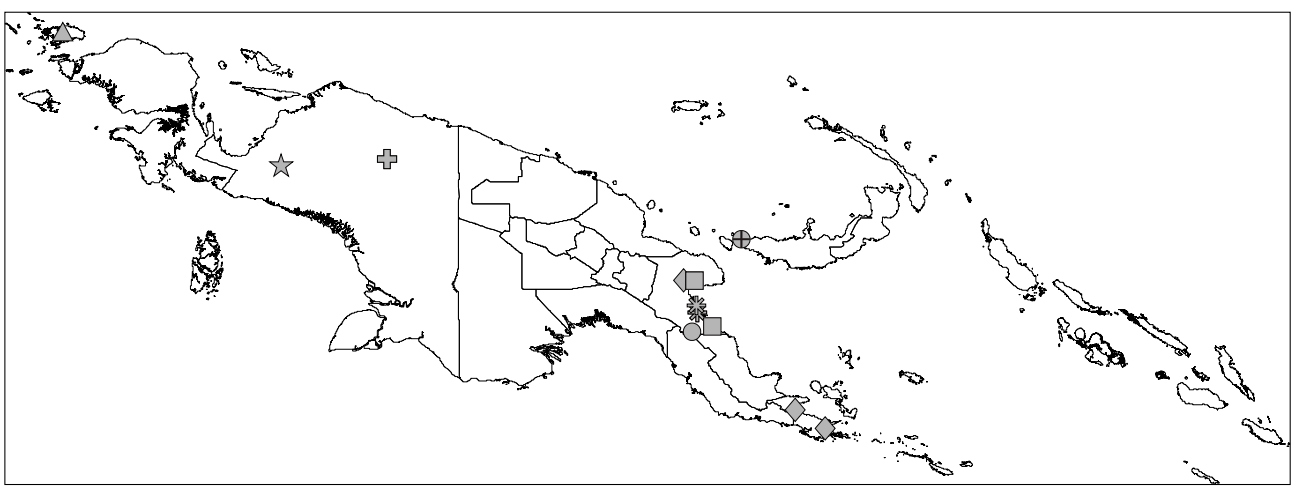
Habitat & Ecology — No information is available on habitat and ecology other than the altitude being c. 2187 m.

Notes — 1. The only specimen seen appears to be in the mid-bud stage of floral development. Consequently, information as to the mature hypanthium shape, staminal disc form, etc. is lacking.

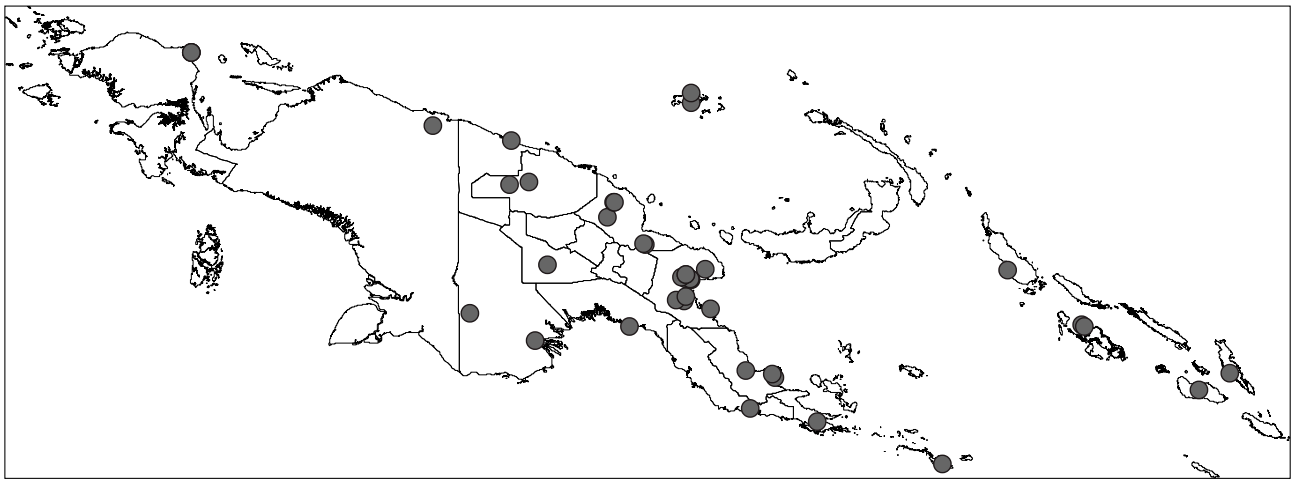
2. *Syzygium bubuuense* is known from the type collection only.

6. *Syzygium buettnerianum* (K.Schum.) Nied. — Fig. 2: 1.8; Map 4

Syzygium buettnerianum (K.Schum.) Nied. (1893) 85. — *Eugenia buettneriana* K.Schum. (in Schumann & Hollrung 1889) 89. — Lectotype (designated here): *Hollrung 658* (lecto MEL!; isolecto BO n.v., L!), Papua New Guinea, East Sepik Province, I. Augusta-Station [Chenap], July 1887.



Map 3 Distribution of *Syzygium bubuuense* Craven (●), *S. busuense* T.G.Hartley & L.M.Perry (■), *S. cheesmaniae* Craven & Damas (▲), *S. debruijnii* Craven & Damas (★), *S. fazangii* Craven & Damas (◆), *S. folidorhachis* Merr. & L.M.Perry (✚), *S. foremanii* Craven & Damas (✱), *S. frodinii* Craven & Damas (⊕).



Map 4 Distribution of *Syzygium buettnerianum* (K.Schum.) Nied.

Tree to 45 m tall, to 100 cm dbh; bark light-brown, brown, whitish brown, light grey-brown or light-grey, papery, flaky or smooth or deeply fissured. *Vegetative branchlet* compressed or terete, rounded or rarely slightly winged, 1.1–2.8 mm diam; bark dull, smooth, slightly striate or cracked, not glandular-verrucose, persistent. *Leaf lamina* elliptic, ovate, narrowly elliptic, or narrowly ovate, 4.6–15.5 by 1.9–8.3 cm, 1.5–3.2 times as long as wide; base attenuate, cuneate or rounded; apex long acuminate or acuminate; acumen recurved; margin revolute or flat; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 10–30 on each side of the midrib, in median part of lamina at a divergence angle of 55–65° and 2–8 mm apart; intramarginal vein present, 0.5–3.3 mm from margin, secondary intramarginal vein present. *Petiole* 4–12 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones. *Inflorescence* leafy, terminal to distal axillary, corymbose, up to 70 by 30 cm, major axis 3–4 mm thick at the midpoint, bark furfuraceous; bracts caducous or persistent; bracteoles apparently subtending each flower, caducous to persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* red, pink, mauve or purple. *Hypanthium* glossy or dull-glossy, smooth, wrinkled-finely-ribbed and finely glandular; stipitate; goblet-shaped to rarely elongated goblet-shaped, 3.25–5 by 2–3 mm; stipe 1–2.5 mm long. *Calyx* an undifferentiated ring of tissue 0.2–0.4 mm long on which 4 lobes rarely distinguishable, lobes up to 0.4 mm long including the rim. *Petals* 4 or 5 (number obscure as the petals are tightly coherent), calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.8). *Stamens* 30–35, 2.5–4.75 mm long. *Style* 2–4.5 mm long. *Placentation* axile-median; placenta a small cushion. *Ovules* 5–12 per locule, spreading, arranged irregularly. *Mature fruit* blue, maroon, or violet-green, smooth, depressed spheroid, 8–10 by 12–17 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and 2.5–4 mm diam; seed depressed spheroid, 7–10 mm across; cotyledons collateral.

Distribution — Papua New Guinea, Solomon Islands, Australia.

Habitat & Ecology — Lowland rainforest on ridge, secondary succession in creek gully, primary forest in plain country, rainforest on slope, margin of sago flat, on steep slopes, rainforest on gently undulating terrain, relict gully rainforest, on alluvial flats, disturbed rainforest on hill slope, tall and fairly open forest on riverbank, swamp, montane forest, margin of primary forest. Altitude 10–1920 m.

Note — The leaf acumen typically is recurved but rarely some leaves on a specimen may be flat (e.g., in *BW 2242*). This species rarely occurs at higher altitudes, e.g., in the Wau area (*NGF 8741*, Wau-Salamaua road, alt. c. 1675 m and *McAdam 405*, Black Cat, Bitoi, alt. c. 1460 m). *Syzygium hooglandii* also occurs in the Wau region but it is not known if the two species ever occur there in biotic sympatry.

7. *Syzygium busuense* T.G.Hartley & L.M.Perry — Fig. 2: 3.3; Map 3

Syzygium busuense T.G.Hartley & L.M.Perry (1973) 206. — Type: *NGF (Floyd) 5683* (holo A n.v.; iso CANB!, LAE n.v.), Papua New Guinea, Morobe Province, near Lae, Busu [River], in a virgin forest near a creek.

Tree to 7 m tall, to 10 cm dbh; bark longitudinally fissured. *Vegetative branchlet* quadrangular, angled, 4–5 mm diam; bark dull, smooth, persistent. *Leaf lamina* 30.7–33.7 by 7.5–12 cm wide, 2.8–4.1 times as long as wide, slightly oblong to elliptic; base cuneate; apex short acuminate to acute; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 20–34 on each side of the midrib, in median part of lamina at a divergence angle of 50–60° and 10–20 mm apart; intramarginal vein present, weakly arched, 1–4 mm from margin, secondary intramarginal vein absent. *Petiole* 15–20 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate, up to 12.5 by 9 cm, major axis c. 5 mm thick at the midpoint, bark furfuraceous; bracts persistent; bracteoles subtending each flower, persistent. *Flowers* white. *Hypanthium* dull, smooth, not visibly gland-dotted, occasionally proximally compressed and then proximally 2-costate; stipitate; stipitate-obconic, 7–8 by 4.5–5 mm; stipe c. 1 mm long. *Calyx lobes* 5, semi-elliptic, 1–1.5 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* ascending (Fig. 2: 3.3). *Stamens* c. 60, c. 8.5 mm long. *Style* 7.5–8 mm long. *Placentation* axile-basal; placenta a small flattened cushion. *Ovules* 5–7 per locule, ascending, arranged irregularly. Open *flowers* and *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Lower montane forest along river bank, virgin forest near creek. Altitude 150 m.

Notes — 1. A few stamens were adhering to the inflorescence of *NGF 5683*, otherwise the mature androecium is not known.

2. The continued existence of *S. busuense* in the vicinity of Lae (i.e., at Busu River) is doubtful due to the extensive clearing for housing and vegetable gardening that has occurred in recent decades.

8. *Syzygium cheesmaniae* Craven & Damas, *sp. nov.* — Fig. 2: 2.6; Map 3

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina narrowly elliptic or narrowly oblong and 3.3–3.5 times as long as wide and with the base attenuate (broadly oblong or sometimes obovate and 1.8–2.6 times as long as wide and the base obtuse in *S. furfuraceum*); placentation axile-median with the ovules spreading (axile-basal and ascending in *S. furfuraceum*); and fruit subspheroid, 4.5–6.5 mm long (fruit depressedly spheroid and c. 15 mm long in *S. furfuraceum*). — Type: *Van Royen 5294* (holo CANB!; iso L n.v.), Indonesia, Papua Barat Province, Waigeo Island, Siam River upstream of Wekasan, in riverine forest, alt. c. 35 m, 25 Jan. 1955.

Etymology. The specific epithet honours Lucy Evelyn Cheesman (1881–1969), an entomologist predominantly, who spent around six months collecting on Waigeo Island in 1938. Cheesman was a dedicated, successful collector whose collecting missions were self-funded. She spent around seven and a half years in New Guinea alone, most of this time in rainforest camps with her Papuan field assistants. She was a competent, interesting author and the publication of books on her travels assisted in raising funds for her future trips (e.g., see Cheesman 1935, 1938, 1949 for accounts of her three New Guinea expeditions).

Tree to 8 m tall, to 12 cm dbh. *Vegetative branchlet* terete, rounded, 1.5–2 mm diam; bark dull-glossy, smooth, not glandular-verrucose, persistent. *Leaf lamina* narrowly elliptic or narrowly oblong, 10–15 by 3–4.6 cm, 3.3–3.5 times as long as wide; base attenuate; apex long acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 25–27 on each side of the midrib, in median part of lamina at a divergence angle of c. 70° and 2–6 mm apart; intramarginal vein present, 0.4–0.6 mm from margin, secondary intramarginal vein absent. *Petiole* 8–10 mm long. *Reproductive seasonal growth unit* apparently with a reproductive zone only. *Inflorescence* apparently leafless, apparently cauline, paniculate, bark furfuraceous; bracts caducous; bracteoles apparently subtending each flower, persistent or caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white or cream. *Hypanthium* glossy, not visibly gland-dotted, minutely wrinkled and striate; stipitate; goblet-shaped (in late bud), c. 4 by 3.5 mm (in late bud); stipe c. 0.5 mm long. *Calyx lobes* 4, transversely narrowly semi-elliptic, c. 0.7 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* descending (Fig. 2: 2.6). *Stamens* c. 70. *Placentation* axile-median; placenta a peltate low cushion. *Ovules* c. 10–12 per locule, spreading, arranged irregularly. *Mature fruit* blackish red, smooth to slightly ribbed, subspheroid, 4.5–6.5 by 6.5–7.5 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit, 3–3.5 mm diam; seed depressed spheroid; c. 6.5–7 mm across, cotyledons collateral.

Distribution — Indonesia (Papua Province).

Habitat & Ecology — Riverine forest. Altitude c. 35 m.

Notes — 1. Only fragmented inflorescences and infructescences have been seen. The recorded data pertaining to inflorescence/infructescence structure, size, etc. therefore require confirmation.

2. The species is known from the type collection only.

9. *Syzygium debruijnii* Craven & Damas, *sp. nov.* — Fig. 2: 1.7; Map 3

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having c. 45 stamens (115–120(–150) in *S. furfuraceum*); the style 6.5–8 mm long (4–5.5 mm long (but seen up to 7.5 mm long on developing fruit) in *S. furfuraceum*); ovules 4–7 per locule (15–26 in *S. furfuraceum*). — Type: *Eyma 5395* (holo L!; iso A!), Indonesia, Papua Barat Province, Wissel Lake region, Bogesiga bivouac. Araboe, 2–3 Nov. 1939.

Etymology. The specific epithet honours Jean Victor de Bruijn (1913–1979), one of the early Dutch administration officials in the Wissel lakes region.

Tree? *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, probably cauline, many-flowered, paniculate, up to 14 by 12 cm, major axis c. 3 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, mostly caducous with a few persistent. *Flower buds* with the apex rounded to obtuse. *Hypanthium* dull, strongly furfuraceous, not visibly gland-dotted; not ribbed, usually very slightly stipitate; stipitate-olliform or goblet-shaped but then often only very slightly stipitate, 5.5–6 by 4.5–5 mm; stipe 0.25–1.5 mm long. *Calyx lobes* 4, transversely semi-elliptic, 0.5–0.75 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.5). *Stamens* c. 45, c. 7 mm long. *Style* 6.5–8 mm long. *Placentation* axile-basal; placenta a very small cushion. *Ovules* 4–7 per locule, ascending, arranged irregularly. *Branchlets*, *leaves* and *fruit* not seen.

Distribution — Indonesia (Papua Province).

Habitat & Ecology — No information available.

Notes — 1. The examined material consists of inflorescences in late bud and/or late flower. No foliage has been seen. Despite this, the species is considered by us to be well distinct from those other Papuasian species in which the hypanthium is furfuraceous.

2. The species is known from the type collection only.

10. *Syzygium fazangii* Craven & Damas, *sp. nov*. — Fig. 2: 1.7; Map 3

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina elliptic or rarely approaching obovate with the base attenuate (broadly oblong or sometimes obovate and the base obtuse in *S. furfuraceum*); calyx reduced to an incomplete, ragged rim of tissue with some segments superficially resembling lobes (calyx is an undulating rim of tissue, typically well developed, with 4 well distinguished lobes in *S. furfuraceum*). — Type: *NGF (Smith) 1329* (holo CANB!; iso LAE!, BRI n.v.), Papua New Guinea, Milne Bay Province, c. 10 km up the Dawa Dawa River, in rainforest, alt. c. 60 m, Mar. 1945.

Etymology. The specific epithet honours Kaigube (Dick) Fazang (1976–), of the PNG National Herbarium, Lae. Kaigube commenced employment with the herbarium in 1997 and has since become a knowledgeable and capable field botanist, sought after for his plant identification skills.

Tree to 30 m tall, to 60 cm dbh; bark brown with flattish, pustular lenticels, dark brown and fissured and flaky or flaky and fissured. *Vegetative branchlet* terete, 3–4 mm diam, round; bark dull, smooth, slightly or not glandular-verrucose, persistent. *Leaf lamina* elliptic or rarely approaching obovate, 13–20 by 6–9.5 cm, 1.6–2.6 times as long as wide; base attenuate; apex acuminate or short acuminate; acumen flat; margin flat; coriaceous (sometimes stiffly so); primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein, or generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 19–29 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 4–8 mm apart; intramarginal vein present, weakly arched, 1–4 mm from margin, secondary intramarginal vein present. *Petiole* 10–12 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* cauline, paniculate, up to c. 12 by 10 cm, major axis c. 4 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles caducous (rarely a few persistent). *Flower buds* with the apex rounded to obtuse. *Flowers* cream or white. *Hypanthium* dull, furfuraceous, obscurely visibly gland-dotted, ribbed; not stipitate; cup-shaped to obconic, 6–7 by 7–8 mm. *Calyx* reduced to a rim of tissue, 1–1.5 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.7). *Stamens* 95–100. *Style* in fruit 6–9 mm long. *Placentation* axile-basal; placenta a cushion, scarcely or not peltate. *Ovules* c. 25 per locule, ascending, arranged irregularly. *Mature fruit* dark purplish pink, smooth but

with a few weakly defined ribs, very depressed spheroid (in side view transversely oblong), 20–25 by 40–50 mm excluding the calyx, with the hypanthium rim appreciably expanding in fruit 12–18 mm diam; seed very depressed spheroid, c. 25 mm across, cotyledons collateral. Open *flowers* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Rainforest at base of foothills above swamp, disturbed primary ridge forest. Altitude 30–800 m.

Notes — 1. Calyx lobes are not distinguishable with the calyx reduced to an incomplete, ragged rim of tissue some of the segments of which superficially resemble lobes.

2. *NGF 19141* (near Markham River bridge, c. 13 km from Lae, c. 30 m, Morobe Province) apparently also belongs here. Although its hypanthium is smaller, it has c. 18 erect ovules per locule on an axile-basal placenta.

11. ***Syzygium folidorhachis*** Merr. & L.M.Perry — Map 3

Syzygium folidorhachis Merr. & L.M.Perry (1942) 276. — Type: *Brass & Versteegh 11917* (holo A n.v.; iso BRI!, LAE!, L n.v.), Indonesia, Papua Province, 15 km SW of Bernhard Camp, Idenburg River, in primary forest on slope of ridge, alt. 1730 m, Jan. 1939.

Tree to 18 m tall, to 54 cm dbh; bark dark brown, scaly. *Vegetative branchlet* terete or compressed, rounded, 3.5 mm diam; bark glossy, smooth, slightly glandular-verrucose, persistent. *Leaf lamina* elliptic or broadly elliptic, 13.5–16 by 8–9.5 cm, 1.7–1.8 times as long as wide; base attenuate; apex rounded or roundly acuminate; margin flat; cartilaginous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; or distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins c. 20 on each side of the midrib, in median part of lamina at a divergence angle of 75–80° and 6–10 mm apart; intramarginal vein present, weakly arched, 2–3 mm from margin; secondary intramarginal vein present. *Petiole* 3–6 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate, up to 10–25 by 4–18 cm, bark furfuraceous. *Hypanthium* strongly furfuraceous, not stipitate. *Placentation* axile-median; placenta a subcircular cushion. *Ovules* 9–11 per locule, spreading, arranged irregularly. *Open flowers* and *fruit* not seen.

Distribution — Indonesia (Papua Province).

Habitat & Ecology — Primary rainforest on ridge slope. Altitude 450–1730 m.

Notes — 1. Hartley & Perry (1973) included *S. folidorhachis* in *S. furfuraceum* because they considered the “distinguishing character of prominent reticulate venation may well be the result of variation in habitat”. The re-appraisal of specimens referred to *S. furfuraceum* by Hartley & Perry in their 1973 publication has resulted in several new species being segregated and the distinctness of *S. folidorhachis* from *S. furfuraceum* has become more evident. For example, the leaf lamina in *S. folidorhachis* is elliptic or broadly elliptic, the base attenuate and there are c. 20 primary veins on each side of the midrib; in *S. furfuraceum* it is broadly oblong or sometimes obovate, the base is obtuse and there are 30–37 primary veins on each side of the midrib.

2. The species is known from two collections only.

12. ***Syzygium foremanii*** Craven & Damas, *sp. nov.* — Fig. 2: 2.3; Map 3

From *Syzygium buettnerianum* (K.Schum.) Nied. it differs in having stouter vegetative branchlets (4–6 mm diam as against 1.1–2.8 mm in *S. buettnerianum*); the leaf lamina broadly elliptic to obovate (in *S. buettnerianum* the lamina is elliptic, ovate, narrowly elliptic or narrowly ovate); 5 calyx lobes (in *S. buettnerianum* the calyx is an undifferentiated rim of tissue on which 4 lobes rarely may be evident); the staminal disc ascending (flat in *S. buettnerianum*); and c. 55 stamens (as against 30–35 in *S. buettnerianum*). — Type: *LAE (Foreman) 52297* (holo CANB!; iso LAE!; BRI, L, both n.v.), Papua New Guinea, Morobe Province, Lae Subprovince, in *Eucalyptopsis-Anisoptera* forest on low ridge, near Buso village, alt. c. 150 m, 6 Jan. 1973.

Etymology. This species is named in honour of Donald Bruce Foreman (1945–2004). Don collected extensively in Papua New Guinea when on the staff of the herbarium in Lae between 1969 and 1975.

Tree to 30 m tall, to 50 cm dbh; outer bark greyish to white, papery; inner bark reddish brown. *Vegetative branchlet* terete, rounded, 4–6 mm diam; bark dull, smooth, not glandular-verrucose, persistent. *Leaf lamina* broadly elliptic to obovate, 5.5–16.7 by 3.5–8.5 cm, 1.6–2.2 times as long as wide; base cuneate; apex acuminate; acumen recurved; margin revolute; lamina coriaceous or cartilaginous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 25–33 on each side of the midrib; in median part of lamina at a divergence angle of 60–70° and 3–7 mm apart; intramarginal vein present, weakly arched, 2.5–3 mm from margin, secondary intramarginal vein present. *Petiole* 5–10 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones. *Inflorescence* leafless, terminal, corymbose, up to 8 by 13 cm, major axis 3–5 mm thick at the midpoint, bark furfuraceous; bracts persistent; bracteoles subtending each flower, persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* pink. *Hypanthium* glossy to dull, striate-glandular, visibly gland-dotted; stipitate; goblet-shaped to elongated goblet-shaped, 6–7 by 2.6–3 mm, stipe 3–3.5 mm long. *Calyx lobes* 5, transversely oblong or transversely narrowly semi-elliptic, 0.4–0.5 mm long. *Petals* 5, calyptrate (coherent and falling as a cap). *Staminal disc* ascending (Fig. 2: 3.1). *Stamens* c. 55, 2.5–7 mm long. *Style* 4–4.5 mm long. *Placentation* axile-median; placenta a hemispherical cushion, slightly peltate. *Ovules* c. 10 per locule, spreading, arranged irregularly. *Fruit* weakly glandular-verrucose, more or less smooth, subspheroid, c. 15 by 18 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and c. 3 mm diam; seed depressed spheroid, c. 12 mm across, cotyledons collateral.

Distribution — Papua New Guinea.

Habitat & Ecology — Depleted primary forest, lowland primary rainforest, *Eucalyptopsis-Anisoptera* forest on low ridge. Altitude 50–200 m.

Note — The species is closely related to *S. buettnerianum* and may represent an adaptation to ultrabasic soils, which are known to occur in the Buso area. The fruit available for study is not fully mature and consequently the data given above for fruit and seed may require amendment once fully developed fruit become available.

13. ***Syzygium frodinii*** Craven & Damas, *sp. nov.* — Fig. 2: 2.3; Map 3

From all other species of sect. *Furfuraceum* Craven it differs in having a connate corolla that falls as a single cap at anthesis but consisting of two separate components, an inner and an outer calyptra, both adherent to each other, with the calyx reduced to a rim of tissue c. 0.1 mm long. — Type: *NGF (Frodin) 26835* (holo CANB!; iso LAE!, BRI, L, both n.v.), Papua New Guinea, West New Britain Province, Talasea Subprovince, SW slope of Mt Talawe, in cloud forest near summit, alt. c. 1525 m, 25 May 1966.

Etymology. The specific epithet honours David Gamman Frodin (1940–2019), the collector of the type. David was an authority on Papuasian *Araliaceae* and had an encyclopaedic knowledge of the history of Papuasian botany. A bibliographer of note, David had also published, in several editions, a valuable guide to the world’s floras (Frodin 2001).

Tree to 7 m tall; bark orange, peeling in thin scales. *Vegetative branchlet* terete to slightly compressed, rounded, 4–6 mm diam;

bark dull, smooth on younger growth, not glandular-verrucose, flaking on the older branchlets. *Leaf lamina* obovate or subelliptic, 7.8–11 by 2.1–4.7 cm, 2.6–3.1 times as long as wide; base obtuse to cuneate; apex acute; margin flat; coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 15–22 on each side of the midrib; in median part of lamina at a divergence angle of 50–60° and 3–6(–8) mm apart; intramarginal vein present, weakly arched, 1–2 mm from margin, secondary intramarginal vein absent. *Petiole* 5–7 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves or on branches, few- to many-flowered; paniculate, up to 7 by 6 cm, major axis c. 3 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles caducous. *Flower buds* with the apex attenuate. *Flowers* red-violet. *Hypanthium* dull-glossy, smooth, not visibly gland-dotted, minutely (but distinctly) wrinkled; stipitate; goblet-shaped; 4–5 by 3.5–4.5 mm, stipe 1 mm long. *Calyx* is reduced to a rim of tissue c. 0.1 mm long. *Petals* calyptrate (connate at least in part, forming two calyptra, one inside the other, falling together as a single cap at anthesis). *Staminal disc* descending (Fig. 2: 2.3). *Stamens* c. 70, 5–6 mm long. *Style* c. 4 mm long. *Placentation* axile-basal; placenta a small cushion. *Ovules* 5–6 per locule, ascending, arranged irregularly. *Fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Cloud forest. Altitude 1520 m.

Notes — 1. This species is unique amongst the Papuasian species of *Syzygium* in that its flowers have two petaline calyptras formed from at least partly connate petals, together with a calyx that is reduced to rim of tissue c. 0.1 mm long.

2. *Syzygium frodinii* is known from the type collection only.

14. *Syzygium furfuraceum* Merr. & L.M.Perry — Fig. 1a–c, 2: 1.1, 1.3, 1.4; Map 5

Syzygium furfuraceum Merr. & L.M.Perry (1942) 276. — Type: *Clemens 2133* (holo A n.v.; iso L!, NY!), Papua New Guinea, Morobe Province, Sattelberg, Quembung Mission, alt. c. 600 m, 23 Mar. 1936.

Tree to 30 m tall, to 60 cm dbh; bark light to dark brown, pustular or flaky. *Vegetative branchlet* terete, rounded, 3–4 mm diam; bark dull, smooth, not glandular-verrucose, persistent. *Leaf lamina* broadly oblong or sometimes obovate, 8.5–19.5 by 3–10.3 cm, 1.8–2.6 times as long as wide; base obtuse; apex obtuse, acute or sometimes short-acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 30–37 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 4–7 mm apart; intramarginal vein present, weakly arched, 3–5 mm from margin, secondary intramarginal vein present. *Petiole* 5–12 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate, up to 16 by 12 cm, major axis 4–5 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white, cream, green or greenish white. *Hypanthium* dull, smooth or striate, furfuraceous, not visibly gland-dotted; stipitate or not (hypanthium then tapering evenly to the base or truncate or rounded); to cup-shaped or narrowly subcampanuloid, 4.5–6 by 5–6 mm, stipe 0–0.5 mm long. *Calyx* is an undulating rim of tissue, typically well developed, with 4 well-distinguished lobes; lobes transversely semi-elliptic or transversely narrowly semi-elliptic, c. 1–1.25 mm long including the rim. *Petals* calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.1, 1.3 or 1.4). *Stamens* 115–120(–150), 6–13 mm long. *Style* 4–5.5 mm long (seen up to 7.5 mm long on developing fruit). *Placentation* axile-basal; placenta a small cushion. *Ovules* 15–26 per locule, ascending, arranged irregularly. *Mature fruit* pink, red or magenta, smooth *in vivo*, wrinkled and ribbed *in sicco*, furfuraceous, depressedly spheroid; c. 15 by 20–30 mm excluding the calyx, with the hypanthium rim appreciably expanding in fruit and 7–10 mm diam; seed depressed spheroid, 15–20 mm across, cotyledons collateral.

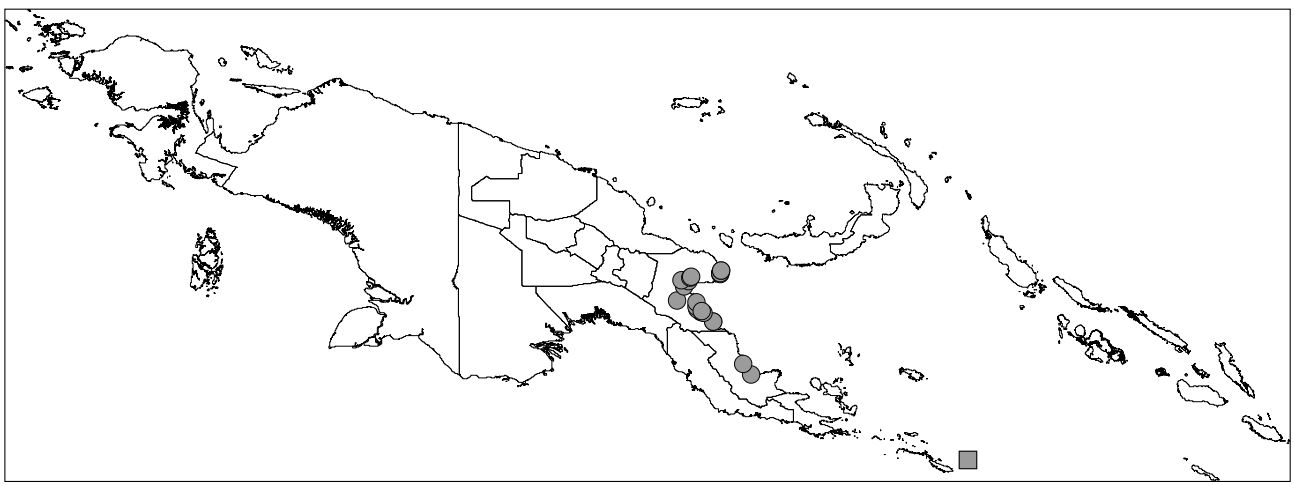
Distribution — Papua New Guinea.

Habitat & Ecology — Hill forest, alluvial forest, lowland primary hill forest, lowland rainforest above swamp, stunted lowland forest on exposed ridge, co-dominant in upper mid-mountain forest, *Anisoptera*-dominated forest, dry rainforest. Altitude 0–1280 m.

Note — Although furfuraceous in the early stages of development, the hypanthium may not be furfuraceous at anthesis, e.g., in *Clemens 8107A*. The inflorescences once were noted by a collector as being among the leaves instead of terminal.

15. *Syzygium gillisonii* Craven & Damas, *sp. nov.* — Fig. 2: 3.4; Map 5

From *Syzygium pyrocarpum* (Greves) Merr. & L.M.Perry it differs in having a cordate base to the leaf lamina (cuneate in *S. pyrocarpum*); 18–24 primary veins on each side of the midrib (35–48 in *S. pyrocarpum*); a petiole up to 0.5 mm long (2–10 mm in *S. pyrocarpum*); and bright mauve, non-furfuraceous fruit (red and furfuraceous in *S. pyrocarpum*). — Type: *NGF (Gillison)*



Map 5 Distribution of *Syzygium furfuraceum* Merr. & L.M.Perry (●), *S. gillisonii* Craven & Damas (■).

25344 (holo CANB!; iso LAE!, BRI, L, both n.v.), Papua New Guinea, Milne Bay Province, ridge top rainforest, Rossel Island, Ulanga Bay, Mt Te, alt. c. 450 m, 11 June 1966.

Etymology. The specific epithet honours Andrew Napier Gillison (1937–), the collector of the type. Andy worked in Papua New Guinea between 1957 and 1972, initially in the Department of Agriculture, Stock and Fisheries and from 1964 in the Department of Forests.

Tree to 12 m tall, to 12.5 cm dbh; bark slightly smooth to papery. *Vegetative branchlet* terete or in the young branchlets compressed, rounded, 5–6 mm diam; bark dull-glossy, smooth, not glandular-verrucose, bark persistent. *Leaf lamina* broadly elliptic or sometimes obovate, 18.5–26.7 by 11.1–14 cm, 1.6–1.9 times as long as wide; base cordate; apex acute to sometimes obtuse; acumen flat; margin flat; coriaceous to cartilaginous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein, primary veins 18–24 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 10–20 mm apart; intramarginal vein present, strongly arched, 3–6 mm from margin, secondary intramarginal vein absent. *Petiole* up to 0.5 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate, up to 13 by 8 cm, major axis c. 4.5 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flowers* white. *Hypanthium* dull or dull-glossy, appearing smooth but actually minutely subspiculate, not visibly gland-dotted, ribbed; not stipitate, elongated cup-shaped, 9–11 by 5.5–7 mm. *Calyx lobes* 4, transversely semi-elliptic, c. 2 mm long. *Staminal disc* ascending (Fig. 2: 3.4). *Style* c. 9.5 mm long. *Placentation* axile-median; placenta a more or less elliptic cushion. *Ovules* c. 12 per locule, ascending, arranged irregularly. *Fruit* bright mauve, more or less smooth, ribbed, lageniform or ellipsoid, 20–25 by 12–15 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and c. 7 mm diam, cotyledons collateral. *Flower buds*, *petals* and *stamens* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Associated with *Myristica* Gronov. (*Myristicaceae*) and *Calophyllum* L. (*Clusiaceae*) in ridge-top rainforest. Altitude c. 450 m.

Notes — 1. The material seen is in the late flower-early fruit stage of development and is lacking petals and stamens. Although the collector's notes suggest the fruit is mature, in the examined material the seeds were immature.

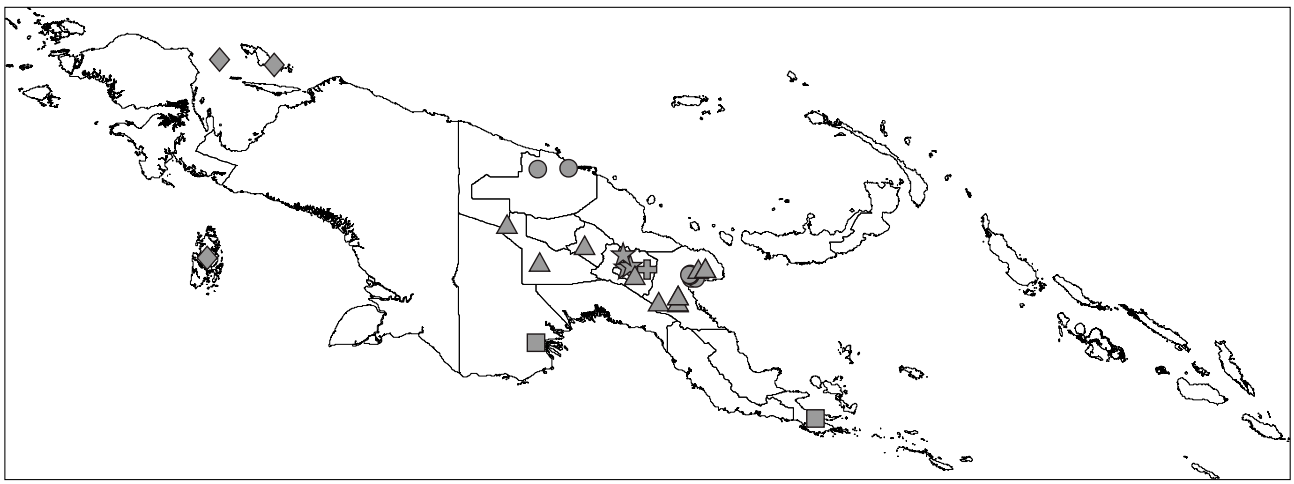
2. The species is known from two collections only.

16. *Syzygium hartleyi* Craven & Damas, *sp. nov.* — Fig. 2: 1.4; Map 6

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having a narrowly elliptic, elliptic or sometimes obovate leaf lamina with a cuneate base (broadly oblong or sometimes obovate and obtuse in *S. furfuraceum*); a glossy, non-furfuraceous hypanthium (dull and furfuraceous in *S. furfuraceum*); and an axile-median placentation with 2–5 ovules per locule (axile-basal and with 15–26 ovules per locule in *S. furfuraceum*). — Type: *Hartley 9630* (holo CANB!; iso A, L, both n.v., LAE!), Papua New Guinea, Morobe Province, c. 11 km N of Lae, near the Butibum River, in primary rainforest, alt. c. 60 m, 24 Dec. 1961.

Etymology. The specific epithet honours Thomas (Tom) Gordon Hartley (1931–2016), an authority on Indo-Pacific *Rutaceae*, and who made many stimulating plant collections in New Guinea during a phytochemical survey in the early 1960s (Hartley et al. 1973). Tom worked up his and other collections of New Guinean *Syzygium* with Lily M. Perry at Harvard University and they published a much needed key to the genus (Hartley & Perry 1973). That research was the stimulus for his continued work in Canberra with Lyn Craven on the group.

Tree to 10 m tall, to 15 cm dbh; outer bark reddish brown, flaky. *Vegetative branchlet* terete, rounded, 1–5 mm diam; bark dull, smooth or sometimes furfuraceous, not glandular-verrucose, bark flaking or peeling. *Leaf lamina* narrowly elliptic, elliptic or sometimes obovate; 8–13.6 by 2.5–5.7 cm wide, 2.4–3 times as long as wide; base cuneate; apex acuminate to long acuminate; acumen flat; margin flat; thinly coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein, primary veins 30–46 on each side of the midrib, in median part of lamina at a divergence angle of 50–60° and 2–4 mm apart; intramarginal vein present, weakly arched, 0.2–0.5 mm from margin, secondary intramarginal vein absent. *Petiole* 5–8 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* generally leafless or rarely a leaf within the inflorescence; on branchlets below the leaves or on branches or cauline, paniculate, up to 3.5–7.5 by 2.5–4.5 cm, major axis 1.5–1.7 mm thick at the midpoint, bark furfuraceous; bracts usually persistent; bracteoles subtending each flower, persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* cream. *Hypanthium* glossy, striate-glandular and wrinkled, visibly gland-dotted; stipitate or not; obconic, stipitate-obconic or shortly broadly clavate, 2–2.5 by 1.7–2 mm wide, stipe 0–0.25 mm long. *Calyx lobes* 5 on a rim of tissue and 0.3–0.5 mm long including the rim. *Petals* 5, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.4). *Stamens* 60–65, 1.2–2.8 mm long. *Style* 2–2.5 mm long. *Placentation* axile-median; placenta is a small cushion; ovules 2–5 per locule, spreading, arranged radially in one row, or arranged irregularly



Map 6 Distribution of *Syzygium hartleyi* Craven & Damas (●), *S. hentyi* Craven & Damas (■), *S. hooglandii* Craven & Damas (▲), *S. idanum* Craven & Damas (★), *S. kosteri* Craven & Damas (◆), *S. kui* Craven & Damas (✚).

(when 4, 2 ovules are collateral on each lobe of the placenta). *Mature fruit* purple, strongly wrinkled (glands are discernible but are not prominent), depressed-spheroid, c. 8 by 10 mm excluding the calyx, with the hypanthium rim c. 3 mm diam; seed depressed spheroid, c. 7.5 mm across, cotyledons collateral.

Distribution — Papua New Guinea.

Habitat & Ecology — Primary rainforest, rainforest on slope. Altitude 60–250 m.

Notes — 1. In *Hartley 9630*, the calyx is a rim of more or less translucent tissue c. 0.2 mm long with 5 protrusions (representing the lobes) each c. 0.3 mm long including the rim. In *Robbins 2138*, the rim is much less well developed and the calyx lobes are distinct and up to c. 0.5 mm long.

2. Hartley & Perry (1973) tentatively referred specimens of this species to *S. iteophyllum* Diels but this placement cannot be confirmed. Until type material of *S. iteophyllum* is located, the correct application of the name cannot be determined.

17. *Syzygium hentyi* Craven & Damas, *sp. nov.* — Fig. 2: 1.6; Map 6

From *Syzygium sambogense* T.G.Hartley & L.M.Perry it differs in having the primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein (in *S. sambogense* the primary and secondary venation is distinctly different with the secondaries relatively little developed and not or rarely joining the intramarginal vein); 15–23 primary veins on each side of the midrib (35–40 in *S. sambogense*); and in lacking a secondary intramarginal vein (present in *S. sambogense*). — Type: *NGF (Henty) 16942* (holo CANB!; iso LAE!, A, BO, BRI, K, L, NSW, SING, UH, all n.v.), Papua New Guinea, Milne Bay Province, in ridge forest on hills above Kaporika village, alt. c. 122 m, 4 June 1964.

Etymology. The specific epithet honours Edward Ellis (Ted) Henty (1915–2002), a member of the staff of the Lae herbarium for many years, and an expert on the economic plant species of Papua New Guinea with a particular interest in grasses.

Tree to 13 m tall; bark brown. *Vegetative branchlet* terete, rounded; bark dull, smooth, not glandular-verrucose, persistent. *Leaf lamina* elliptic to obovate; base cuneate, 9–15 by 3.5–7 cm, 2.2–2.6 times as long as wide; apex acuminate; acumen flat; coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 15–23 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 3–5 mm apart; intramarginal vein present, weakly arched, 1–3 mm from margin, secondary intramarginal vein absent. *Petiole* 5–10 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones or with a reproductive zone only (see note 1). *Inflorescence* paniculate, up to 6–21 by 5–20 cm, major axis 3–5 mm thick at the midpoint, bark furfuraceous; bracts caducous or some persistent; bracteoles subtending each flower, caducous or rarely some persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* white. *Hypanthium* dull, smooth, not visibly gland-dotted, ribbed or rarely angled laterally (i.e., 2-costate), stipitate; stipitate-cup-shaped, 7–9 by c. 6 mm, stipe c. 3 mm long. *Calyx lobes* 4, transversely semi-elliptic, 1.5–2 mm long. *Petals* 4, falling at anthesis. *Staminal disc* flat (Fig. 2: 1.6). *Stamens* 90–100. *Style* c. 7 mm long. *Placentation* axile-median; placenta narrow, oblong. *Ovules* c. 12 per locule, spreading, arranged irregularly. *Flowers* (see note 1) and *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Ridge forest. Altitude 120 m.

Notes — 1. The available material was overly trimmed in the field and the specimens consequently lack structural information. It therefore is unclear as to whether the material represents leafy or leafless reproductive seasonal growth units and no clearly vegetative seasonal growth units are present. Note therefore that the data given on branchlets and leaves in the description may not reflect the actual situation with respect to vegetative growth per se. Flowers have not been seen; only late bud stage material has been studied and, although the petals are discrete in bud it is not known if they cohere and fall as a cap at anthesis. Only a very early stage of fruiting has been seen and the young fruits were all galled. The stipe soon thickens and the young fruit is more or less cylindrical to long cup-shaped.

2. The species is known from the type collection only.

18. *Syzygium hooglandii* Craven & Damas, *sp. nov.* — Fig. 2: 1.8; Map 6

From *Syzygium buettnerianum* (K.Schum.) Nied. it differs in having the primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein (in *S. buettnerianum* the primary and secondary venation is distinctly different with the secondaries relatively little developed and not or rarely joining the intramarginal vein); the terminal flower in a triad ebracteolate (all flowers apparently bracteolate in *S. buettnerianum*); 5–10 ovules per locule, arranged radially in one row (5–12 per locule and arranged irregularly in *S. buettnerianum*). — Type: *Hoogland & Pullen 5961* (holo CANB!; iso LAE!, A, BM, BRI, G, K, L, MEL, US, all n.v.), Papua New Guinea, Western Highlands Province, c. 5 km SE of Mt Hagen, near Wankl village on mountain slope, in tall largely secondary forest on steep slope, alt. c. 2050 m, 18 Aug. 1956.

Etymology. The specific epithet honours Ruurd Dirk Hoogland (1922–1994), a collector of numerous, high quality specimens of Papuasian and Australian plants, and a botanical bibliographer. Ru joined the New Guinea Surveys team of the then CSIRO Division of Land Use and Regional Survey in 1952. He established excellent standards for the collection of herbarium specimens in New Guinea, and trained newly appointed staff in his methods.

Tree to 45 m tall (often 21–27 m), to 135 cm dbh; bark pale orange-brown, grey, whitish yellow-brown, pinkish grey, light grey brown, smooth, flaky or papery. *Vegetative branchlet* terete or sometimes compressed or rounded-quadrate, rounded, 2–5.5 mm diam; bark dull, smooth and finely cracked or subfurfuraceous, not glandular-verrucose, persistent. *Leaf lamina* narrowly elliptic, elliptic or broadly elliptic, 5–10 by 2.5–6 cm, 1.4–2.4 times as long as wide; base attenuate, cuneate or obtuse; apex acuminate to long acuminate; acumen recurved; margin revolute; chartaceous to subcartilaginous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 27–33 on each side of the midrib; major veins in median portion of lamina 1.5–3 mm apart; intramarginal vein present, weakly arched, 2–3 mm from margin, secondary intramarginal vein present. *Petiole* 4–10 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones. *Inflorescence* leafless or leafy, terminal or distal axillary, corymbose, up to 3–13 by 4.5–13 cm, major axis 2.5–4 mm thick at the midpoint, bark furfuraceous; bracts caducous or persistent; bracteoles subtending lateral flowers of a triad but with the terminal flower without bracteoles; persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* purple, red or maroon. *Hypanthium* glossy or dull-glossy; striate-glandular, visibly gland-dotted; stipitate; goblet-shaped or stipitate-cup-shaped, 2.5–4.25 by 2–3.75 mm, stipe 0.5–1 mm long. *Calyx* a rim of tissue, lobes if distinguishable 4 or 5 and very depressedly triangular or depressedly triangular and 0.2–0.5 mm long including the rim. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.8). *Stamens* 2.5–5 mm long. *Style* 2.5–4 mm long. *Placentation* axile-median; placenta a small cushion. *Ovules* 5–10 per locule, spreading, arranged radially in one row. *Mature fruit* blue, smooth, depressed spheroid, c. 10 by 10–14 mm wide excluding the calyx; seed depressed spheroid, 8–12 mm across, cotyledons collateral.

Distribution — Papua New Guinea.

Habitat & Ecology — Tall and largely secondary forest on steep slope, mossy fagaceous forest on hillside, mid mountain oak forest, associated with *Garcinia* L. (*Clusiaceae*), *Terminalia* L. (*Combretaceae*) and *Palaquium* Blanco (*Sapotaceae*) in montane rainforest, secondary succession in creek gully, dry rainforest in gully. Altitude 760–2130 m.

Notes — 1. *Syzygium hooglandii* additionally differs from *S. buettnerianum* in the reticulate leaf venation being more prominent, and in the inflorescences being shorter and stouter with the bracteoles more persistent. There is some variation in the placentation among the specimens assigned to *S. hooglandii*, i.e., *NGF 17337* has c. 5 ovules in one row, *Hoogland & Pullen 5961* c. 10 in one row, whereas *NGF 15429* has c. 13 ovules/locule arranged irregularly on the placenta. *NGF 15429* was collected at c. 760 m while *NGF 17337* and *Hoogland & Pullen 5961* were collected at c. 2130 and c. 2050 m, respectively. It may be that *NGF 15429* is transitional with respect to *S. buettnerianum* or represents another taxon.

2. A distinction between primary and secondary veins may be artificial and this species may in fact have very few secondary veins per se. In robust seasonal growth units, the proximal inflorescence branchlets are subtended by leaves but in non-robust seasonal growth units the inflorescence per se is leafless.

19. *Syzygium idanum* Craven & Damas, *sp. nov.* — Fig. 2: 1.6; Map 6

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina base attenuate (obtuse in *S. furfuraceum*) and 15 or 16 primary veins on each side of the midrib (30–37 in *S. furfuraceum*); and the hypanthium not furfuraceous and with a stipe c. 2 mm long (furfuraceous and up to 0.5 mm long in *S. furfuraceum*). — Type: *Brass 31320* (holo CANB!; iso L n.v., NY!), Papua New Guinea, Eastern Highlands Province, NE slopes of Mt Michael, in gullies in *Nothofagus* forest, alt. 2000 m, 3 Sept. 1959.

Etymology. The specific epithet is derived from the Greek, *idanos*, fair, comely, in reference to the attractive appearance of specimens of this species.

Tree to 20 m tall; bark pale brown or silvery brown, flaky. *Vegetative branchlet* terete, rounded, 2–3 mm diam; bark dull-glossy or glossy, smooth; slightly glandular-verrucose, persistent. *Leaf lamina* obovate, 9–11.5 by 5–5.5 cm, 1.8–2.1 times as long as wide; base attenuate; apex obtuse or rounded, margin revolute; cartilaginous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein or distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein primary veins 15 or 16 on each side of the midrib, in median part of lamina at a divergence angle of c. 60° and 3–5 mm apart; intramarginal vein present, weakly arched, 1.5–2 mm from margin, secondary intramarginal vein present. *Petiole* 6–8 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves, on branches or cauline, paniculate, up to 14–17 by 17–18 cm, major axis 3.5–4 mm thick at the midpoint, bark furfuraceous; bracts persistent or caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* cream. *Hypanthium* dull-glossy, striately glandular-wrinkled, visibly gland-dotted; stipitate; stipitate-obconic or goblet-shaped 5.5–6 by 3.75–4.25 mm, stipe c. 2 mm long. *Calyx* is a rim of tissue on which 4 lobes usually can be distinguished, lobes c. 0.5 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.6). *Stamens* 100–105, 5.5–9 mm long. *Style* c. 6 mm long. *Placentation* axile-basal; placenta a small cushion. *Ovules* 18–20 per locule, ascending, arranged irregularly. *Fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Gullies in *Nothofagus*-forest, montane forest. Altitude 2000–2500 m.

Note — The leaf does not have an acumen but the obtuse leaf apex is recurved.

20. *Syzygium kosteri* Craven & Damas, *sp. nov.* — Fig. 2: 1.6; Map 6

From *Syzygium hartleyi* Craven & Damas it differs in having the calyx reduced to a rim c. 0.5 mm long and lobes not evident (5 lobes evident and calyx 0.3–0.5 mm long in *S. hartleyi*); c. 110 stamens (60–65 in *S. hartleyi*); ovules numerous per locule and arranged irregularly (ovules 2–5 per locule in *S. hartleyi* and arranged irregularly when 5 or regularly in one row when 4). — Type: *BW (Koster) 1075* (holo CANB!; iso L, MAN, both n.v.), Indonesia, Papua Province, Numfoor Island, Namber, alt. c. 10 m, 2 Oct. 1954.

Etymology. The specific epithet honours Christiaan Koster (1922–2000), who moved from Java to Netherlands New Guinea in 1950. From 1951, he was employed by the Netherlands New Guinea forest service, largely as a plant collector.

Tree. *Vegetative branchlet* terete, c. 2 mm diam; bark dull, smooth, not glandular-verrucose, peeling. *Leaf lamina* elliptic, ovate, or sometimes obovate, 6.6–10.5 by 2.5–5.4 cm, 1.9–2.6 times as long as wide; base cuneate; apex long acuminate; acumen flat; margin flat; thinly coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 30–35 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 2–4 mm apart; intramarginal vein present, weakly arched, c. 0.5 mm from margin; secondary intramarginal vein absent. *Petiole* 5–8 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, perhaps cauline, paniculate, up to 22 by 15 cm, major axis c. 2.5 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending lateral flowers of a triad but with the terminal flower ebracteolate, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* yellowish. *Hypanthium* glossy, not visibly gland-dotted, ribbed and minutely (but distinctly) wrinkled; stipitate; stipitate-cup-shaped or goblet-shaped, 3–3.5 by 2.5 mm, stipe c. 0.5–0.75 mm long. *Calyx* is a rim of tissue c. 0.5 mm long. *Petals* calyptrate (coherent and falling as a cap or at least partly connate (outer petal free, the others connate)). *Staminal disc* flat (Fig. 2: 1.6). *Stamens* c. 110, 2.5–5 mm long. *Style* c. 2.3 mm long. *Placentation* axile-median; placenta a flattened cushion. *Ovules* numerous, ascending, arranged irregularly. *Fruit* not seen.

Distribution — Indonesia (Aru Islands, Papua Province).

Habitat & Ecology — Old secondary forest, coral limestone. Altitude 0–10 m.

21. *Syzygium kui* Craven & Damas, *sp. nov.* — Map 6

From *Syzygium hartleyi* Craven & Damas it differs in having the leaf lamina coriaceous or cartilaginous and with 20–25 primary veins on each side of the midrib (thinly coriaceous and 30–46 in *S. hartleyi*); hypanthium furfuraceous (not furfuraceous in *S. hartleyi*); and the fruit c. 15–20 by 15–20 mm with the hypanthium rim c. 10 mm diam (c. 8 by 10 mm and the hypanthium rim 3 mm diam in *S. hartleyi*). — Type: *Robbins 950* (holo CANB!; iso L n.v., LAE!), Papua New Guinea, Eastern Highlands Province, Kainantu Subdistrict, Okapa road, forest, alt. c. 1920 m, 3 Oct. 1957.

Etymology. The specific name *kui*, is a noun in apposition and is the name for this plant in the Hagen language.

Tree to 7 m tall. *Vegetative branchlet* terete, rounded, 2–3 mm diam; bark dull, smooth, slightly glandular-verrucose, bark persistent. *Leaf lamina* elliptic or obovate, 14–19.5 by 4.5–7.5 cm, 2.6–3.1 times as long as wide; base cuneate; apex short acuminate; acumen flat; margin flat; coriaceous or cartilaginous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 20–25 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 5–7 mm apart; intra-

marginal vein present, weakly arched, 2–3 mm from margin, secondary intramarginal vein absent. *Petiole* 7–10 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, few-flowered, cymose, up to 2.5 by 3 cm, major axis c. 2.5 mm thick at the midpoint, bark furfuraceous; bracts caducous (rarely a few persistent); bracteoles apparently subtending each flower, caducous (rarely a few persistent). *Hypanthium* furfuraceous. *Calyx lobes* 4, very depressedly triangular, c. 1.5 mm long. *Style* c. 6 mm long. *Placentation* axile-median; placenta cushion-shaped. *Ovules* c. 15 per locule, spreading, arranged irregularly. *Mature fruit* purple, strongly furfuraceous, plane, apparently spheroid; 15–20 by 15–20 mm excluding the calyx, with the hypanthium rim appreciably expanding in fruit and c. 10 mm diam; seed spheroid, c. 9 mm across, cotyledons collateral. *Open flowers* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Beech to lower montane rainforest. Altitude c. 1920 m.

Notes — 1. The furfuraceous hypanthium and few-flowered inflorescence is diagnostic.

2. The species is known from the type collection only.

22. *Syzygium kutubuense* Craven & Damas, *sp. nov.* — Map 7

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the inflorescence branches much more strongly furfuraceous and acute flower buds (buds rounded in *S. furfuraceum*). — Type: *Schodde 2182* (holo CANB!; iso LAE!, A, BM, BO, BRI, L, PNH, US, all n.v.), Papua New Guinea, Southern Highlands Province, Lake Kutubu, on margin of primary forest, near Tage, alt. c. 825 m, 20 Sept. 1961.

Etymology. The specific epithet is derived from the locality, Lake Kutubu.

Tree to 31 m tall, to 50 cm dbh. *Vegetative branchlet* terete or compressed, rounded, 3–5 mm diam; bark dull, not glandular-verrucose, persistent. *Leaf lamina* broadly obovate, broadly elliptic or sometimes broadly elliptic, 14–22 by 8.5–11 cm, 1.8–2 times as long as wide; base cuneate or obtuse; apex rounded or obtuse; acumen flat; margin flat; coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein, primary veins 26–29 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 5–10 mm apart; intramarginal vein present, weakly arched, 4–5 mm from margin, secondary intramarginal vein present. *Petiole* 5–10 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate, up to 19 by 17 cm, major axis c. 4.5 mm thick at the midpoint, bark very strongly furfuraceous; bracts caducous (apparently sloughing off with patches of epidermis); bracteoles subtending each flower, caducous. *Flower buds* with the apex acute. *Calyx lobes* 4. *Open flowers* and *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Margin of primary forest. Altitude c. 820 m.

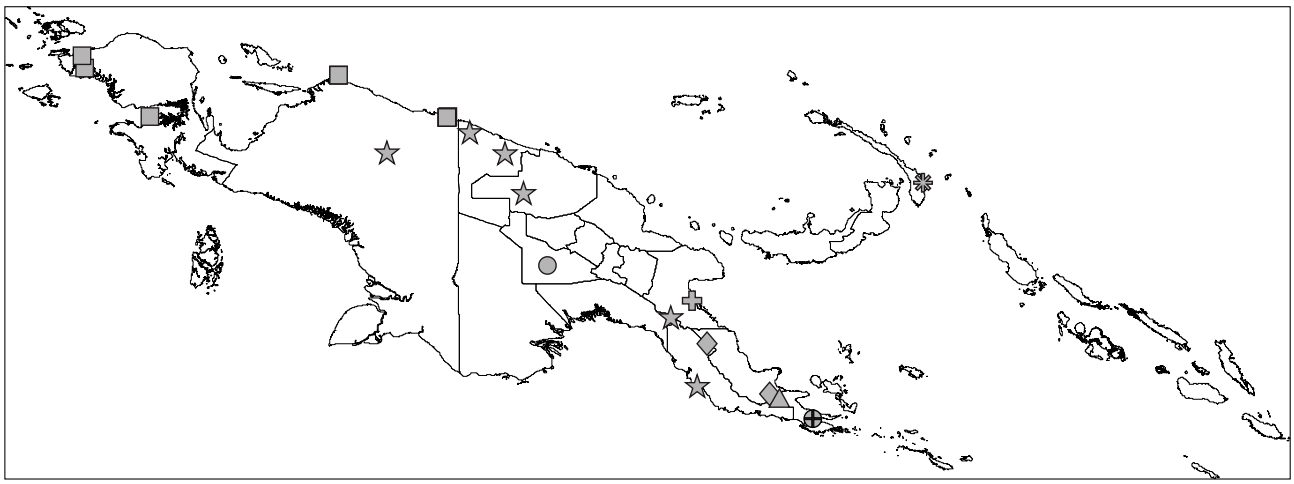
Notes — 1. The large leaves and stout and strongly furfuraceous inflorescence, together with the acute young buds, are evidence that this material represents a distinct species. From the similarity in leaf shape and size, it appears to be allied to *S. furfuraceum*. The acute buds are not matched in those of *S. furfuraceum* specimens at a comparable stage of development.

2. The species is known from the type collection only.

23. *Syzygium leptophlebioides* Merr. & L.M.Perry — Fig. 2: 2.9; Map 7

Syzygium leptophlebioides Merr. & L.M.Perry (1942) 282. — Type: *Brass 8979* (holo A n.v.; iso BRI!, L photo), Indonesia, Papua Province, Jayapura and vicinity, alt. c. 100 m, June–July 1938.

Tree to 15 m tall, to 20 cm dbh; bark brown, flaky with hard thick flakes. *Vegetative branchlet* terete, rounded, 2–3 mm diam; bark glossy, smooth, not glandular-verrucose, sometimes persistent. *Leaf lamina* elliptic, obovate or suboblong, 6–15.5 by 3–6 cm, 2.2–4 times as long as wide; base cuneate or obtuse; apex acute to acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein, or primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 20–35 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 3–5 mm apart; intramarginal vein present, weakly arched, 1–2 mm from margin, secondary intramarginal vein present. *Petiole* 10–20 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate and often robust, up to 25 by 19 cm, major axis 3–5 mm thick at the midpoint, bark furfuraceous (sometimes sparingly so); bracts caducous; bracteoles subtending each flower, persistent or caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* pink, cream or red (described as wine-red, or with pink hypanthium and cream stamens). *Hypanthium* dull or dull-glossy, more or less smooth, visibly gland-dotted or not, ribbed; stipitate; stipitate-cup-shaped, broadly



Map 7 Distribution of *Syzygium kutubuense* Craven & Damas (●), *S. leptophlebioides* Merr. & L.M.Perry (■), *S. maneauense* Craven & Damas (▲), *S. megistophyllum* Merr. & L.M.Perry (★), *S. millariae* Craven & Damas (◆), *S. montis-venetus* Craven (✚), *S. novotnyi* Craven & Damas (✱), *S. prolatum* Craven & Damas (⊕).

clavate or stipitate-olliform, 4–6 by 3.5–5 mm, stipe 1–2 mm long. *Calyx lobes* 4, transversely semi-elliptic or depressedly triangular to rounded depressedly triangular, 0.5–1.5 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* descending (Fig. 2: 2.9). *Stamens* c. 100, 4–10 mm long. *Style* 3.5–4 mm long. *Placentation* axile-median; placenta a rounded and slightly prominent or transversely elliptic and distinctly raised cushion. *Ovules* 14–18 per locule, spreading, arranged irregularly. *Mature fruit* red or reddish purple, smooth, spheroid; 12–14 by 12–14 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and c. 4 mm diam; seed spheroid, c. 10 mm across, cotyledons collateral.

Distribution — Indonesia (Papua Province).

Habitat & Ecology — Partly felled primary forest on slope along river, rainforest, disturbed lowland rainforest. Altitude 10–150 m.

Note — The inflorescence is often robust and then collected in part only, leading to its misinterpretation by collectors as being lateral and/or terminal.

24. *Syzygium maneauense* Craven & Damas, *sp. nov.* — Fig. 2: 3.2; Map 7

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina broadly elliptic with the acumen recurved (broadly oblong or sometimes obovate and the acumen flat in *S. furfuraceum*); the hypanthium dull-glossy, not furfuraceous and weakly furrowed or 2-costate (dull, furfuraceous and not furrowed or costate in *S. furfuraceum*); calyx a rim of tissue c. 0.5 mm long with 2 triangular lobes c. 1.25 mm long (calyx a rim with 4 well evident lobes 1–1.25 mm long in *S. furfuraceum*); and 35–40 stamens (115–120(–150) in *S. furfuraceum*). — Type: *Brass 22687* (holo LAE!; iso A, L both n.v.), Papua New Guinea, Milne Bay Province, Maneau Range, N slopes of Mt Dayman, in mossy forest gully, alt. 2200 m, 30 May 1953.

Etymology. The specific epithet is derived from the locality, Maneau Range.

Tree to 12 m tall. *Vegetative branchlet* compressed, rounded, c. 4 mm diam; bark dull-glossy, smooth, slightly glandular-verrucose, persistent. *Leaf lamina* broadly elliptic, 15–16 by c. 10 cm wide, 1.5–1.6 times as long as wide; base obtuse or rounded; apex roundly acuminate; acumen recurved; margin revolute; subcartilaginous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins c. 16 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 10–12 mm apart; intramarginal vein present, weakly arched, 3–4 mm from margin, secondary intramarginal vein present. *Petiole* 8–10 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate, up to 7.5 by 9 cm, major axis c. 4 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* green. *Hypanthium* dull-glossy, striate-glandular, furfuraceous, visibly gland-dotted, weakly furrowed or weakly 2-costate; usually stipitate; goblet-shaped or narrowly obconic, 4.5–5 by c. 4 mm, stipe 0–0.5 mm long. *Calyx* is a rim of tissue c. 0.5 mm long with 2 triangular lobes c. 1.25 mm long (including the rim). *Petals* 5, calyptrate (coherent and falling as a cap). *Staminal disc* ascending (Fig. 2: 3.2). *Stamens* 35–40, c. 7.5 mm long. *Style* 7–9 mm long. *Placentation* axile-basal; placenta a small cushion. *Ovules* c. 9 per locule, ascending, arranged irregularly. *Flowers* and *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Mossy forest gully. Altitude 2200 m.

Notes — 1. Flowers at anthesis have not been seen, the recorded androecial details being observed in buds supplemented with a few old stamens persistent on flowers past anthesis.

2. The species is known from the type collection only.

25. *Syzygium megistophyllum* Merr. & L.M.Perry — Fig. 2: 2.3–2.7; Map 7

Syzygium megistophyllum Merr. & L.M.Perry (1942) 279. — Type: *Brass 13340* (holo A n.v. photo seen; iso BRI!, L n.v. photo seen), Indonesia, Papua Province, Idenburg River, 4 km SW of Bernhard Camp, *Agathis* forest, alt. c. 900 m, Mar. 1939.

Tree to 7 m tall, to 10 cm dbh; bark orange-brown or grey to dark grey, smooth or rough. *Vegetative branchlet* terete or quadrangular, rounded or winged, 8–12 mm diam; bark dull or dull-glossy, smooth, slightly glandular-verrucose, persistent. *Leaf lamina* narrowly elliptic to ovate, 43–87 by 12–34 cm, 2.5–4.3 times as long as wide; base cordate; apex acuminate; acumen flat; margin revolute; cartilaginous or coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 35–60 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 10–20 mm apart; intramarginal vein present, 1–3 mm from leaf margin, secondary intramarginal vein absent (rarely a weak secondary intramarginal vein is evident). *Petiole* 0–3 mm long (leaves sessile to subsessile). *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, few-flowered, paniculate, up to 9 by 7 cm, major axis c. 3 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, persistent. *Flower buds* with the apex acuminate. *Flowers* white, red or brown. *Hypanthium* dull, furfuraceous, not visibly gland-dotted, plane; stipitate; shortly stipitate-cylindrical or stipitately very narrowly obconic, c. 25 by 4–5 mm, stipe c. 0.5 mm long. *Calyx* calyptrate (the lobes connate). *Petals* obsolete, forming a calyptra that is adherent to the calycine calyptra and falls with it. *Staminal disc* descending (Fig. 2: intermediate between 2.3 and 2.7). *Stamens* c. 55, 7–21 mm long. *Style* c. 18 mm long (style is deeply inserted within the hypanthium tube of c. 20 mm long). *Placentation* axile-median; placenta a flattened, narrowly elliptic cushion. *Ovules* c. 15 per locule, ascending, arranged irregularly. *Mature fruit* red, furfuraceous, wrinkled (when dry), lageniform, 45–70 by c. 75 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and 8–10 mm diam; seed ellipsoid, up to 18 mm across, cotyledons collateral.

Distribution — Indonesia (Papua Province), Papua New Guinea.

Habitat & Ecology — Shale ridge, lowland forest on side of ridge, lower montane rainforest, forest on hillslope, *Agathis*-forest. Altitude 30–1100 m.

Note — *Syzygium pseudomegistophyllum* W.N.Takeuchi is very close to *S. megistophyllum*. Infructescence axes of *Takeuchi & Kulang 11601* (identified by Takeuchi (2002) as being *S. megistophyllum*) are very short (up to c. 2 cm long) and may be a link between the sessile inflorescences of *S. pseudomegistophyllum* and *S. megistophyllum* in which the infructescence may be as much as 9 cm long (Merrill & Perry 1942). Some of the primary veins in the proximal one-third of the leaf blade in *Takeuchi & Kulang 11601* and *NGF 22045* slightly 'dip' before running to the margin but the other veins are more regularly curved to the margin. These two collections, both from south of the main New Guinea cordillera (whereas all the other collections are from north of the cordillera), also have quadrangular and winged branchlets (but see Takeuchi 2002). In the non-furfuraceous *S. recurvovenosum* (Lauterb.) Diels all the primary veins have a strongly dipped (i.e., recurved) curvature. Further collections are required from both sides of the cordillera so that the significance of the several similarities and differences can be properly assessed. It may be that the southern collections represent a species distinct from both *S. megistophyllum* and *S. pseudomegistophyllum* and that the last two species are conspecific.

26. *Syzygium millariae* Craven & Damas, *sp. nov.* — Fig. 2: 3.1; Map 7

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina 2.5–5.5 by 1.3–3.2 cm, elliptic to obovate, cuneate at the base and with 10–17 primary veins on each side of the midrib (8.5–19.5 by 3–10.3 cm, broadly oblong or sometimes obovate, obtuse at the base and with 30–37 veins in *S. furfuraceum*); axile-median placentation and mature fruit c. 7.5 mm long (axile-basal and c. 15 mm long in *S. furfuraceum*). — Type: *UPNG (Millar) 1231* (holo L!), Papua New Guinea, Central Province, Woitape Subprovince, in rainforest near Avios, alt. c. 2930 m, 28 Aug. 1971.

Etymology. The specific epithet honours Andrée Norma Millar (1916–1995), who went to New Guinea in 1947 and there developed a lay interest in ferns and orchids. This led to her working professionally in botany and horticulture in Papua New Guinea for three decades, initially with the Lae herbarium and later with the national orchid collection in Port Moresby.

Tree to 32 m tall, to 65 cm dbh; bark brown, flaky. *Vegetative branchlet* terete, rounded, 3–4 mm diam, dull, smooth or sometimes cracked, not glandular-verrucose, bark persistent or sometimes flaking or peeling. *Leaf lamina* elliptic to obovate, 2.5–5.5 by 1.3–3.2 cm, 1.3–1.9 times as long as wide; base cuneate; apex acute to short acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 10–17 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 3–5 mm apart; intramarginal vein present, weakly arched, 1–2 mm from margin, secondary intramarginal vein absent. *Petiole* 4–10 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones. *Inflorescence* leafless, on branchlets below the leaves, paniculate, up to 24 by 22 cm, major axis c. 3 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles apparently subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white, cream or sometimes greenish pink. *Hypanthium* dull-glossy, generally smooth, sparsely wrinkled and with a few ribs; sometimes very shortly stipitate; stipitate-cup-shaped or stipitate obconic, 4–6.5 by 3–3.5 mm, stipe 0.25–2 mm long. *Calyx lobes* 4, very depressedly triangular, 0.2–0.3 mm long. *Petals* 5, calyptrate (coherent and falling as a cap). *Staminal disc* ascending (Fig. 2: 3.1). *Stamens* c. 40, c. 5 mm long. *Style* 4.5–7.5 mm long. *Placentation* axile-median; placenta a flattened, semicircular cushion. *Ovules* 12–15 per locule, spreading-ascending, arranged irregularly. *Mature fruit* red, smooth to wrinkled, stipitately solid cup-shaped to stipitately subspheroid, c. 7.5 by 6 mm wide excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and c. 4.5 mm diam.

Distribution — Papua New Guinea.

Habitat & Ecology — Upper montane forest on gentle slope, rainforest. Altitude 2500–2930 m.

Notes — 1. The only material available for study is in late bud or late flower and fruit, hence some floral features may not have their mature sizes recorded. The available fruits are galled and consequently no information on the seed is available.

2. The species is known from two collections only.

27. *Syzygium montis-venetus* Craven, *sp. nov.* — Fig. 2: 1.7; Map 7

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in the leaf lamina being larger (20–22 cm long), and narrowly elliptic to elliptic, with a recurved acumen (8.5–19.5 cm long, broadly oblong or sometimes obovate, with a flat acumen in *S. furfuraceum*), and depressed pyriform fruit (in *S. furfuraceum* the fruit is depressedly spheroid). — Type: *James, Paul & Allison 112* (holo CANB!; iso BISH n.v.), Papua New Guinea, Morobe Province, Kamiali Wildlife Management Area, above Top Camp on ridge trail towards Blue Mountain, *Nothofagus*-dominant wet moss forest, 1585 m, 14 July 2011.

Etymology. The specific epithet is derived from the Latin *mons*, mountain, and *venetus*, sea-coloured, blue, in reference to the locality Blue Mountain. Shrub to 2 m tall. *Vegetative branchlet* terete proximally and compressed distally, rounded, 3–4 mm diam; bark dull, striate, moderately glandular-verrucose, persistent. *Leaf lamina* narrowly elliptic or elliptic, 20–22 by 7.5–8 cm, 2.5–2.9 times as long as wide; base cuneate; apex acuminate; acumen recurved; margin slightly revolute; coriaceous; primary and secondary venation not distinctly different with all or nearly all secondaries joining the intramarginal vein (although secondaries usually more slight); primary veins 30–40 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 3–5 mm apart; intramarginal vein present, weakly arched, 1.5–3 mm from margin; secondary intramarginal vein present but sometimes obscure. *Petiole* c. 6 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, few-flowered, paniculate, c. 5 by 5 cm, major axis c. 2.5 mm thick at the midpoint, bark furfuraceous. *Calyx lobes* ?5. *Staminal disc* flat (Fig. 2: 1.7). *Stamens* ?70–80, 4–8 mm long. *Mature fruit* pink-red, furfuraceous, wrinkled, depressed pyriform with the apex truncate, 17–19 by 11–20 mm excluding the calyx, with the hypanthium rim 8–9 mm diam; seed very depressed spheroid, 9–18 mm across, cotyledons collateral. *Open flowers* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — *Nothofagus*-dominant wet moss forest. Altitude 1585 m.

Notes — 1. In the material studied, the calyx in the fruiting stage is much degraded and the number of lobes is uncertain.

2. The species is known from the type collection only.

28. *Syzygium novotnyi* Craven & Damas, *sp. nov.* — Fig. 2: 1.5; Map 7

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having the leaf lamina 6–9 by 2–4 cm and lacking a secondary intramarginal vein (8.5–19.5 by 3–10.3 cm and with a secondary vein in *S. furfuraceum*); the inflorescences on branchlets below the leaves or on branches (cauline in *S. furfuraceum*); the hypanthium not furfuraceous (furfuraceous in *S. furfuraceum*); and 7–9 ovules per locule (15–26 in *S. furfuraceum*). — Type: *NGF (Coode, Sands & Lelean) 46098* (holo CANB!; iso LAE!, BRI, K, L, all n.v.), Papua New Guinea, New Ireland Province, Namatanai Subprovince, Danfu River area, inland from Manga, ridge top on limestone, alt. c. 275 m, 9 Feb. 1970.

Etymology. The specific epithet honours Vojtech Novotny (1964–), a Czech entomologist with a special interest in insect-plant relationships. Vojtech established the New Guinea Binatang Research Center, Madang, a non-profit body dedicated to the training of Papua New Guineans in biology and biodiversity research and to the development of educational and nature conservation programs with a focus on better equipping villagers to manage their forest lands.

Tree to 24 m tall; bark red to pinkish brown, flaking in thick scales. *Vegetative branchlet* terete, rounded, 2–4 mm diam; bark dull, furfuraceous, not glandular-verrucose, peeling in relatively thin strips, or flaking in relatively large pieces. *Leaf lamina* obovate or rarely elliptic, 6–9 by 2–4 cm, 2.2–2.6 times as long as wide; base obtuse or sometimes cuneate; apex acute to short acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 30–35 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 2–4.5 mm apart; intramarginal vein present, strongly or weakly arched, 0.5–1 mm from margin, secondary intramarginal vein absent. *Petiole* 5–6 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless; on branchlets below the leaves or on branches, paniculate, up to 8 by 9 cm, major axis c. 2 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles caducous. *Hypanthium* dull or dull-glossy, smooth; not visibly gland-dotted; stipitate; stipitate-subglobose, 4.5–5 by 4–4.5 mm, stipe c. 0.5 mm long. *Calyx* reduced to a rim of tissue c. 0.2 mm long. *Staminal disc* flat (Fig. 2: 1.5).

Placentation axile-basal; placenta is a small cushion. *Ovules* 7–9 per locule, ascending, arranged irregularly. *Open flowers* and mature *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Ridge top forest on limestone. Altitude c. 275 m.

Notes — 1. As noted above, flowers and mature fruit have not been seen; our material is in the post anthesis/early fruit stage of development. The calyx is reduced to a rim of tissue, as occurs in several other furfuraceous species.

2. This species may be closely related to *S. frodinii* but differs in its hypanthium shape and in having a more developed calyx.

3. The species is known from the type collection only.

29. *Syzygium prolatum* Craven & Damas, *sp. nov.* — Fig. 2: 1.5; Map 7

From *Syzygium branderhorstii* Lauterb. it differs in the leaf lamina lacking a secondary intramarginal vein (secondary intramarginal vein present in *S. branderhorstii*); and the corolla in late bud approximating the hypanthium in length (corolla very much shorter in bud in *S. branderhorstii*). — Type: *NGF (Womersley) 19301* (holo CANB!; iso A, BO, BRI, K, L, LAE!, SING, all n.v.), Papua New Guinea, Milne Bay Province, headwaters of Gumini River, Cameron Plateau, ridge top in forest, 11 June 1964.

Etymology. The specific epithet is derived from the Latin, *prolatus*, extended, elongate, in reference to the long flower buds of this species relative to those of others of the section.

Tree to 33 m tall; bark pale brown, papery. *Vegetative branchlet* terete or slightly compressed, rounded, 2–3 mm diam, dull; bark smooth or slightly furfuraceous, not glandular-verrucose, persistent. *Leaf lamina* obovate or rarely elliptic, 4.5–10 by 3.5–6 cm, 1.2–1.6 times as long as wide; base cuneate; apex obtuse, rounded or retuse; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 17–19 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 2–5 mm apart; intramarginal vein present, weakly arched, 1–1.5 mm from margin, secondary intramarginal vein absent. *Petiole* 3–4 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves, paniculate, up to 15 by 14 cm, major axis c. 1.5 mm thick at the midpoint, branchlets predominantly smooth but patches of furfuraceous epidermis occur; bracts persistent; bracteoles subtending each flower, persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* white. *Hypanthium* dull, glandular-verrucose, visibly gland-dotted; minutely but distinctly wrinkled and ribbed; not stipitate; goblet-shaped, 2.5–3 by c. 2.5 mm. *Calyx lobes* 4, transversely narrowly semi-elliptic or very depressedly triangular, c. 0.3 mm long. *Petals* 5, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.5). *Stamens* c. 100. *Placentation* axile-median; placenta a narrowly oblong cushion. *Ovules* 10–12 per locule, ascending, arranged irregularly. *Open flowers* and *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Forest on ridge top.

Notes — 1. The material available is in late bud and open flowers have not been seen. The branchlets predominantly are smooth but patches of furfuraceous epidermis may occur. The primary and secondary venation is distinctly different. In late bud the petals approximate the hypanthium in length, unlike all other furfuraceous species that have been examined in the late bud stage in which the petals are short relative to the hypanthium.

2. The species is known from the type collection only.

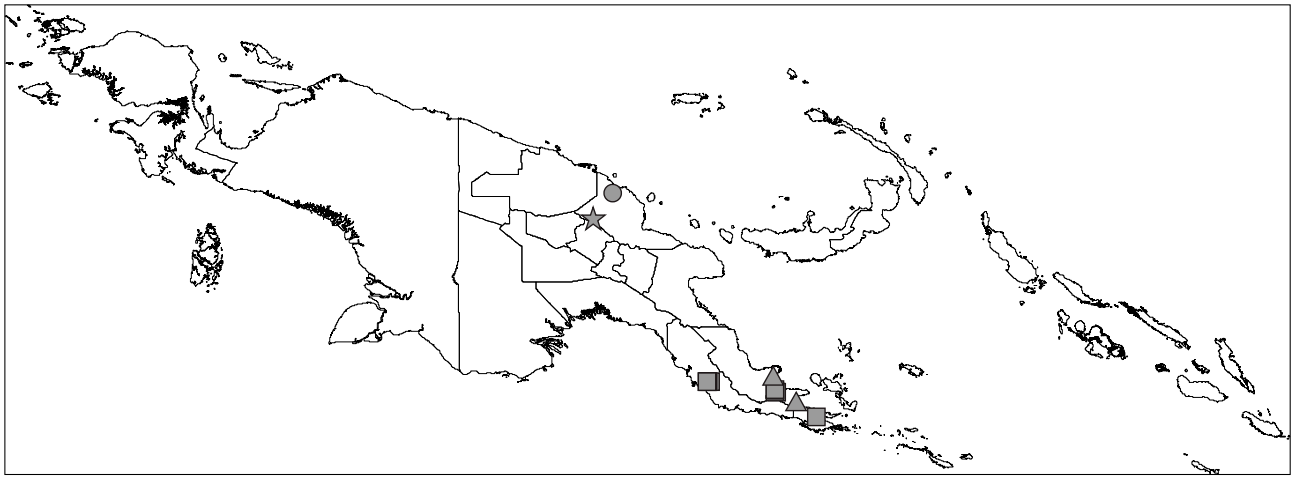
30. *Syzygium pseudomegistophyllum* W.N.Takeuchi — Map 8

Syzygium pseudomegistophyllum W.N.Takeuchi (2002) 266. — Type: *Takeuchi & Saxon 13068* (holo LAE!; iso A n.v. photo seen), Papua New Guinea, Madang Province, Josephstaal Forest Management Agreement Area, Guam River, alluvial forest on successional terraces, S4°32' E144°59', 86 m, 11 Sept. 1998.

Treelet to 7 m tall; bark brunnescent to reddish brown, crustaceous. *Vegetative branchlet* quadrangular, angled or winged, 7–10 mm diam, glandular-verrucose. *Leaf lamina* oblong, elliptic or elliptic-oblong, 53–64 by 12.5–17 cm; base cordate; apex acute; coriaceous; primary and secondary venation different; primary veins 39–45 on each side of the midrib; in median part of lamina at a divergence angle of 30–40° and 5–24 mm apart; intramarginal vein 1–3 mm from margin. *Petiole* 5–10 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, fasciculate, up to c. 2 cm long. *Flower buds* with the apex acuminate. *Hypanthium* furfuraceous, plane, not stipitate; subcylindrical (tapering proximally to its point of insertion on the inflorescence axis), c. 20 by 4–6 mm. *Calyx* calyptrate (the lobes connate). *Petals* 5, discrete and not coherent. *Stamens* 6–9 mm long. *Style* 10–11 mm long. *Ovules* c. 10 per locule. *Open flowers* and *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Alluvial forest on successional terraces. Altitude c. 86 m.



Map 8 Distribution of *Syzygium pseudomegistophyllum* W.N.Takeuchi (●), *S. pyrocarpum* (Greves) Merr. & L.M.Perry (■), *S. radiciflorum* Craven & Damas (▲), *S. rhysgardneri* Craven (★).

Notes — 1. This species is very similar to *S. megistophyllum* and see under that species for notes on their distinction.

2. *Syzygium pseudomegistophyllum* apparently lacks secondary veins per se, having primary and tertiary venation only. The flowers are fasciculate on woody callosities near ground level and the inflorescence per se apparently is 1-flowered with the axis upon which the flowers are inserted so short that it effectively is obsolete.

3. The species is known from the type collection only.

31. *Syzygium pyrocarpum* (Greves) Merr. & L.M.Perry — Fig. 2: 2.4; Map 8

Syzygium pyrocarpum (Greves) Merr. & L.M.Perry (1942) 280. — *Eugenia pyrocarpa* Greves (1923) 17. — Type: *Forbes 99* (holo BM!; carbon rubbing A n.v.), Papua New Guinea, Central Province, Sogeri, alt. c. 610 m, 20 ?Oct. 1885.

Eugenia xylantha Greves (1923) 18. — *Syzygium xylanthum* (Greves) Merr. & L.M.Perry (1942) 280. — Type: *Forbes 325* (holo BM!), Papua New Guinea, Central Province, Sogeri, 30 Oct. 1885.

Tree to 21 m tall, to 20 cm dbh; outer bark grey-brown, inner bark brown, flaky. *Vegetative branchlet* quadrangular, angled, 5–10 mm diam; bark dull, slightly striate, strongly glandular-verrucose, persistent. *Leaf lamina* broadly elliptic, broadly oblong, broadly ovate or sometimes broadly obovate, 20–31.5 by 6.5–16.5 cm, 1.9–2.7 times as long as wide; base cuneate; apex acute to acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 35–48 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 5–15 mm apart; intramarginal vein present, weakly arched, 2–7 mm from margin, secondary intramarginal vein present. *Petiole* 2–10 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, paniculate, up to 10 by 5 cm, major axis 5–6 mm thick at the midpoint, bark furfuraceous; bracts persistent; bracteoles subtending each flower, persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* white, pink or brown (commonly recorded as pinkish brown, rarely as white). *Hypanthium* dull, furfuraceous, not visibly gland-dotted, plane but distinctly minutely wrinkled or ribbed, stipitate; very shortly goblet-shaped or broadly obconic, 7–8 by 7–9 mm, stipe c. 1 mm long. *Calyx lobes* 4, transversely semi-elliptic, c. 3 mm long. *Petals* 4, calyptrate (coherent and then falling as a cap). *Staminal disc* descending (Fig. 2: 2.4). *Stamens* 130–140, 12–18 mm long. *Style* c. 12 mm long. *Placentation* axile-basal; placenta a semispheroidal cushion. *Ovules* c. 18 per locule, ascending, arranged irregularly. *Mature fruit* red, furfuraceous, slightly ribbed, solid cup-shaped to astipitate goblet-shaped, c. 23 by 28 mm excluding the calyx, with the hypanthium rim appreciably expanding in fruit and 12 mm diam; seed subspheroid, c. 13 mm across, cotyledons collateral.

Distribution — Papua New Guinea.

Habitat & Ecology — *Castanopsis*-forest on ridge, rainforest on stony riverine terrace, lowland forest, wet flats in lower montane forest. Altitude 45–1000 m.

Note — The large, broad leaves and congested inflorescence are distinctive features of the species.

32. *Syzygium radiciflorum* Craven & Damas, *sp. nov.* — Fig. 2: 3.3; Map 8

From *Syzygium branderhorstii* Lauterb. it differs in the leaf lamina lacking a secondary intramarginal vein (secondary intramarginal vein present in *S. branderhorstii*); a pair of much-reduced leaves within the inflorescence (inflorescence leafless in *S. branderhorstii*); and 6–7 ovules per locule (13–18 in *S. branderhorstii*). — Type: *Hoogland 4198* (holo CANB!; iso LAE!), Papua New Guinea, Northern (Oro) Province, Tufi Subprovince, c. 2 km NW of Naukwate village, in tall secondary forest on wet soil, alt. c. 50 m, 25 June 1954.

Tree to 9 m tall, to 4 cm dbh; bark grey-green, flaky or papery. *Vegetative branchlet* terete or compressed, rounded, 1.5–2.5 mm diam; bark dull, smooth or cracked and furfuraceous, not glandular-verrucose, flaking in relatively large pieces. *Leaf lamina* elliptic, 16–22.5 by 7–10.5 cm wide, 1.9–2.6 times as long as wide; base not cordate; apex obtuse, or sometimes short acuminate; acumen flat; margin flat or slightly revolute; primary and secondary venation generally similar with all or nearly all secondaries joining the intramarginal vein; primary veins 20–26 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 4–10 mm apart; intramarginal vein present, weakly arched, 1–3 mm from margin, secondary intramarginal vein absent. *Petiole* 10–20 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafy (a pair of reduced, narrowly elliptic leaves up to 75 by 15 mm subtends the first pair of branchlets in the inflorescence), on branchlets below the leaves, cauline or radicine, many-flowered, paniculate, up to at least 21 by 26 cm, major axis c. 4 mm thick at the midpoint, bark furfuraceous; bracts persistent; bracteoles subtending each flower or subtending lateral flowers of a triad but with the terminal flower ebracteolate, persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* pinkish white. *Hypanthium* dull, visibly gland-dotted, minutely (but distinctly) wrinkled, ribbed, stipitate; goblet-shaped or goblet-shaped-without-the-stipe, 4–5 by c. 3.5 mm, stipe up to 0.5 mm long. *Calyx lobes* 4, transversely semi-elliptic or very depressedly triangular, 0.5–0.6 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* ascending (Fig. 2: 3.3). *Stamens* c. 50, 3.5–8 mm long. *Style* c. 7 mm long. *Placentation* axile-median; placenta a more or less narrowly elliptic to oblong cushion. *Ovules* 6 or 7 per locule, ascending, apparently arranged irregularly. *Fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Tall secondary forest on wet soil, light forest by stream. Altitude 50–300 m.

Notes — 1. Given the often variable positioning of inflorescences in *Syzygium* (within an individual plant the inflorescences may be inserted among the leaves, on the branchlets below the leaves, on the major branches and on the trunk), the development of inflorescences on exposed roots should not be unexpected. In the material of *Hoogland 4198* deposited in CANB, inflorescences are inserted at the base of the trunk (*fide* Hoogland in herb.) and on the roots, the latter presumably having become exposed by the removal of leaf litter, etc., and stimulated by increased light reception so as to produce inflorescences. The inflorescences in *Pullen 7718* are inserted on branchlets below the leaves.

2. The species is known from two collections only.

33. *Syzygium rhysgardneri* Craven, *sp. nov.* — Fig. 2: 1.5; Map 8

From *Syzygium royenii* Craven & Damas it differs in having larger and apically acuminate leaves (5–6 by 2.5–3.5 cm, broadly obovate to narrowly elliptic, apex truncately acuminate to acuminate as opposed to 2.5–5.3 by 1.4–1.7 cm, narrowly elliptic or sometimes obovate, apex acute in *S. royenii*), a larger hypanthium (5–6 mm long as opposed to 3–4.5 mm in *S. royenii*), and a calyx that is an irregularly ragged rim of tissue (in *S. royenii* the calyx is a rim of tissue on which 4 points are discernible or consists of 4 relatively distinct lobes). — Type: *Gardner 9730* (holo CANB!; iso AK, K, L, all n.v.), Papua New Guinea, Madang Province, Schrader Range, Kaironk Valley, large tree of primary forest on steep talus slope, alt. c. 2200 m, 13 Nov. 1999.

Etymology. The specific epithet honours Rhys Owen Gardner (1949–), an expert on the flora of New Zealand and several of the South West Pacific islands.

Large tree, 150 cm dbh; bark pinkish brown with a thin flaky layer over a fibrous layer of at least 10 mm thick. *Vegetative branchlet* generally terete (distally compressed or quadrangular), rounded, c. 1.5 mm diam; bark dull, smooth and slightly glandular-verrucose or not, persistent on young growth units but at length peeling to reveal a soft, mealy, furfuraceous-like tissue. *Leaf lamina* broadly obovate to narrowly elliptic, 5–6 by 2.5–3.5 cm, 1.6–2.4 times as long as wide; base attenuate to cuneate; apex truncately acuminate or acuminate, acumen flat; margin flat; lamina cartilaginous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 19–22 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 1.5–2 mm apart; intramarginal vein present, weakly arched, 1–1.5 mm from leaf margin, secondary intramarginal vein present. *Petiole* 6–11 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves, many-flowered, paniculate, up to 20 by 26 cm, major axis c. 4 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* cream. *Hypanthium* dull, smooth to obscurely glandular-verrucose, visibly gland-dotted, angled laterally (i.e., 2-costate); stipitate; stipitate-napiform to stipitate-cup-shaped, 5–6 by 5–5.5 mm, stipe 1–1.5 mm long. *Calyx* a persistent, irregularly ragged rim of tissue, up to 0.5 mm long. *Petals* calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.5). *Stamens* c. 65, 4–6 mm long. *Style* c. 6 mm long. *Placentation* axile-basal; placenta peltate and flattened. *Ovules* 15 or 16 per locule, ascending, arranged irregularly. *Fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Primary forest on steep talus slope. Altitude c. 2200 m.

Notes — 1. Once the smooth epidermis of the branchlets has cracked, a mealy tissue is exposed. This tissue superficially resembles the furfuraceous epidermis that occurs in other species but it is quite different. The calyx is another interesting feature of *S. rhysgardneri* as it is a ragged rim of tissue around the apex of the hypanthium and discrete lobes per se are not present.

2. The species is known from the type collection only.

34. *Syzygium royenii* Craven & Damas, *sp. nov.* — Fig. 2: 1.2; Map 9

From *Syzygium furfuraceum* Merr. & L.M.Perry it differs in having smaller leaves with a lamina 2.5–5.3 by 1.4–1.7 cm, a cuneate base and 10–16 primary veins on each side of the midrib (lamina 8.5–19.5 by 3–19.3 cm, the base obtuse and the veins 30–37 in *S. furfuraceum*); and the hypanthium dull or dull-glossy, not furfuraceous, minutely wrinkled, or 2-costate (dull, furfuraceous, smooth or striate in *S. furfuraceum*). — Type: *NGF (Croft & Lelean) 34941* (holo CANB!; iso LAE!, A, BISH, BRI, E, K, L, M, NSW, PNH, QRS, US, all n.v.), Papua New Guinea, Central Province, Port Moresby Subprovince, E slope to Lake Myola No. 1, submontane rainforest-moss forest, alt. c. 2100 m, 28 Sept. 1973.

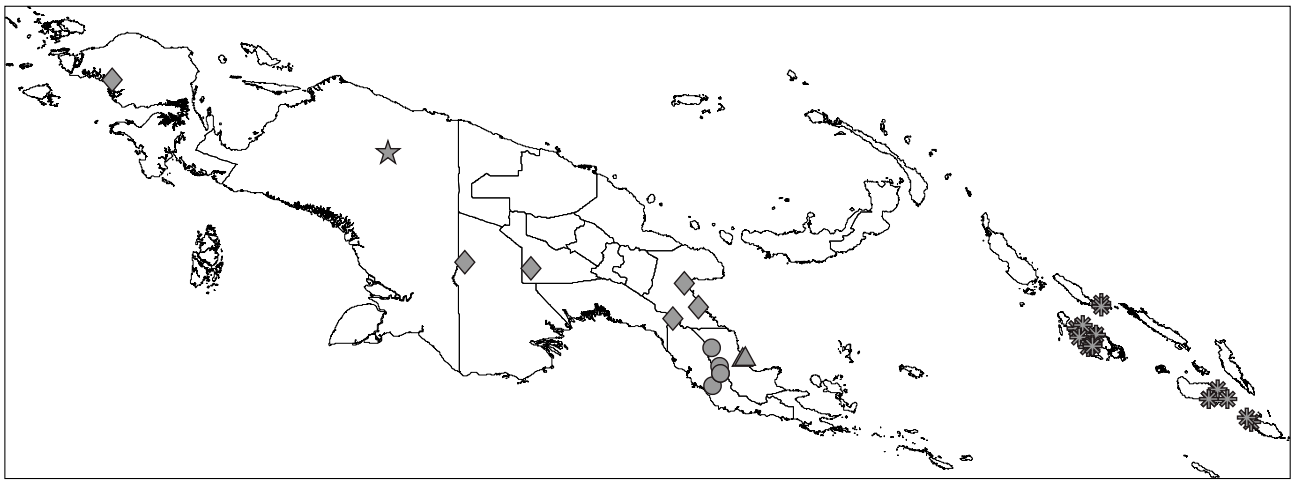
Etymology. The specific epithet honours Pieter van Royen (1923–2002), a significant collector of, and author on, the flora of New Guinea.

Tree to 50 m tall, to 120 cm dbh; outer bark orange, inner straw, papery. *Vegetative branchlet* terete in mature branchlets, quadrangular in immature branchlets, rounded or angled, 2–4 mm diam; bark dull, bark more or less smooth, not glandular-verrucose, flaking in relatively large pieces. *Leaf lamina* narrowly elliptic or sometimes obovate, 2.5–5.3 by 1.4–1.7 cm, 1.7–2.3 times as long as wide; base cuneate; apex acute, flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 10–16 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 1–2 mm apart; intramarginal vein more or less parallel to the margin to weakly arched, 0.05–1 mm from margin, secondary intramarginal vein absent. *Petiole* 5–7 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branches or cauline, paniculate, up to 17 by 13 cm, major axis 3–4 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Hypanthium* dull or dull-glossy, visibly gland-dotted or not, minutely but distinctly wrinkled or angled laterally (i.e., 2-costate); stipitate; stipitate-cup-shaped, 3–4.5 by 2–3.5 mm, stipe 0.5–1 mm long. *Calyx lobes* 4, relatively distinct or discernible as points on a rim of tissue, very depressedly triangular when well developed, 0.2–0.4 mm long including the rim. *Petals* ?4, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.2). *Stamens* c. 70. *Placentation* axile-basal; placenta a small cushion. *Ovules* c. 12 per locule, ascending, arranged irregularly. *Open flowers* and *fruit* not seen.

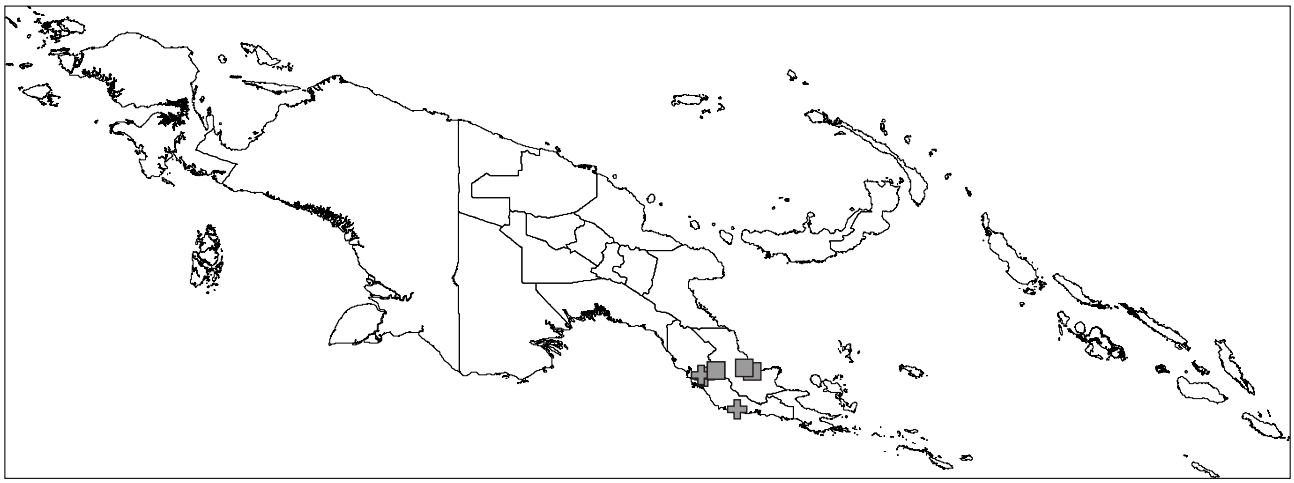
Distribution — Papua New Guinea.

Habitat & Ecology — Submontane rainforest-moss forest, submontane rainforest, in *Nothofagus-Astronia* forest. Altitude 1520–2650 m.

Note — The only reproductive material seen was in the late bud stage. The petal number is unclear and it may be that some of the petals are connate.



Map 9 Distribution of *Syzygium royenii* Craven & Damas (●),*S. sambogense* T.G.Hartley & L.M.Perry (▲), *S. squamatum* Merr. & L.M.Perry (★), *S. takeuchii* Craven & Damas (◆), *S. whitmorei* Craven & Damas (✱).



Map 10 Distribution of *Syzygium rubroalabastrum* Craven & Damas (■), *S. thornei* T.G.Hartley & L.M.Perry (✚).

35. *Syzygium rubroalabastrum* Craven & Damas, *sp. nov.* — Map 10

From *Syzygium pyrocarpum* (Greves) Merr. & L.M.Perry it differs in having smaller leaves (the lamina 13–20 by 5–8.5 cm as against 20–31 by 6.5–16.5 cm in *S. pyrocarpum*); the hypanthium striate-glandular and obscurely gland-dotted (distinctly minutely wrinkled or ribbed and not visibly gland-dotted in *S. pyrocarpum*); and 55–60 stamens (130–140 in *S. pyrocarpum*). — Type: *Carr 13068* (holo CANB!; iso L n.v.), Papua New Guinea, Central Province, Boridi, in forest, alt. c. 1460 m, 10 Sept. 1935.

Etymology. The specific epithet is a compound word to be treated as a noun in apposition and is derived from the Latin *ruber*, red, and *alabastrum*, flower bud, in reference to the red flower buds.

Tree to 12 m tall; both outer and inner bark brown. *Vegetative branchlet* terete, rounded, 2–5 mm diam; bark dull, smooth, not glandular-verrucose, persistent. *Leaf lamina* elliptic, slightly obovate or slightly ovate, 13–20 by 5–8.5 cm, 2.2–3.2 times as long as wide; base cuneate to sometimes obtuse; apex acuminate; acumen flat; margin flat; lamina coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 30–38 on each side of the midrib, in median part of lamina at a divergence angle of 70–80° and 3–5 mm apart; intramarginal vein present, weakly arched, 2–4 mm from margin, secondary intramarginal vein present. *Petiole* 5–14 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, cauline, shortly and congestedly paniculate, up to 4–6 by 4–6 cm, major axis 3–3.5 mm thick at the midpoint, bark furfuraceous; bracts mostly persistent; bracteoles subtending each flower, persistent. *Flower buds* with the apex rounded to obtuse. *Flowers* red or with calyx red and corolla green. *Hypanthium* dull, furfuraceous, striate-glandular, obscurely gland-dotted; stipitate; turgid-goblet-shaped (when reconstituted, goblet-shaped with a very short stipe or obconic and then tending to be narrowly so), 6.5–8.5 by 6–6.5 mm, stipe 0.5–1 mm long. *Calyx lobes* 5, very depressedly obtusely triangular or transversely semi-elliptic, c. 1–1.5 mm long. *Petals* 5, calyptrate (coherent and falling as a cap). *Staminal disc* immature. *Stamens* 55–60. *Placentation* axile-basal; placenta a small cushion. *Ovules* c. 12 per locule, ascending, arranged irregularly. *Open flowers* and *fruit* not seen.

Distribution — Papua New Guinea.

Habitat & Ecology — Rainforest. Altitude 1130–1560 m.

Note — Mature, i.e., open, flowers have not been seen and floral characters have been recorded from the late bud stage. The staminal disc is modified but it is too immature to assign to any particular form. *Pullen 5776 pro parte* possibly may not belong to this species although its leaves are generally consistent with those of *Pullen 5447* which does. The separate infructescence forming a part of the specimens of *Pullen 5776* in CANB is of *S. furfuraceum*.

36. *Syzygium sambogense* T.G.Hartley & L.M.Perry — Fig. 2: 1.2; Map 9

Syzygium sambogense T.G.Hartley & L.M.Perry (1973) 207. — Type: *Hoogland 3838* (holo A n.v.; iso CANB!, LAE!, BM, BRI, L, all n.v.), Papua New Guinea, Northern (Oro) Province, along Samboga River near crossing W of Embi Lakes, stony riverside flooded by high water, alt. c. 60 m, 5 Sept. 1953.

Tree to 7 m tall, to 15 cm dbh; outer bark pale grey-brown, inner bark pale brown, smooth. *Vegetative branchlet* terete, rounded, 3–5 mm diam; bark dull, bark smooth, not glandular-verrucose, flaking in relatively large pieces or peeling in relatively thin strips. *Leaf lamina* oblong, elliptic or sometimes obovate, 9.5–23 by 5–8.5 cm, 1.8–2.9 times as long as wide; base cuneate; apex acute to short-acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 35–40 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 4–8 mm apart; intramarginal vein present, weakly arched, 1–3 mm from margin, secondary intramarginal vein present. *Petiole* 5–15 mm long. *Reproductive seasonal growth unit* with a reproductive zone only or with distinct vegetative and reproductive zones. *Inflorescence* leafless or leafy, apparently cauline, paniculate (sometimes elaborately), up to 12 by 13 cm, major axis c. 4 mm thick at the midpoint, bark furfuraceous; bracts persistent or caducous (persistent especially on the distal axes); bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* pale pink. *Hypanthium* dull, smooth; not visibly gland-dotted, ribbed; not stipitate; obconic, 5–6 by 3.5–4 mm. *Calyx lobes* 4, transversely semi-elliptic, semicircular or obtusely depressedly triangular, c. 1 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.2). *Stamens* c. 130, up to 10 mm long. *Style* c. 6 mm long. *Placentation* axile-median; placenta a narrowly ellipsoid flattened cushion, apparently not peltate. *Ovules* c. 12 per locule, spreading to ascending, arranged irregularly. *Mature fruit* pale red, smooth, ellipsoid, up to 20 by 15 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and c. 4 mm diam; seed ellipsoid, c. 9 mm across, cotyledons collateral.

Distribution — Papua New Guinea.

Habitat & Ecology — Stony riverside flooded by high water, steep sandy river bank. Altitude 50–60 m.

Notes — 1. The CANB specimens of *Hoogland 3838* include an inflorescence in which the main axis apparently aborted with one of the resulting lateral axes being leafy and the other entirely reproductive.

2. The species is known from two collections only.

37. *Syzygium squamatum* Merr. & L.M.Perry — Map 9

Syzygium squamatum Merr. & L.M.Perry (1942) 277. — Type: *Brass & Versteegh 13125* (holo A n.v.; iso BRI!, L n.v.), Indonesia, Papua Province, Idenburg River, 4 km SW of Bernhard Camp, primary rainforest of plain, alt. c. 850 m, Mar. 1939.

Tree to 28 m tall, to 53 cm dbh; outer bark red-brown, scaly. *Vegetative branchlet* terete, rounded, 2–3 mm diam; bark dull, smooth, not glandular-verrucose, persistent. *Leaf lamina* elliptic to obovate, 4–7 by 2–3 cm, 2–2.3 times as long as wide; base cuneate or obtuse; apex acute or short acuminate; acumen flat; margin flat; lamina coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 25–31 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 1–2 mm apart; intramarginal vein present, weakly arched, 1–2 mm from margin, secondary intramarginal vein absent. *Petiole* 3–4 mm long. *Reproductive seasonal growth unit* with a reproductive zone only. *Inflorescence* leafless, on branchlets below the leaves or on, paniculate, up to 16 by 16 cm, major axis c. 2 mm thick at the midpoint, bark furfuraceous; bracts caducous; bracteoles apparently subtending each flower, caducous. *Flowers* and *fruit* not seen.

Distribution — Indonesia (Papua Province).

Habitat & Ecology — Primary rainforest on plain. Altitude 850 m.

Note — Only one collection, the type, is available for study. This is in the early stages of inflorescence development and the flower buds are too small to provide data.

38. *Syzygium takeuchii* Craven & Damas, *sp. nov.* — Fig. 2: 2.2; Map 9

From *Syzygium hartleyi* Craven & Damas it differs in the inflorescence usually bearing leaves (usually leafless in *S. hartleyi* but occasionally with a leaf within the inflorescence); ovules 2–5 per locule (c. 10 in *S. hartleyi*); and mature fruit pink or red, 25–30 by 25–30 mm excluding the calyx (purple and c. 8 by 10 mm in *S. hartleyi*). — Type: *Takeuchi & Kulang 11563* (holo CANB!; iso LAE!, NY!, A, K, L, UPNG, all n.v.), Papua New Guinea, Gulf Province, Lakekamu area, E branch of the Avi Avi River, in natural growth foot-hill forest on ridgeline near the proposed research station, alt. c. 335 m, 5 Nov. 1996.

Etymology. This species is named in honour of Wayne N. Takeuchi (1952–), a botanist who collected many interesting species in both Papua New Guinea and the Indonesian province of Papua during his long residency in Papua New Guinea, and who was active in floristic survey work in New Guinea.

Tree to 20 m tall; outer bark orange-brown, inner reddish brown, flaky. *Vegetative branchlet* terete, rounded, 3–5 mm diam; bark dull, smooth, not glandular-verrucose, persistent. *Leaf lamina* elliptic, narrowly elliptic or sometimes narrowly obovate, 7.5–20.8 by 2.3–6.5 cm, 2.9–4.2 times as long as wide; base cuneate; apex long-acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 30–50 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 2–4 mm apart; intramarginal vein present, weakly arched, c. 1 mm from margin, secondary intramarginal vein present. *Petiole* 3–6 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones. *Inflorescence* usually leafy or sometimes leafless, cauline, paniculate, up to 9–15(–35) by 5–10 cm, major axis 2–3 mm thick at the midpoint, bark furfuraceous; bracts persistent or occasionally some tenuously present; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white or cream. *Hypanthium* dull, smooth, visibly but often obscurely gland-dotted; stipitate; elongated goblet-shaped, goblet-shaped or stipitate-cup-shaped; 4.5–6.5 by 3–3.5 mm, stipe 1.5–2.5 mm long. *Calyx lobes* 4, transversely semi-elliptic, 1–1.5 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* descending (Fig. 2: 2.2). *Stamens* 70–80, 5–6 mm long. *Style* c. 3.3 mm long. *Placentation* axile-median; placenta cushion-shaped, peltate. *Ovules* c. 10 per locule, spreading, arranged irregularly. *Mature fruit* pink or red, smooth, subspheroid, 25–30 by 25–30 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and 7–8 mm diam; seed spheroid, 18–20 mm across, cotyledons collateral.

Distribution — Indonesia (Papua Province), Papua New Guinea.

Habitat & Ecology — Stunted lowland forest on exposed ridge on ultrabasics, primary forest, natural growth foothill forest, primary forest in ravine, rather disturbed rainforest. Altitude 10–1220 m.

Note — The inflorescence is a cauline structure, sometimes ramifying but often only 1-branched and usually with 1 or 2 pairs of reduced leaves subtending the constituent inflorescences. Leaves are rarely absent. The flowers are in cymes that are often irregular and may represent condensed branchlets.

39. *Syzygium thornei* T.G.Hartley & L.M.Perry — Fig. 2: 1.6; Map 10

Syzygium thornei T.G.Hartley & L.M.Perry (1973) 206. — Type: *NGF (Gray & Thorne) 12899* (holo A n.v.; iso CANB!, LAE!), Papua New Guinea, Central Province, W of Port Moresby, Brown River Forest Reserve, alt. c. 60 m, 14 June 1960.

Tree to 11 m tall, to 12 cm dbh; bark pale brown to grey, smooth. *Vegetative branchlet* terete, rounded, 3–4 mm diam; bark dull, furfuraceous, flaking or peeling. *Leaf lamina* elliptic or rarely obovate, 7–12(–15.5) by 3–6(–7) cm, 1.9–2.8 times as long as wide; base cuneate or obtuse; apex acuminate; acumen flat; margin flat; lamina coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 20–30 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 4–6 mm apart; intramarginal vein present, weakly arched, 1–2 mm from margin, secondary intramarginal vein absent. *Petiole* 5–10 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones. *Inflorescence* leafless, cauline, fasciculate, up to 9 by 9 cm, major axis 3–3.5 mm thick at the midpoint, bark furfuraceous; bracts caducous or occasionally a few persistent; bracteoles subtending each flower or subtending lateral flowers of a triad. *Flower buds* with the apex rounded to obtuse. *Flowers* with the hypanthium pink and stamens white. *Hypanthium* dull, smooth, not visibly gland-dotted, minutely but distinctly wrinkled, ribbed; stipitate; goblet-shaped, 5.5–6 by 4–4.5 mm, stipe 1.5–2 mm long. *Calyx lobes* 4, transversely semi-elliptic, 1–1.5 mm long. *Petals* 5 or 6, calyptrate (coherent and falling as a cap). *Staminal disc* flat (Fig. 2: 1.6). *Stamens* 90–100, 5–9 mm long. *Style* c. 4.5 mm long. *Placentation* axile-median; placenta a flattened, peltate cushion. *Ovules* c. 15 per locule, spreading, arranged irregularly. *Mature fruit* dark pink, verrucose-wrinkled, obovoid and flattened distally, 13–15 by 7–8.5 mm excluding the calyx, with the hypanthium rim not appreciably expanding in fruit and c. 3 mm diam; seed ellipsoid, c. 5.5 mm across, cotyledons collateral.

Distribution — Papua New Guinea.

Habitat & Ecology — Transitional forest in foothills, poor primary lowland rainforest. Altitude 25–60 m.

Note — In fruit, the inner pair of sepals is distinctly larger than the outer pair.

40. *Syzygium whitmorei* Craven & Damas, *sp. nov.* — Fig. 2: 4.4; Map 9

From *Syzygium buettnerianum* (K.Schum.) Nied. it differs in having the leaf lamina narrowly elliptic, ovate or obovate with the acumen flat (elliptic, ovate, narrowly elliptic, or narrowly ovate with the acumen recurved in *S. buettnerianum*); the hypanthium obconic, stipitate obconic, or narrowly obconic (goblet-shaped to rarely elongated goblet-shaped in *S. buettnerianum*); and c. 50 stamens (c. 30–35 in *S. buettnerianum*). — Type: *BSIP (Whitmore's collectors) 3104* (holo L!), Solomon Islands, NW New Georgia Island, Vaimbu River, well drained primary forest on hillside, alt. c. 160 m, 19 Mar. 1964.

Etymology. The species is named in honour of Timothy Charles Whitmore (1935–2002) who, as a forest botanist in the forestry department of the then British Solomon Islands Protectorate, established an extensive collection program between September 1962 and September 1964.

Tree to 36 m tall; outer bark dark brown, flaky and papery. *Vegetative branchlet* terete, rounded, 3–6 mm diam; bark dull, smooth, slightly or very striate, or cracked and furfuraceous, not glandular-verrucose, flaking in relatively large pieces or sometimes peeling. *Leaf lamina* narrowly elliptic, ovate or obovate, 7.2–12.8 by 1.5–5.4 cm, 2.3–3.7 times as long as wide; base cuneate; apex long acuminate; acumen flat; margin flat; coriaceous; primary and secondary venation distinctly different with secondaries relatively little developed and not or rarely joining the intramarginal vein; primary veins 25–50 on each side of the midrib, in median part of lamina at a divergence angle of 60–70° and 1–2 mm apart; intramarginal vein present, weakly arched, 0.5–2 mm from margin, secondary intramarginal vein present. *Petiole* 5–12 mm long. *Reproductive seasonal growth unit* with distinct vegetative and reproductive zones. *Inflorescence* leafy, terminal or distal axillary, paniculate-corymbose, up to 20 by 8 cm, major axis c. 3 mm thick at the midpoint, bark furfuraceous or not; bracts caducous; bracteoles subtending each flower, caducous. *Flower buds* with the apex rounded to obtuse. *Flowers* white or cream. *Hypanthium* glossy, striate, visibly gland-dotted, sometimes angled laterally (i.e., 2-costate) and then stipitate; stipitate or not; obconic, stipitate obconic, or narrowly obconic, 3–4 by c. 2 mm, stipe up to 1 mm long. *Calyx* reduced to a rim of tissue 0.1–0.2 mm long. *Petals* 4, calyptrate (coherent and falling as a cap). *Staminal disc* raised (Fig. 2: 4.4). *Stamens* c. 50, 3.5–9 mm long. *Style* 6.5–7.5 mm long. *Placentation* axile-median; placenta a subelliptic flattened cushion. *Ovules* c. 8–10 per locule, spreading, arranged irregularly. *Mature fruit* reddish purple, smooth or wrinkled, subspheroid to depressed spheroid, 8–12 by 12–16 mm excluding the calyx; with the hypanthium rim not appreciably expanding in fruit and 2–2.5 mm diam; seed depressed spheroid, c. 12 mm across, cotyledons collateral.

Distribution — Solomon Islands.

Habitat & Ecology — Well-drained primary forest on ridge top or hillside, secondary forest on ridge top, disturbed high forest, dense forest. Altitude 30–520 m.

Note — The inflorescence is a leafy panicle-corymb, in form intermediate between a panicle and a corymb, with leaves on the proximal part of the reproductive seasonal growth unit and the panicle-corymb proper in a terminal position. Additional inflorescences may also occur in distal leaf axils of the growth unit. The calyx of *S. whitmorei* is reduced to a rim of tissue with discernible lobes not evident as it is in several other furfuraceous species. Non-furfuraceous plants sometimes occur sporadically through the Solomons' archipelago, e.g., *BSIP 1489*, *9857*. These interesting cases otherwise agree with the furfuraceous specimens placed in this species.

Acknowledgements Studies of Papuasian *Syzygium* at CANB were commenced by Tom Hartley and Lyn Craven in the 1970s. It is a matter of regret that these studies could not be pursued to fruition at that time; two papers only being produced. Tom's enthusiasm for the genus and his excellent field knowledge considerably assisted the project in refining species concepts for Papuasian *Syzygium*; these have been further refined in recent years by Lyn as the work has progressed. Kipiro Damas' input into the delimitation of species treated in the present paper has further improved our knowledge of the species of sect. *Furfuraceum*. A grant to Lyn from The Hermon Slade Foundation for research into *Syzygium* enabled him in 2006 to visit PNG and there collaborate with Kipiro, and enabled Kipiro to visit Canberra in 2011 and work with Craven on sect. *Furfuraceum*. Cath Busby obtained geocode data for those collections for which the data had not been recorded in Lyn's specimen database. Cath also read the descriptions. Nunzio Knerr generated the distribution maps ready for final editing. Siobhan Duffy, in good humour, printed in A3 format the numerous digital images of type specimens that were sent by herbaria for Craven to study, prepared the staminal disc figures from Craven's crude drawings, prepared the final versions of the distribution maps, and prepared the SEM plate. Mark Talbot, Microscopy Centre, CSIRO Plant Industry, produced the scanning electron micrographs in Fig. 1, and Siobhan Duffy produced the final plate, and Nunzio Knerr helped edit this plate for publication. The curators and/or directors of the following herbaria have made available specimens and/or images that have been used in the ongoing studies of Papuasian *Syzygium* and they are sincerely thanked for this assistance: A, B, BISH, BM, BO, BRI, CANB, E, K, L, LAE, LY, MEL, NY, P, WRSL. Those who have assisted Lyn variously in the foregoing and other matters include, in no particular sequence: Emily Wood, Melinda Peters, Wayne Takeuchi, Eve Lucas, Ana Claudia Araujo, Shelley James, Frédéric Danet, Gaëtan Guignard, Mélanie Thiébaut, Robin Hide, Jan-Frits Veldkamp, Wim Vink, Gerard Thijsse, Nicolien Sol, Thomas Zanoni, Rusty Russell, Anton Igersheim, Adele Smith.

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INDEX TO NUMBERED EXSICCATAE

1 = *Syzygium aporematum* Craven & Damas
2 = *Syzygium araucariarum* Craven & Damas
3 = *Syzygium bowersiae* Craven & Damas
4 = *Syzygium branderhorstii* Lauterb.
5 = *Syzygium bubuuense* Craven
6 = *Syzygium buettnerianum* (K.Schum.) Nied.
7 = *Syzygium busuense* T.G.Hartley & L.M.Perry
8 = *Syzygium cheesmaniae* Craven & Damas
9 = *Syzygium debruijnii* Craven & Damas
10 = *Syzygium fazangii* Craven & Damas
11 = *Syzygium folidorhachis* Merr. & L.M.Perry
12 = *Syzygium foremanii* Craven & Damas
13 = *Syzygium frodinii* Craven & Damas
14 = *Syzygium furfuraceum* Merr. & L.M.Perry
15 = *Syzygium gillisonii* Craven & Damas
16 = *Syzygium hartleyi* Craven & Damas
17 = *Syzygium hentyi* Craven & Damas
18 = *Syzygium hooglandii* Craven & Damas
19 = *Syzygium idanum* Craven & Damas
20 = *Syzygium kosteri* Craven & Damas
21 = *Syzygium kui* Craven & Damas
22 = *Syzygium kutubuense* Craven & Damas
23 = *Syzygium leptophlebioides* Merr. & L.M.Perry
24 = *Syzygium maneauense* Craven & Damas
25 = *Syzygium megistophyllum* Merr. & L.M.Perry
26 = *Syzygium millariae* Craven & Damas
27 = *Syzygium montis-venetus* Craven
28 = *Syzygium novotnyi* Craven & Damas
29 = *Syzygium prolatum* Craven & Damas
30 = *Syzygium pseudomegistophyllum* W.N.Takeuchi
31 = *Syzygium pyrocarpum* (Greves) Merr. & L.M.Perry
32 = *Syzygium radiciflorum* Craven & Damas
33 = *Syzygium rhysgardneri* Craven
34 = *Syzygium royenii* Craven & Damas
35 = *Syzygium rubroalabastrum* Craven & Damas
36 = *Syzygium sambogense* T.G.Hartley & L.M.Perry
37 = *Syzygium squamatum* Merr. & L.M.Perry
38 = *Syzygium takeuchii* Craven & Damas
39 = *Syzygium thornei* T.G.Hartley & L.M.Perry
40 = *Syzygium whitmorei* Craven & Damas

Aet (exp. Lundquist) 668: 23 – Anta (exp. Wentholt) 164: 4 – ANU series 2800: 3.
bb series 25055: 23; 28981: 6 – Beccari PN 262: 23 – Bowers 795: 3 – Branderhorst 129: 4 TYPE – Brass 844: 4; 3150: 4; 6267: 4 TYPE; 8314: 6; 8979: 23 TYPE; 13340: 25 TYPE; 22687: 24 TYPE; 27729: 6; 31320: 19 TYPE; 31858: 18 – Brass & Versteegh 11917: 11 TYPE; 13125: 37 TYPE; 13583: 11 – BSIP series 664: 6; 1480: 40; 1489: 40; 1897: 40; 2677: 4; 3104: 40 TYPE; 3385: 40; 3943: 4; 3984: 4; 5258: 40; 5348: 40; 5543: 4; 6537: 4; 7582: 6; 8085: 4; 8767: 6; 8857: 40; 8941: 40; 9421: 40; 9714: 40; 9857: 40; 10873: 4; 11006: 4; 11054: 4; 11478: 40; 11653: 40; 12297: 4; 12561: 40; 12611: 4; 12701: 4; 12722: 40; 13515: 6; 13751: 4; 15090: 4; 15250: 4; 16514: 4; 17342: 4; 17505: 4; 17627: 4; 17696: 6; 17925: 4; 17960: 4; 18027: 4 – Buwalda 5288: 20 – BW series 1075: 20 TYPE; 2242: 6; 5998: 38.
Carr 12051: 31; 12256: 2; 12767: 31; 13068: 35 TYPE; 14383: 35; 15572: 34 – Clemens 1524: 14; 1570: 14; 2133: 14 TYPE; 4492: 6; 4831: 1; 5013: 18; 7187: 18; 8041: 14; 8107A: 14; 9428: 1 TYPE.
Docters van Leeuwen 9049: 23; 9491: 23; 11191: 23.
Eyma 5395: 9 TYPE.
Feuilletau de Bruyn 341: 20 – Forbes 99: 31 TYPE; 325: 31 TYPE; 720: 34.
Gardner 9730: 33 TYPE – Gjellerup 162: 4; 162a: 23 – Gunn 2650: 4.
Hartley 9630: 16 TYPE; 10233: 14; 10309: 16; 11438: 16; 11885: 7; 12325: 18; 12368: 16; 12449: 6; 12455: 1; 12576: 38; 12719: 2 – Heyligers 1724: 25 – Hollrung 658: 6 TYPE – Hoogland 3793: 36; 3838: 36 TYPE; 4198: 32 TYPE; 4518: 6; 4829: 6 – Hoogland & Craven 10196: 6; 10854: 25 – Hoogland & Pullen 5961: 18 TYPE.
Jacobs 9000: 38; 9677: 12 – James, Damas, Emai & Purui 556: 5 TYPE – James, Paul & Allison 112: 27 TYPE.
Kanis 1183: 10 – Koch 57: 4; 446: 6; 505: 4 – Kostermans 82: 6 – Kostermans & Soegeng 345: 23; 376: 23.
LAE series 51596: 31; 52297: 12 TYPE; 52428: 6; 52661: 4; 53901: 18; 55524: 26; 56252: 31; 56319: 31; 59265: 6; 59335: 3; 61894: 34; 65547: 4; 70447: 39; 72312: 4; 73798: 4; 74882: 7; 74884: 4; 78984: 14; 78987: 12; 79011: 6 – Lane-Poole 317: 6; 627: 6.
McAdam 405: 6; 417: 6.
NGF series 517: 6; 1329: 10 TYPE; 1429: 6; 1578: 6; 1699: 6; 2094: 14; 2528: 2; 2914: 6; 2925: 14; 3140: 4; 3154: 14; 4065: 6; 5683: 7 TYPE; 5876: 39; 7460: 2 TYPE; 8741: 6; 9140: 2; 10119: 2; 10239: 6; 11401: 19; 11840: 14; 12899: 39 TYPE; 13102: 4; 13899: 6; 14193: 6; 15266: 2; 16928: 31; 16942: 17 TYPE; 17005: 14; 17058: 18; 17337: 18; 17782: 4; 19092: 4; 19141: 10; 19192: 14; 19301: 29 TYPE; 19417: 18; 20478: 34; 20543: 6; 21689: 2; 22045: 25; 22368: 4; 22495: 14; 24280: 4; 24428: 38; 24430: 14; 25290: 4; 25344: 15 TYPE; 25358: 15; 26602: 4; 26835: 13 TYPE; 26951: 6; 27133: 4; 28113: 3; 30447A: 4; 31635: 4; 31650: 14; 32209: 4; 34451: 1; 34899: 1; 34941: 34 TYPE; 37474: 14; 39291: 25; 40090: 3 TYPE; 40593: 4; 40744: 19; 41202: 4; 41710: 18; 42251: 4; 46098: 28 TYPE; 47804: 14; 48613: 4.
Pullen 3494: 4; 5447: 35; 5813: 6; 7342: 38; 7438: 6; 7718: 32; 8217: 6; 8315: 31.
Rechinger 4704: 4 – Robbins 950: 21 TYPE; 1621: 6; 2084: 18; 2138: 16; 2178: 16; 2421: 16 – RSS series 2638: 4.
Schodde 2182: 22 TYPE; 2186: 6; 2560: 39; 2623: 4; 2749: 4.
Takeuchi, Ama, Siga, Kavua 16220: 14 – Takeuchi & Kulang 11563: 38 TYPE; 11601: 25 – Takeuchi & Saxon 13068: 30 TYPE – Takeuchi, Siga & Towati 14944: 14 – Takeuchi, Towati & Jisaka 19319: 3.
UPNG series 242: 4; 1231: 26 TYPE.
Van Royen 3203: 23; 4656: 4; 5294: 8 TYPE – Versteeg 1899: 4.
Waterhouse 563-B: 6; 849-B: 4; 6520: 4.