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REINWARDTIA

A JOURNAL ON TAXONOMIC BOTANY, PLANT SOCIOLOGY AND ECOLOGY

ISSN 0034 – 365 X | E-ISSN 2337 – 8824 | Accredited 10/E/KPT/2019

2020 19 (1)

REINWARDTIA

A JOURNAL ON TAXONOMIC BOTANY, PLANT SOCIOLOGY AND ECOLOGY

Vol. 19 (1): 1 – 73, June 29, 2020

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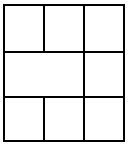

Cover images: *Begonia tjiasmantoi* Ardi & D.C.Thomas. A. Habit. B. Stipule. C. Male. D. Male inflorescence and female flower. E. Male flower. F. Female flower. G. Infructescence. H. Ovary cross-section, axile placentation and bilamellate placentae. A–H from *WI 562*. Photos: W.H. Ardi.

The Editors would like to thank all reviewers of volume 19(1):

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REINWARDTIA
Vol. 19. No. 1. pp: 1–25
DOI: 10.14203/reinwardtia.v19i1.3799

TOWARDS A FLORA OF NEW GUINEA: OLEACEAE. PART 1. *JASMINUM*, *LIGUSTRUM*, *MYXOPYRUM* AND *OLEA*

Received January 20, 2020; accepted May 28, 2020

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ABSTRACT
KIEW, R. 2020. Towards a Flora of New Guinea: Oleaceae. Part 1. *Jasminum*, *Ligustrum*, *Myxopyrum* and *Olea*. *Reinwardtia* 19(1): 1–25. — Oleaceae in New Guinea is represented by five genera and about 32 species, namely *Chionanthus* (about 16 species), *Jasminum* (10 species), *Ligustrum* (3 species), *Myxopyrum* (2 species) and *Olea* (1 species). A key to genera as well as descriptions of and keys to species of *Jasminum*, *Ligustrum*, *Myxopyrum* and *Olea* are provided. Of the three *Ligustrum* species, *L. glomeratum* is widespread throughout Malesia, *L. novoguineense* is endemic and *L. parvifolium* Kiew is a new endemic species. Six species of *Jasminum* are endemic (*J. domatiigerum, J. gilgianum*, *J. magnificum, J. papuasicum, J. pipolyi* and *J. rupestre*). *Jasminum turneri* just reaches the northern tip of Australia; of the two species from the Pacific Islands *J. simplicifolium* subsp. *australiense* just reaches SE Papua New Guinea and *J. didymum*, a coastal species, reaches into Malesia as far north as E Java; *J. elongatum* is widespread from Asia to Australia. Neither *Myxopyrum* species is endemic: *M. nervosum* subsp. *nervosum* extends from Peninsular Malaysia to Indonesian New Guinea, and *M. ovatum* from the Philippines to the Admiralty Islands. The sole species of *Olea*, *O. paniculata*, stretches from Java to Australia and New Caledonia.

Keywords: *Chionanthus*, distribution, endemism, Indonesia, *Jasminum*, *Ligustrum*, *Myxopyrum*, New Guinea, *Olea*, Oleaceae.

ABSTRAK
KIEW, R. 2020. Mengungkap Flora Papua: Oleaceae. Bagian 1. *Jasminum*, *Ligustrum*, *Myxopyrum* dan *Olea*. *Reinwardtia* 19(1): 1–25. — Oleaceae di Papua Nugini terwakili oleh lima marga dan sekitar 32 jenis, yaitu *Chionanthus* (sekitar 16 jenis), *Jasminum* (10 jenis), *Ligustrum* (3 jenis), *Myxopyrum* (2 jenis) dan *Olea* (1 jenis). Sebuah kunci identifikasi tingkat marga serta pertelaan dan kunci identifikasi tingkat jenis untuk *Jasminum*, *Ligustrum*, *Myxopyrum* dan *Olea* disajikan. Dari tiga jenis *Ligustrum*, *L. glomeratum* tersebar luas di Kawasan Malesia, *L. novoguineense* endemik dan *L. parvifolium* Kiew adalah jenis baru endemik. Enam jenis *Jasminum* endemik (*J. domatiigerum, J. gilgianum*, *J. magnificum, J. papuasicum, J. pipolyi* dan *J. rupestre*). *Jasminum turneri* yang sebarannya hanya sampai ujung utara Australia; dimana dua jenis berasal dari Kepulauan Pasifik, *J. simplicifolium* subsp. *australiense* yang hanya sampai tenggara Papua Nugini, dan *J. didymum*, jenis yang dijumpai di pinggiran pantai, tersebar di Malesia sampai ke utara paling jauh hingga timur Jawa; *J. elongatum* tersebar luas dari Asia sampai Australia. Tidak ada jenis *Myxopyrum* yang endemik: *M. nervosum* subsp. *nervosum* tersebar mulai dari Semenanjung Malaysia sampai ke Papua Indonesia, dan *M. ovatum* dari Filipina hingga Kepulauan Admiral. Satu-satunya jenis *Olea*, yaitu *O. paniculata*, tersebar dari Jawa sampai Australia dan Kaledonia Baru.

Kata kunci: *Chionanthus*, distribusi, endemik, Indonesia, *Jasminum*, *Ligustrum*, *Myxopyrum*, *Olea*, Oleaceae, Papua Nugini.

INTRODUCTION

It is timely to revise the Oleaceae in New Guinea because the last account is that of Lingelsheim (1927), who described 24 species of which 14 were new species. This new flora account includes not only data from the many specimens that have been collected since Lingelsheim's time, but also provides keys for identification and will provide a basis for future efforts as much of New Guinea remains to be explored so new taxa can be expected to come to light. At present five genera are recognised: *Chionanthus* with about 16 species, *Jasminum* with 10, *Ligustrum* with 3, *Myxopyrum* with 2, and *Olea* is represented by a single species. Part 1, this account, deals with *Ligustrum, Jasminum, Myxopyrum* and *Olea.* Part 2 with *Chionanthus* is in preparation.

MATERIAL STUDIED

Herbarium material was studied from the following herbaria: A, BM, BO, BRI, CANB, GH, K, KEP, L, LAE (herbarium codes from *Index Herbariorum* at http://sweetgum.nybg.org/ih). All specimens cited have been seen unless otherwise indicated. Only specimens from New Guinea are cited in this account. Localities are listed alphabetically based on data from herbarium labels. Descriptions are based on New Guinea material except for a few species where the New Guinea material is incomplete, *e.g. Myxopyrum nervosum*. Where the full range of variation of a species is not represented in New Guinea, this is indicated by 'elsewhere' The dimensions given in the descriptions are from dried material.

OLEACEAE

Oleaceae Hoffmanns & Link, Fl. Port. 1 (1809) 62 "Oleinae'; Lingelsheim, Bot. Jahrb. Syst. 61 (1927) 1; Backer & Bakhuizen f., Fl. Java 2 (1965) 212; Kiew, Tr. Fl. Sabah & Sarawak 4 (2002) 129; Green, in Kadereit (ed.), Fam. Gen. Vasc. Pl. 7 (2004) 296.

Trees, shrubs or woody climbers, evergreen, glabrous or pubescent. *Stipules* absent. *Leaves* opposite (rarely alternate), petiolate, simple, unifoliolate or trifoliolate or imparipinnate, margin entire, sometimes toothed toward the apex. *Inflorescence* axillary or terminal, rarely ramiflorus, cymose in fascicles or spicate or in dichasia or thyrses or flowers solitary. *Flowers* actinomorphic, bisexual, sometimes polygamous or unisexual. *Calyx* usually small, campanulate and undivided or divided in 4(–15) lobes or teeth. *Corolla* gamopetalous with long or short tube or divided to base and petals joined in pairs, (2–)4 (–16)-lobed, lobes imbricate or valvate-induplicate or absent. *Stamens* 2 (rarely 3 or 4), alternating with corolla lobes, epipetalous or inserted at base of corolla tube, filaments short or sometimes long; anthers oblong, dorsifixed, thecae 2, dehiscing longitudinally, connective sometimes apiculate. Sometimes with an annular nectary. *Ovary* superior, locules 2, styles short or long, stigma capitate or shortly bifid; ovules 2 per locule, rarely 1 or 4–8. *Fruit* a drupe, capsule, samara or 2-lobed berry. *Seeds* 1–4, erect or pendulous, testa thin, endosperm fleshy, bony, oily or rarely absent.

Distribution. About 25 genera and about 600 species worldwide in tropical, subtropical and temperate regions, cosmopolitan but mostly Old World. Five genera and 32 species are recognised from New Guinea.

Uses. Commercial uses include the olive *Olea europaea* L. subsp. *europaea* for its fruits and oil; *Fraxinus* and *Olea* species for timber; a few *Jasminum* species are a source of perfume; species of *Jasminum*, *Osmanthus* and *Syringa* are popular ornamental plants, many of which are strongly fragrant; a few *Ligustrum* species are popular hedge plants. Locally several species are recorded to have minor medicinal uses. Among New Guinea species, several species have potential as ornamental plants such as *Jasminum magnificum* and *J. turneri* that have exceptionally large flowers and *J. domatiigerum* var. *orogenes* for its pretty diminutive habit.

Notes. Since Lingelsheim's 1927 account, in spite of many specimens having been collected in the 1960s and 1970s, rather few new species or records have come to light – two new species (*Jasminum pipolyi* and *Ligustrum parvifolium*), one new variety of *Jasminum*, one new record for *Myxopyrum*, none for *Olea*, but *Chionanthus* is the exception with eight new species awaiting description.

Of the 32 species recorded for New Guinea, more than half (21 species) are endemic in New Guinea. Of the 16 species in Part 1, eight are endemic (*Jasminum domatiigerum, J. gilgianum*, *J. magnificum, J. papuasicum, J. pipolyi, J. rupestre, Ligustrum novoguineense* and *L. parvifolium*) with *J. turneri* just reaching the northern tip of Australia. Of the others, *Olea paniculata* is widespread from Java to New Caledonia, four are widespread Malesian species (*Jasminum elongatum, Ligustrum glomeratum, Myxopyrum nervosum* subsp. *nervosum* and *M. ovatum*), and two have their centre of distribution in the Pacific Islands (*Jasminum didymum* and *J. simplicifolium* subsp. *australiense*). At present, the great majority, ten species, are known only from Papua New Guinea, compared with four from both Papua New Guinea and Indonesian New Guinea, and two known only from Indonesian New Guinea. This difference reflects collecting effort as Indonesian New Guinea is less well collected.

Only three taxa can be considered common. Species of conservation concern are those known from less than five localities and that have not been recollected recently. Two, *Jasminum rupestre* and *Myxopyrum nervosum*, are species collected by Zipelius in 1828 that have not been recollected. Unfortunately, no precise locality was provided by Zipelius. Van Steenis-Kruseman (1950) suggests he collected in south and southwest New Guinea. The third species is *Jasminum magnificum*, known only from the type specimens collected in 1907 from a single locality, 'Djamu' in Kaiser Wilhelmsland. That it is known from a single locality suggests that it was always a rare species because several German botanists were collecting in this area at this time. If this area has since suffered from habitat disturbance, this species is likely to be extinct. The recently described *Jasminum pipolyi* is described as locally frequent and as it lies within the Crater Mt. Wildlife Management Area is presumably protected from habitat disturbance. *Ligustrum parvifolium* grows on the steep slopes of the Nawandowan Gorge in stunted forest. The state of this forest is not known. Apart from *Myxopyrum nervosum*, the other four species are New Guinea endemics (Table 1).

Ecology. They are found in a wide variety of forest types: in primary lowland forest or are more common outside forest in open or in secondary forest or in grassland and in mountains to upper montane cloud forest or subalpine shrubbery to about 3,600 m asl. Several widespread species are associated with coastal forest, but very few occur in mangroves.

Table 1. Rarity of taxa based on number of localities (distribution: ING – Indonesian New Guinea, PNG – Papua New Guinea).

A. Less than 5 localities

Taxon	Last collected	Distribution	Endemic
Jasminum magnificum	1907	PNG	+
Jasminum pipolyi	1997	PNG	+
Jasminum rupestre	1828	ING	+
Myxopyrum nervosum	1828	ING	-
Ligustrum parvifolium	1974	PNG	+

B. 5 to 10 localities

Taxon	Last collected	Distribution	Endemic
Jasminum didymum	1980s	PNG	-
Jasminum papuasicum	1970s	PNG	+
Jasminum simplicifolium	1970s	PNG	-

C. 11 to 30 localities

Taxon	Last collected	Distribution	Endemic
Jasminum domatiigerum var. *orogenes*	1997	PNG	+
Jasminum elongatum	1980s	PNG	-
Jasminum turneri	1997	PNG	-
Ligustrum glomeratum	1970s	ING + PNG	-
Ligustrum novoguineense	1994	ING PNG	+
Myxopyrum ovatum	1970s	ING + PNG	-
Olea paniculata	1970s	PNG	-

D. 31 to 70 localities

Taxon	Last collected	Distribution	Endemic
Jasminum domatiigerum var. *domatiigerum*	1997	PNG	+
Jasminum didymum var. *didymum*	1997	ING + PNG	-
Jasminum gilgianum	1997	PNG	+

Key to genera

1a. Climbers or scandent shrubs……...……... 2

1b. Trees or shrubs …….……... 3

2a. Twigs usually terete, sometimes quadrangular. Leaves trifoliolate or unifoliolate. Corolla tube 2–45 mm long, lobes (4–)5(–16), spreading, 4–45 mm long. Fruit a bilobed drupe ……..... *Jasminum*

2b. Twigs strongly quadrangular. Leaves simple. Corolla tube 1–2(–4) mm long, lobes 4, not spreading, 1–3 mm long. Fruit a globose or ellipsoid drupe, not bilobed ……..….... *Myxopyrum*

3a. Corolla with petals divided almost to base, stamens subsessile attached to the base of and included within corolla. Inflorescences axillary, rarely cauliflorous ……..... *Chionanthus* (to be treated in Part 2)

3b. Corolla with a distinct tube, stamens with a long filament, attached at top of the tube between the lobes, anthers exserted. Inflorescences terminal, sometimes also axillary…….. 4

4a. Shrub, sometimes small tree to 15 m. Style long. Indumentum without large lepidote scales……...…….. *Ligustrum*

4b. Tree to 30 m. Styles short or stigma sessile. Indumentum with large lepidote scales……..……..…*Olea*

1. JASMINUM

Jasminum is large genus of woody climbers with about 200 species in tropical and warm temperate Asia, of which about 54 species have been recorded from Malesia (Kiew, 1994a). A few Malesian species have trifoliolate leaves, but the majority have unifoliolate leaves. The first jasmine from New Guinea, *Jasminum rupestris*, was described by Blume (1850), followed by *Jasminum gilgianum* by K.Schum. & Lauterbach (1901). White (1926) described a spectacular new large flowered species, *J. turneri*, with long pedicels and exceptionally long, narrow corolla lobes. The first and only complete account of New Guinea jasmines that included descriptions and a key is that of Lingelsheim (1927) who included nine species of which six were new species, *J. domatiigerum, J. magnificum, J. papuasicum, J. pseudanastomosans, J. roseo-album* and *J. schumannii* (the last a unifoliate species split from trifoliolate *J. gilgianum*), the widespread species, *J. elongatum* (as *J. bifarium*) and *J. nitidum* (doubtfully attributed to the Admiralty Is). The widespread coastal species were recorded later, *J. didymum* by Warburg (1891) and *J. simplicifolium* by Green (1984a). In 1999, Takeuchi described *J. pipolyi* that has massive fruits 3–3.5 cm in diameter, definitely the largest of any species in Malesia. Van Royen's detailed exploration of the alpine flora of New Guinea led to the recognition of a new dwarf alpine variety of *J. domatiigerum* var. *orogenes* Kiew in Green (2001).

Examination of specimens currently available shows that *J. pseudanastomosans* is a synonym of the earlier described *J. turneri*, and *J. roseo-album* is a synonym of *J. papuasicum*, and *J. schumannii* is not recognised as distinct from *J. gilgianum. Jasminum nitidum* is excluded (see below). This brings the current total to ten species.

Jasminum didymum is a widespread and variable species and several subspecies have been recognised (Green, 2001). Only the typical subspecies occurs in New Guinea. Green (2001) took an extremely broad view of this species and included two quite different New Guinea species in his synonymy. Both these species, *J. pipolyi* and *J. rupestre* are distinct species, although *J. rupestre*, still known only from type material, remains incompletely known.

JASMINUM L.

Jasminum L., Sp. Pl. 1 (1753) 7; DC, Prodr. 8 (1844) 301; Schumann & Lauterbach, Fl. Schutzgeb. Südsee (1911) 496; Lingelsheim, Nova Guin. 14 (1927) 330, Bot. Jahrb. Syst. 61 (1927) 16; White, J. Arnold Arb. 10 (1929) 259; van Royen, Alpine Fl. New Guinea 3 (1982) 2271; Green in Kadereit, Fam. Gen. Vasc. Pl. & (2004) 301.

Evergreen climbers (elsewhere deciduous), sometimes lianas, sometimes shrubby. Indumentum of uniseriate hairs or lacking. *Stems* woody, usually terete, sometimes quadrangular. *Leaves* opposite, unifoliolate or trifoliolate, (elsewhere imparipinnate or lacking); petiole articulate; lamina broadly or narrowly lanceolate, ovate or obovate, base decurrent, cuneate, truncate or cordate, margin entire, apex obtuse, acute to acuminate or caudate, glabrous to densely pubescent, membranous or chartaceous to coriaceous; venation pinnate, or the basal pair of lateral vein ascending more-or-less halfway before joining lateral veins in the upper half, or tripliveined; domatia present or absent. *Inflorescences* terminal, sometimes axillary, (elsewhere cauliflorus), few- to many-flowered, a simple cyme with 3 flowers sometimes reduced to a single flower or a dichasial cyme, sometimes umbellate, or a thyrse, peduncle long to almost lacking, bracts usually small and linear, (elsewhere large and leaf-like). *Flowers* bisexual, actinomorphic, heterodistylous, scented, pedicels short or long or subsessile; *calyx* with a small campanulate or cupulate tube, teeth 5–9, filiform or sometimes robust and stiff or minute and scarcely dentate, persistent; *corolla* white, sometimes tinged purplish or rosy in bud, (elsewhere yellow or red), glabrous, narrowly tubular, tube usually much longer than the lobes, sometimes lobes longer than the tube, lobes 5–9, sometimes to 12, usually narrowly ligulate, sometimes broadly elliptic, spreading, imbricate in bud; *stamens* 2, included in the corolla tube, filaments short, anthers dorsifixed, narrowly elliptic, connective broad, usually extended into an appendage, introrse, dehiscing longitudinally; *ovary* superior, small, subglobose, locules 2, ovules 2 per locule, style long in long-styled flowers or short in short-styled flowers, stigma bilobed or capitate. *Fruit* a 2-lobed berry, sometimes only a single lobe developing, lobes usually ellipsoid, sometimes globose, ripening dark purple or black, sometimes waxy white. *Seed*: one per locule (elsewhere 2), cotyledons massive, lacking endosperm (elsewhere endosperm present, cotyledons thin).

Distribution. Six of the ten species native in New Guinea are endemic with only *J. gilgianum* extending into New Britain and New Ireland. *Jasminum magnificum, J. pipolyi* and *J. rupestre* are very rare and are known only from their type locality. *Jasminum turneri* just reaches the northernmost tip of Australia. *Jasminum elongatum* is widespread from Asia to Australia, *J. didymum* from East Java to Tahiti (Society

Islands) and *J. simplicifolium* subsp. *australiense* extends to Australia, Lord Howe and Norfolk Islands.

Ecology. In New Guinea, the majority of jasmines are found in lowland forest usually below 1,300 m asl. *Jasminum papuasicum* and *J. gilgianum* have been collected from a wide range of elevation (10–3,700 m). Only *J. domatiigerum* has consistently between collected from higher elevations (1,500–3,600 m) in montane to upper montane cloud forest with var. *orogenes* occurring in subalpine vegetation. Most species are confined to rain forest, the two exceptions being *J. didymum,* a species of sea shores and coastal forest, and *J. simplicifolium* var. *australiense* that in New Guinea is found in lowland savannah vegetation and grassland.

Notes. 1. In general, apart from stating that the species is a climber, data about the height and diameter of the stem are lacking on most herbarium labels. Since very few species are cauliflorous, the specimen usually consists of a flowering twig. From field work in Malaysia, it appears that jasmines are species specific in their maximum height, *i.e.* as lianas with thick stems that reach the tree canopy, or more slender and grow below the canopy or on forest margins, or are much-branched and shrubby.

2. Domatia can be a good supporting character in discriminating species (Jacobs, 1966). Domatia in *Jasminum* are dense tufts of hairs on the lower lamina surface in the axil of the lateral veins and midrib. Table 2 shows that in some New Guinea *Jasminum* species they are totally lacking, while in others they are usually present.

3. Pollination. No pollinator or even flower visitor has been recorded visiting New Guinea jasmines although fruits can usually be found indicating that pollination was successful. In general, jasmine flowers display the classic characters of moth pollinated flowers (Faegri & van der Pijl, 1979) being white, strongly fragrant towards dusk and having a long, narrow corolla tube. Apart from this general moth-pollination syndrome, there appear to be two other distinct pollination syndromes, namely that of small-flowered species and those with the hawk-moth pollination syndrome.

The small-flowered species, *J. didymum* and *J. gilgianum,* have a short corolla tube, 1–8 × 1–2 mm, and corolla lobes 1–7 mm long. Flowers with a short corolla tube are accessible to a wider range of insects, such as bees.

First identified in *J. longipetalum* King in Peninsular Malaysia (Kiew, 2020), the hawk-moth pollination syndrome is characterised by a combination of exceptionally long pedicels that bend to position the long corolla tube in a horizontal or pendent position making them accessible to hovering insects, the long narrow corolla tube accessible only to long-proboscised moths, and the long corolla lobes that presumably attract the pollinator. In New Guinea, the hawk-moth pollination syndrome is exemplified by *J. magnificum* and *J. turneri* that have exceptionally long pedicels 20–40 mm long (compared with 0–7(–12) mm long in the other New Guinea species), a corolla tube 10–20 mm long (compared with 1–8 in small-flowered species and 7–25 mm in most) and exceptionally long corolla lobes 15–35(–45) mm that are longer than the corolla tube (compared with 1–9(–15) mm long in the other species).

Table 2. Frequency of domatia in New Guinea *Jasminum* species

Species	% specimens with domatia	No. specimens examined
J. didymum	0	9
J. papuasicum	0	9
J. turneri	0	8
J. simplicifolium	0	6
J. elongatum	0	11
J. domatiigerum var. *domatiigerum*	91	22
J. domatiigerum var. *orogenes*	65	20
J. gilgianum	97	28
J. pipolyi	100	2

Key to *Jasminum* species

1a. Leaves trifoliolate ……. 2
1b. Leaves unifoliolate ……..…….. 6
2a. Terminal leaflet narrow (8–10 × 1.5–2 cm), five times longer than broad …….... 8. *J. rupestre*
2b. Terminal leaflet up to twice as long as broad ……3
3a. Terminal leaflet 3.5–12 × 3–5 cm, without domatia …….. 1. *J. didymum*
3b. Terminal leaflet almost twice the size of the laterals, domatia usually present ……... 4
4a. Terminal leaflet 1.2–8 × 0.7–5.5 cm ……..…… *J. domatiigerum*
4b. Terminal leaflet 7–15 × 2.5–7.5 cm ……..……... 5
5a. Terminal leaflets 7–15 × 4–7.5 cm. Corolla tube 3–8 mm, lobes short 1–2 mm long. Fruit 6–9 mm diameter……. 4. *J. gilgianum* (in part)
5b. Terminal leaflet 8–12 × 2.5–5 cm. Corolla tube *ca*. 10 mm, lobes 6–8 mm long. Fruit 31–35 mm diameter ……..….. 7. *J. pipolyi* (in part)
6a. Lamina 9–19 × 6–13 cm wide. Inflorescence long, 10–31 cm long. Corolla tube 3–8 mm long, lobes 1–2 mm long ……. 4. *J. gilgianum* (in part)
6b. Lamina 2–6.5 cm wide. Inflorescence subsessile or 1–17 cm long. Corolla tube 10–20 mm long, lobes 6–45 mm long ……. 7
7a. Calyx teeth 0–2 mm long …….. 8
7b. Calyx teeth 3–8 mm long ……..…….. 11
8a. Lamina coriaceous. Inflorescence many-flowered. Pedicels 4–12 mm long. Corolla lobes 6–9 mm long, shorter than the corolla tube ……..……. 9
8b. Lamina chartaceous. Inflorescence with up to 7 flowers. Pedicels 20–40 mm long. Corolla lobes 15–45 mm long, longer than the corolla tube……..…… 10
9a. Lamina 5–9 × 2.5–5 cm. Inflorescence 2.5–5 cm long. Pedicels 6–12 mm long. Fruit lobes 5–11 mm diameter……..….... 9. *J. simplicifolium*
9b. Lamina 8–12 × 2.5–5 cm. Inflorescence 7–17 cm long. Pedicels 4–7 mm. Fruit lobes 31–35 mm diameter……..…... 7. *J. pipolyi* (in part)
10a. Petiole 1–1.5 cm long, lamina with 5–7 lateral veins. Corolla with 6–9 lobes, lobes broad, 20–35 × 4–6 mm ……..……...……. 5. *J. magnificum*
10b. Petiole 0.2–0.8 cm long, lamina with 2–3 lateral veins. Corolla with 8–12 lobes, lobes narrow, 16–45 × 1–2 mm wide……... 10. *J. turneri*
11a. Lamina chartaceous, veins conspicuous above, prominent beneath. Pedicels 3–5 mm long……. ……..3. *J. elongatum*
11b. Lamina subcoriaceous, veins faint above, obscure beneath. Pedicels 5–7 mm long…… ……..... 6. *J. papuasicum*

1. JASMINUM DIDYMUM G.Forst. (Fig. 1 a-c).

Jasminum didymum G.Forst., Fl. Ins. Austr. Prod. (1786) 3; Bentham, Fl. Austral. 4 (1868) 294; Müller, Pap. Plants 1 (1876) 11; Hooker f., Bot. Mag. 104 (1878) t. 6349; Hemsley, Bot. Challenger 1 (1882) 163; Warburg, Bot. Jahrb. Syst. 13 (1891) 403; Schumann in Schumann & Lauterbach, Fl. Schutzgeb. Sudsee 2 (1901) 496; White, J. Arn. Arbor. 13 (1932) 17; Green, J. Arn. Arbor. 43 (1962) 112, Allertonia 3 (6) (1984) 405, Fig. 2A-C; Kiew, Sandakania 5 (1994) 5; Green, Kew Bull. 56 (2001) 904. — Type: Tahiti [Society Islands], *Forster s.n*. (Lectotype BM; Isolectotype C, K [K000901590], selected by Kiew, Sandakania 5 (1994) 5). Synonym: *Jasminum parviflorum* Dcne. in Nouv. Ann. Mus. Hist. Nat. 3 (1834) 405, Herb. Timor Descr. (1835) 77; Blume, Mus. Bot. Ludg.-Bat. 1 (1850) 280; Miquel, Fl. Ned. Ind. 2 (1856) 531; Peekel, *Illustrierte Flora des*

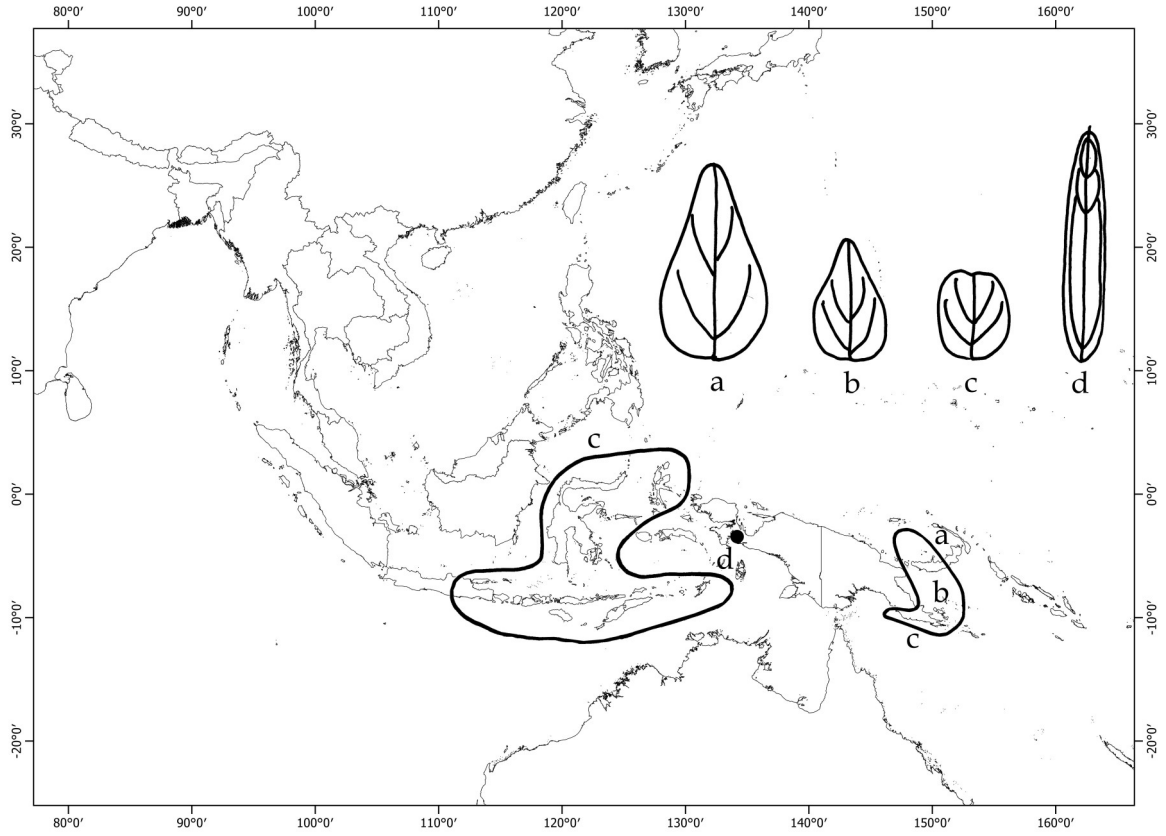

Fig. 1. Distribution of *Jasminum didymum* and *J. rupestre* (a-c. clinal variation in the size and shape of the terminal leaflet of *J. didymum*; d. characteristic venation of the unifolate leaf of *J. rupestre*).

Bismarck Archipelago für Naturfreunde (1947) Fig. 1405 & 1406; Backer & Bakhuizen f., Fl. Java 2 (1965) 216. — Type: Timor, *Gaudichand-Beaupré s.n.* P, *n.v.*).

Woody climber. *Stem* minutely pubescent or glabrous. *Twigs* terete. *Leaves* trifoliolate; petiole *ca*. 1.5 cm long, grooved above, terminal petiolule 0.7–2 cm, lateral petiolules 0.5–0.7 cm; laminas ovate to narrowly lanceolate, chartaceous, base rounded or subcordate, apex rounded, obtuse or acute (rarely acuminate), terminal leaflet 3.5–12 × 3–5 cm, lateral leaflets 2.5–7.5 × 1.5–5 cm; venation penniveined, veins 4 or 5 pairs, lower 2–3 pairs strongly ascending to margin, lateral veins conspicuous on both surfaces, without domatia. *Inflorescences* axillary or terminal, a lax many-flowered thyrse, 6–10 cm long, with opposed secondary branches, minutely pubescent or glabrous; bracts linear, 1–2 mm long; pedicels 1–5 mm long. *Flowers* fragrant; *calyx* glabrous, tube campanulate, *ca.* 2 mm long, scarcely toothed, teeth to *ca*. 0.5 mm long; *corolla* white, tube 5–8(–10) mm, lobes 4–7, ovate, 2–3 × 2 mm, apex rounded to acute; *stamens*: anthers narrowly ellipsoid, 2–3.5 mm long; *ovary* globose, *ca.* 1 mm diam., style 2–2.5 mm long (short-styled flower), *ca.* 5 mm (long-styled flower), stigma bilobed, 1–2 mm long. *Fruits* bilobed, lobes 6–10 × 5–9 mm, glossy red-black or black when ripe, sometimes the outer layer transparent and separates on drying.

Distribution. East Java, Madura, Lesser Sunda Island, Sulawesi, Maluku, New Guinea (West Papua Province - Manokwari; Papua New Guinea - Milne Bay and Central Provinces), West New Britain, New Hebrides, Australia, South-western Pacific (Solomon Island, New Caledonia, Fiji, Niue, Lord Howe Island, Tahiti).

Ecology. Seashores, coastal rain forest or dry low-land forest to 70 m asl. In Manokwari, it was recorded from a dry limestone area. It does not penetrate into lowland rain forest. Throughout its range in Malesia, *J. didymum* is confined to areas with seasonal drought falling within the eastern or southeastern phytogeographic region in Malesia as defined by van Steenis (1979).

Notes. *Jasminum didymum* is a distinct species by a combination of its trifoliolate leaves, its leaflets without domatia, its branched, many-flowered

inflorescences with small flowers and its scarcely toothed calyx. However, leaflet form is variable in this widespread species and has been used to distinguish subspecies (Green, 1984a). In New Guinea, leaflet form shows clinal variation from specimens with larger lanceolate leaflets, (4.5–)6–8(–12) × 3–5 cm (Fig. 1a) of the typical form, subsp. *didymum,* seen in specimens from Milne Bay Province, Port Moresby, Normanby Islands, New Britain and the Bismarck Archipelago; through intermediate forms (Fig. 1b) in the Milne Bay Province and the Solomon Islands; to the strikingly different small, 4.5–5.5 × 3–4 cm, orbicular leaflets with the basal pair of veins strongly ascending and the apex retuse (Fig. 1c). This form is the common coastal jasmine from East Java through the Lesser Sunda Island, but in New Guinea is restricted to a small area of savannah vegetation in the Port Moresby area.

Green (1984a) in his account of Australian jasmines suggested that *J. didymum* subsp. *racemosum* (F.Muell.) P.S.Green occurred in the vicinity of Port Moresby but without citing specimens, nor did he cite any from New Guinea in Green (2001). This account confirms that subspecies *racemosum* is endemic in Australia and does not occur in New Guinea.

The specimen listed by Schumann & Hollrung (1889) as *J. didymum,* Schumann (1901) later described as *J. gilgianum*.

New Guinea specimens (typical form). INDONESIAN NEW GUINEA PAPUA. Manokwari *Johns 7879* (K), *Johns 7885* (K), *Kanehira & Hatusima 13061* (BO). PAPUA NEW GUINEA. Milne Bay *Cruttwell 1660* (K), *Henty NGF 16881* (BO, BRI, CANB, LAE, S), *Mann NGF 43176* (L, LAE). Normanby Is. *Brass 25365* (K, L, LAE), *25491* (CANB, K, L, LAE), *Womersley* NGF 8627 (K), *Womersley & Brass 8627* (BRI, LAE). Port Morseby *Carr 11842* (BM, K), *Heylingers 1165* (L, LAE), *1201* (BRI, CANB, K, L, LAE), *1752* (CANB), *Pullen 6833* (BO, BRI, CANB, K, L, LAE), *White 56* (BRI), 106 (BRI). Rigo *Schodde 2786* (K, L, LAE), *Turner s.n.* (BRI). Yule Is. *Darbyshire 739* (L, LAE). NEW BRITAIN *Frodin NGF 26740* (BO, BM, BRI, CANB, L, LAE, S), *Green RSNH 1028* (L), *RSNH 1171* (L). NEW IRELAND *Millar NGF 23823* (BO), *Peekel 89* (BO, L).

Small-leaved form (Fig. 1c)

Terminal leaflet 4.5–5.5 × 3–4 cm, chartaceous, petiolule (2–)4–6(–10) mm long; apical lamina rotund to orbicular, apex retuse. Inflorescence (5–)9–(27)-flowered, 5–8(–10) cm long, pedicels slender, 0.2–0.4 mm diameter.

Distribution. PAPUA NEW GUINEA Milne Bay, Port Moresby, Rigo, Normanby Island, Yule Island. NEW BRITAIN. NEW IRELAND.

Ecology. Savannah, monsoon or deciduous forest and coastal forest.

New Guinea specimens. PAPUA NEW GUINEA. Central Province: Motupore Island *Hopkins UPNG 13189* (K), *UPNG 13591* (K). South East Tave *Schodde 2786* (K). Port Morseby *Heyligers 1165* (K), *1201* (K); *Pullen 6833* (K); *Carr 11842* (K).

2. JASMINUM DOMATIIGERUM Lingelsh.

Jasminum domatiigerum Lingelsh., Bot. Jahrb. Syst. 61 (1927) 21; Kobuski, J. Arn. Arbor 21 (1940) 329; van Royen, Alpine Fl. New Guinea 3 (1982) 2272, Fig. 683; Kiew, Sandakania 5 (1994) 5; Green, Kew Bull. 56 (2001) 909. — Type: NE Papua New Guinea, forests at Maijen *Schlechter 18058* 22 July 1908 (Lectotype L, Isolectotype A [A00021474], BM, K [K000901536], S; selected by Kiew, Sandakania 5 (1994) 5).

Woody, weakly twining climber to 6 m long, *ca*. 5 mm thick. *Stem* densely to minutely pubescent to glabrous; bark of older stems lenticellate. *Twigs* terete. *Leaves* trifoliolate, glabrous or pubescent; petiole 0.5–1.5 cm long, terminal petiolule 0.5–1.7 cm, lateral petiolules 0.1–0.3 cm; laminas lanceolate to ovate to rotund, subcoriaceous to membraneous, base cuneate to cordate, apex acute to rounded to retuse (sometimes apiculate), terminal leaflet 3–6(–8) × 1.5–5(–5.5) cm, usually twice the size of the laterals, lateral leaflets 1.5–3 × 1–3 cm; venation pinnate, lateral veins plane or impressed above, prominent beneath, 3–4(–5) pairs; domatia usually present. *Inflorescences* axillary and terminal, a many-flowered thyrse, (1.5–)5–11 (–15) cm long, golden pubescent to glabrous; bracts linear, 2.3 mm long; flowers sessile or with pedicels to 4 mm long. *Flowers* fragrant; *calyx* glabrous or hirsute, tube campanulate, 2–3 mm long, scarcely toothed, teeth to 1 mm long; *corolla* white or pale cream, pinkish in bud, tube 7–10 mm, *ca*. 3 mm wide, lobes 4–5, ovate to oblong, 2–4(–5) × (1–)2–3 mm, apex rounded or minutely apiculate; *stamens* sessile or with short filament; anthers narrowly ellipsoid, 2–3 mm long; *ovary* globose, *ca*. 1 mm diam., style 3–7 mm long, stigma *ca*. 2 mm long. *Fruits* bilobed, lobes 5–9 × 4–7 mm, ripening dark blue-black.

Distribution. Endemic in Papua New Guinea.

Ecology. Montane forest to upper montane cloud

forest, 1,500–3,000 m asl., edge of forest or in pioneer regrowth. *Jasminum domatiigerum* is one of the two New Guinea jasmines that grow above 2,500 m. The other is *J. papuasicum* that grows from 25–3,700 m asl.

Uses. Stems are used as ropes.

Notes. The presence of domatia is a conspicuous feature of this species and distinguishes it from the other small-leaved trifoliolate species *J. didymum*. It also differs from *J. didymum* in that the terminal leaflet is twice the size of the lateral leaflets. Leaf morphology in var. *domatiigerum* is variable: plants at lower altitudes have larger, chartaceous and pubescent leaves, compared with those from higher altitudes with smaller, subcoriaceous, more or less glabrous leaves with a glossy surface, the veins are deeply impressed above and the inflorescences are shorter. Although leaf morphology of plants of var. *domatiigerum* from higher elevations resembles that of var. *orogenes,* their leaves are still larger and the inflorescence is a many-flowered thyrse.

Key to varieties of *Jasminum domatiigerum*

1a. Terminal leaflet 3–8 × 1.5–5.5 cm; inflorescence a many-flowered thyrse, 1.5–15 cm long ……..... var. *domatiigerum*

1b. 1b. Terminal leaflet 1.2–3 × 0.7–1.7 cm; Inflorescence a condensed 5–8-flowered dichasium, to 1 cm long …... var. *orogenes*

var. *domatiigerum*

New Guinea specimens. PAPUA NEW GUINEA. Aiyura *Womersley et al. 6005* (BO, BRI, CANB, K, L, LAE). Anga Valley *Schodde 1466* (BRI, CANB, K, L). Bulolo *Floyd & Havel NGF 7465* (CANB, LAE). Finisterre Mts. *Womersley & Thorne NGF 12663* (BRI, LAE). Enga *Frodin UPNG 6308* (K). Ganigi River *Womersley & Jones NGF 8799* (BRI, K, LAE). Goilala *van Royen NGF 20197* (BO, BRI, CANB, K, L, LAE). Goroka *Stevens LAE 51022* (BRI, CANB, L, LAE), *Womersley NGF 37397* (BO, BRI, K, L, LAE). Idenburg River *Brass 12362* (BM, BO, BRI, L, LAE), *Brass 12405* (BM, L). Kainantu *Wheeler ANU 5567* (CANB, LAE). Lake Habbema *Brass 11556* (BM, BO, BRI, L, LAE). Lake Myola *Croft & Lelean LAE 60522* (K), *NGF 34816* (BRI, K, L, LAE), *Croft & Vinas LAE 61881* (BRI, K, LAE). Madang *Schlechter 18058* (BM, K, L). Marafunga *Hartley TGH 13207* (CANB, K, LAE), *Miller NGF 40783* (BO, BRI, CANB, K, LAE). Maral *Coode s.n.* (LAE). Mendi *Vanderburg et al. NGF 39821* (BO, BRI, K, L, LAE). Mt. Giluwe *Croft & Nimms LAE 61074* (BRI, L, LAE), *Croft et al. LAE 60919* (BRI, L), *van Royen 11507* (K), *Womersley & Leach LAE 55264* (BO, BRI, K, LAE), *NGF 40045* (LAE). Mt Hagen *Bowers 295* (CANB, LAE), *Clunie et al.* LAE 63448 (BRI, K, LAE), Henty NGF 20610 (BRI, CANB, K, L, LAE), *Hoogland & Pullen 5801* (BM, BO, CANB, K, L, LAE), *Millar & Holttum NGF 18584* (BRI, CANB, K, L, LAE), *Womersley NGF 9449* (BRI, CANB, K). Mt Kajiende *Takeuchi et al. 19995* (K). Mt. Ialibi *Andrew LAE 57066* (BRI, LAE), *Coode & Katik NGF 40356* (CANB, LAE), *Larivita LAE 57066* (BRI, LAE), *LAE 67118* (K). Mt. Kenive *Croft et al. LAE 65141* (BM, BO, K, LAE), *LAE 65228* (BRI, K, L, LAE). Mt. Michael *Brass 31178* (CANB, K, L, LAE). Mt. Timtongopig *Rees & Reeve 25* (K). Mt. Victoria *Croft LAE 61623* (BM, BO, BRI, CANB, K, LAE), *van Royen 10781* (BRI, K, L, LAE). Neon Basin *Croft LAE 61548* (K). Nondugl *van Royen NGF 18238* (BO, BRI, CANB, LAE), *18214* (CANB, L, LAE), *Womersley NGF 4402* (BRI, CANB, K, L, LAE), *4825* (BRI, CANB, K, L, LAE), *5371* (BO, BRI, CANB, K, L, LAE). Okapa *Brass 31607* (BO, CANB, L, LAE), *31777* (LAE), *31829* (CANB, L, LAE), *Hornibrok 135* (LAE), *Womersley NGF 24702* (LAE). S. Karius *Takeuchi et al. 22571* (K). Sattelberg *Clemens 7089* (L). Sepik *Ledermann 12791* (L), *12866* (L). Tambul *Womersley NGF 14254* (BRI, CANB, L, LAE). Tari Gap *Frodin UPNG 6882* (K), *Vinas UPNG 7538* (K). Tari *Vink 17470* (CANB, L, LAE). Uinba *Vink 16417* (CANB, L, LAE). Wabag *Flenley ANU 2634* (BRI, CANB, K, L), *Womersley NGF 11087* (BRI, CANB, K, LAE). Wau *Hartley TGH 11737* (BRI, CANB, LAE), *Streimann & Kairo NGF 39108* (LAE), *van Royen NGF 16282* (BO, BRI, K, L). Yodda River *Carr 13943* (BM, CANB, K, L, LAE).

var. *orogenes* Kiew in Green, Kew Bull. 56 (2001) 910. — Type: Papua New Guinea, Mt Wilhelm *Hoogland & Pullen 5722*, 23 July 1956, at 3350 m (Holotype LAE, Isotype A, BM, BRI [AQ0048396], CANB, L).

Scandent twining shrub 0.5–3 m tall, bushy with crowded leaves, stems minutely pubescent. *Leaves* with a common petiole 3–7 mm, pubescent, terminal petiolule 2–5 mm, grooved above, lateral leaflets sessile or to 2 mm long; lamina subcoriaceous, leaflets oval, terminal 1.2–3 × 0.7–1.7 cm, lateral leaflets 0.7–2 × 0.5–1.2 mm, margin recurved, apex acute to rounded to retuse, base cuneate; venation pinnate with 3–4 pairs of lateral veins, deeply impressed above, prominent below, domatia usually present. *Inflorescence* terminal and axillary, a condensed dichasium with 5–8 flowers, sessile, or with peduncle 5(–10) mm long. *Flowers* fragrant, sessile or with pedicel to 2 mm

long, white or cream, pink in bud; *calyx* tube 2 mm pubescent; *corolla* tube 6–10 mm, lobes 5–6, ovate apex rounded, 2–3 × 1–3 mm. *Fruit* ovoid 7–10 × 5–7 mm, purplish-green becoming pale brown when ripe.

Distribution. Endemic in Papua New Guinea: Western, Chimbu, Eastern, Southern Highlands and West Sepik Provinces.

Ecology. Cloud forest to the subalpine zone, at edge of grasslands, 2,550–3,500 m asl.

Use. Tough stems used as ropes.

Notes. Figure 683 in van Royen (1982) illustrates this distinct montane variety of *Jasminum domatiigerum*. It has the same flower structure and trifoliolate leaves with terminal leaflets twice the size of the laterals as the typical variety but is distinct in its much reduced inflorescences that are sessile or have a peduncle 0.5–1 cm long, have 5–8 flowers or occasionally one-flowered inflorescences in the upper leaf axils; and smaller subcoriaceous leaves with a recurved margin.

If the dwarf habit breeds true and is not a phenotypic response to high altitude conditions, this variety has potential in cultivation as it is attractive in its diminutive habit with crowded leaves and fragrant flowers tinged pink. Its highland habitat may pre-adapt it to being hardy in temperate climates.

New Guinea specimens. PAPUA NEW GUINEA. Goroka *Hoogland & Pullen 5517* (BM, BRI, L, AE), *Paijmans 1303* (L). Kindewah *Kairo & Streimann NGF 35750* (BO, BRI, CANB, L, LAE). Kuaki River *Pullen 292* (CANB, L, LAE). Laiagam *Hoogland & Schodde 7455* (BM, CANB, LAE), 7576 (CANB, LAE). Marafunga *Womersley NGF 24597* (BO, CANB). Mt. Ambua *Frodin NGF 28303* (BO, BRI, CANB, K, L, LAE). Mt. Bli *Henty et al. NGF 41689* (L, LAE). Mt. Giluwe *Coode NGF 32516* (BO, BRI, CANB, K, L, LAE), *Vanderberg et al. NGF 39762* (BO, BRI, K, L, LAE). Mt. Hagen *Womersley NGF 43531* (BRI, L, LAE). Mt. Kajiende *Takeuchi et al. 19581* (K), *19596* (K), *20298* (K). Mt. Wilhelm *Balgooy 384* (CANB, K, L, LAE), *Borgman 221* (L, LAE), *Brass 30126* (CANB, K, LAE), *30628* (L, LAE), *30755* (L, LAE), *Hoogland & Pullen 5722* (BM, BRI, CANB, L, LAE), *Hope ANU 10670* (L), *10692* (L), *Robbins 738* (CANB, LAE), 1175 (L), *Smith ANU 15146* (BRI, CANB, K, L, LAE), *Stauffer 5645* (BRI, CANB, K, L), *Stone LAE 53224* (L, LAE), *Womersley NGF 8890* (LAE). Pengagl Creek *Millar NGF 23203* (BO, K, L, LAE). Tari *Kalkman 4613* (CANB, K, L, LAE), *Vink 16959* (CANB, K, L, LAE). Wabag *Hoogland & Schodde 7096* (BM, LAE), *Robbins 3251* (L).

3. JASMINUM ELONGATUM (Bergius) Willd.

Jasminum elongatum (Bergius) Willd., Sp. Pl. ed. 4 (1797) 37; Green, Kew Bull. 42 (1987) 437. Basionym: *Nyctanthes elongata* Bergius, Phil. Trans. 61 (1772) 289, t.11. Abrev. (Hutton) 13 (1809) 147, t. 4, Fig. 6. — Type: China, Canton, Ekeberg *s.n.*, (Holotype SBT *n.v.*, photo K). Synonyms: *Jasminum aemulum* R.Br., Prodr. (1810) 521; Bentham, Fl. Austral. 4 (1868) 296; Mueller, Pap. Plants 4 (1876) 71; Warburg, Bot. Jahrb. Syst. 13 (1891) 403; White, J. Arn. Arbor. 10 (1929) 259; Kobuski, J. Arn. Arbor 21 (1940) 328; Green, Allertonia 3 (6) (1984) 432, Fig. 15; Kiew, Sandakania 5 (1994) 3. — Type: Australia, Cavern Island, Groote Eylandt, 1803, *Brown 2842* (Lectotype BM, Isolectotype K). *Jasminum aemulum* R.Br. forma *glabrum* Kobuski, J. Arn. Arbor. 21 (1940) 328. — Type: New Guinea *Brass 873* (syntypes A, BRI). *Jasminum bifarium* Wall. ex G.Don, Gen. Syst. 4 (1837) 60; Lingelsheim, Bot. Jahrb. Syst. 61 (1927) 20, Nova Guinea Bot. 14 (1927) 330; Kobuski, J. Arn. Arbor 21 (1940) 329. — Type: Peninsular Malaysia, Penang *Wall. Numer Cat. No. 2866* (Holotype K-W). *Jasminum lancifolium*, Dcne., Herb. Timor Descr. (1835) 76. — Type: Timor *Zippelius s.n*. (Isotype K).

Scrambling shrub or climber, with a series of side branches. *Stem* terete, glabrous or pubescent, sometimes velutinous. *Leaves* unifoliolate, glabrous or pubescent; petioles 0.5–1 cm long; lamina ovate to lanceolate (sometimes narrowly lanceolate), 5–9.5 × 2–4(–6) cm, chartaceous, base rounded to cordate, apex acute to acuminate; venation pinnate with lateral veins slightly ascending, lateral veins conspicuous above, prominent beneath, (2–)3–4(–6) on either side of the midrib; without domatia. *Inflorescences* axillary or terminal, a compact cyme of 3–9 flowers, 1–5.5 cm long, glabrous or velutinous; lower bracts leaf-like, *ca*. 12 × 6 mm, upper bracts linear 7 × 2 mm; pedicels 3–5 mm long. *Flowers* fragrant; *calyx* glabrous or densely pubescent, tube campanulate, 2–3 mm long, teeth 5–7, linear or filiform sometimes curled backwards, 2–3(–7) mm long; *corolla* white, tube 11–25 mm, lobes 6–8, ligulate, 6–15 × 2–3 mm, apex rounded or apiculate; *stamens*: filament *ca*. 1 mm long, anthers narrowly ellipsoid, 2–4 mm long, connective broad, apex apiculate; *ovary* globose, *ca*. 1 mm diam., style *ca*. 3 mm long (short-styled flower), *ca*. 18 mm (long-styled flower), stigma narrowly ellipsoid. *Fruits* bilobed, lobes *ca*. 10 × 7 mm, black when ripe.

Distribution. Bhutan, India, Myanmar, S. China, Indo-China, Thailand, throughout Malesia to North Australia.

Ecology. Open areas from sea level to 830 m asl., including coastal scrub and inner edge of mangrove forest.

Notes. This is the most widespread of any jasmine in Malesia and in West Malesia is common on forest margins and in hedges in disturbed habitats (Kiew, 2020). In New Guinea, judging from the number of collections, although widespread it does not appear to be particularly common.

Jasminum elongatum is variable in leaf size and shape, dimensions of flower parts, and density of hairs from glabrous to tomentose (Kiew, 1994 as *J. aemulum*). This variation is neither correlated with habitat nor with geographic distribution. Forma *glabrum* Kobuski is therefore not recognised as a distinct taxon.

New Guinea specimens. PAPUA NEW GUINEA Bismarck River *Schlechter 18639* (BM, BRI, K, LAE). Bulolo *Womersley NGF 15390* (BRI, BO, CANB, K, L, LAE). Milne Bay Area, Cape Vogel Peninsula *Brass 21888* (CANB, K, L, LAE), *Hoogland 4371* (BM, BO, BRI, CANB, K, L, LAE). Fly River *Brass 8177* (BM, BRI, L). Kiunga Airstrip *Foreman & Katik LAE 5201*1 (K, L, LAE). Koitaki *Carr 12613* (LAE), *12802* (BM, CANB, K, L, LAE). Lae *Streimann LAE 51931* (BO, K, L). Milne Bay *Hoogland 4671* (BM, BRI, CANB, K, L, LAE). Motupore Is. *Hopkins 657* (K), *UPNG 13658* (K). Port Moresby *Brass 873* (BRI), *884* (BRI, K), *Champion 1922* (BRI), *Gebo UPNG 428* (BRI, CANB, L, LAE), *Haylingers 1122* (L), *Womersley NGF 19099* (BO, BRI, K, L, LAE, S), *Womersley NGF 43878* (BRI, CANB, K, L, LAE). Rigo *Heylingers 1759* (CANB), *Levington NGF 36407* (LAE), *Turner s.n.* (BRI). Sepik *Wigkabu & Yefle LAE 70311* (LAE). Sogeri *Schodde 2998* (BRI, CANB, K, L, LAE). Vailala River *Brass 1011* (BRI, K). Waigani *Puisford UPNG 229* (LAE). Watut *Streimann & Kairo NGF 21194* (BO, BRI, CANB, K, L, S).

4. JASMINUM GILGIANUM K.Schum.

Jasminum gilgianum K.Schum., in K. Schumann & K. Lauterbach, Fl. Schütgeb. Südsee 2 (1901) 496; Lingelsheim, Bot. Jahrb. Syst. 61 (1927) 21; Kiew, Sandakania 5 (1994) 6; Green, Kew Bull. 56 (2001) 911. — Type: North East Papua New Guinea, forests in Maijen *Schlechter 17929* 10 July 1908 (Neotype L, Isoneotype A [A00075272], BM, BRI [AQ0048292], K, LAE, selected by Kiew, Sandakania 5 (1994) 6). Synonym – *Jasminum schumannii* Lingelsh., Bot. Jahrb. Syst. 61 (1927) 18; Kobuski, J. Arn. Arbor. 21 (1940) 331; Kiew, Sandakania 5 (1994) 10. — Type: North East Papua New Guinea, Kani Mts. *Schlechter 17754* 22 May 1908 (Lectotype K [K000901543], selected by Kiew, Sandakania 5 (1994) 10).

Vigorous, woody climber, to 10 m long, 5–10 mm thick, sometimes quadrangular, lenticellate, bark of old stems white and corky. *Twigs* densely pubescent. *Leaves* unifoliolate or trifoliolate, glabrous or pubescent; petiole grooved above, 1.2–4 cm long; lamina elliptic–oval to ovate, chartaceous, base rounded or cuneate to cordate, apex acute, acuminate, to apiculate, unifoliolate leaf 9.2–19 × 6–13 cm, terminal leaflet of trifoliolate leaf (7–)9.5–11.5(–15) × 4–7.5 cm, lateral leaflets 5–7.5(–9.5) × 3–4.5 cm; venation pinnate, lateral veins conspicuous above and beneath, 4–8 on either side of the midrib; domatia present. *Inflorescences* axillary and terminal, a many-flowered thyrse, 10–31 cm long, lateral branches opposed, lowest branch three quarters the length of the inflorescence, branches decreasing in length towards the apex, densely tomentose, sometimes with several from a single axil, flowers crowded; lower bracts leaf-like *ca*. 25 × 15 mm long, upper bracts linear 2–4 mm long; pedicels 1–2 mm long. *Flowers* fragrant; *calyx* finely pubescent to tomentose, tube *ca*. 1 mm long, scarcely toothed; *corolla* white or cream, tube 3–8 mm, 1–1.5 mm wide, lobes 4–5, oval or oblong, 1–2 × *ca*. 1 mm, apex rounded to acute; *stamens*: filament *ca.* 1 mm long; anthers narrowly ellipsoid, 2–4 mm long; *ovary* globose, *ca*. 1 mm diam., style 3–6 mm long, stigma narrowly ellipsoid, *ca*. 1 mm long. *Fruits* bi-lobed, lobes sub-globose, 7–10 × 6–9 mm, ripening purple-black.

Distribution. Endemic in Papua New Guinea, East and West New Britain and New Ireland.

Ecology. Rain forest, river side or forest margin, secondary or disturbed forest, 10–2,300 m asl.

Uses. Stems used for making rope.

Notes. The original description of *J. gilgianum* by Schumann in 1901 included both trifoliolate (*Hollrung 524* and *Lauterbach 2750*) and unifoliolate (*Rodatz & Klink 147*) specimens. Lingelsheim (1927) segregated the unifoliolate specimens into a new species, *J. schumannii.* These two taxa are closely similar in having the smallest flowers among the New Guinea species (corolla tube 1–8 mm long and extremely short corolla lobes 1–2 mm long), a large many-flowered thyrse 12–30 cm long, and a large chartaceous lamina with domatia. Within *Jasminum* there are several species that have both

trifoliolate and unifoliolate forms (Green, 2001). Since there are no significant taxonomic characters to separate these two taxa, *J. schumannii* is considered synonymous with *J. gilgianum.*

New Guinea trifoliolate specimens. PAPUA NEW GUINEA Bismarck Mts., *Lauterbach 2750* (*n.v.*). Bulolo *Floyd 7465* (LAE), *Wiakabu & Kauning LAE 70336* (BRI, K, L, LAE), *Womersley & Jones NGF 8813* (BO, BRI, CANB, K, L, LAE), *Womersley & Thorne NGF 12782* (BRI, LAE). Maijen Thor *Schlechter 16320* (K), Maijen *Schlechter 17929* (Lectotype LAE, Isotype BM, BRI, K, L). Boridi *Carr 13462* (BM, CANB, K, L). Usino *Hoogland 5008* (LAE). Wau *Galore NGF 15776* (L, LAE). NEW IRELAND *Millar NGF 23823* (BRI, CANB, K, L, LAE), *Peekel 879a* (BRI).

New Guinea unifoliolate specimens. PAPUA NEW GUINEA. Angabena Ridge *Streimann & Stevens LAE 53980* (K, L, LAE). Bewapi Creek *Womersley NGF 13457* (BRI, CANB, K, L, LAE, S). Boana *Clemens 41718* (K, MICH), *41744* (K, MICH). Bubia *Takeuchi & Ama 15316* (K), *16303* (K). Buso River *Katik & Larivita LAE 62050* (BRI, K, L, LAE). Fly River *Brass 6980* (BRI, L). Galumbu *Clemens 41259* (K, MICH). Garaina *Millar NGF 22674* (BRI, CANB, K, L, LAE). Gwabadik *Takeuchi 9043* (K). Huon Peninsula *Hoogland 8922* (CANB, L, LAE). Kainantu *Wheeler ANU 5567* (LAE). Kapau River *Schodde 4651* (CANB). Kipu *Streimann NGF 45065* (BO, BRI, CANB, K, LAE). Lae *Hartley TGH 10161* (LAE), *TGH 11781* (BRI, CANB, K, L, LAE). Okapa *Brass 31606* (CANB, L, LAE), *Coode NGF 29919*, *Hartley TGH 13183* (CANB, LAE). Oomsis *Brass 29215* (L). Markham River *Floyd 5524* (BM, BO, BRI, CANB, L, LAE). Menyamya *Streiman & Kairo NGF 44542* (BRI, LAE). Milne Bay *Brass 22053* (CANB, K, L, LAE). Mt. Airu *Wiakabu LAE 50533* (K). Mt. Michael *Brass 31159* (CANB, K, L, LAE). Rani Mts. *Schlechter 17754* (K). Sattelberg *Clemens 8288* (L). Taraka *Takeuchi & Ama 17924* (K), *17931* (K). Tufi *Womersley & Katik NGF 43974* (BRI, CANB, L, LAE). Tusambu River *Henty NGF 14773* (CANB, L, LAE). Wau *Hartley TGH 12318* (BRI, CANB, L, LAE), *Womersley & Millar NGF 7879* (LAE). NEW BRITAIN *Henty NGF 27186* (BRI, CANB, L, LAE), *Sayers NGF 24230* (BO, CANB, K, L, LAE).

5. JASMINUM MAGNIFICUM Lingelsh.

Jasminum magnificum Lingelsh., Bot. Jahrb. Syst. Syst. 61 (1927) 21; Kobuski, J. Arn. Arbor. 21 (1940) 330. Kiew, Sandakania 5 (1994) 8. — Type: North East Papua New Guinea, Djamu (Madang) *Schlechter 16568* 12 Sept 1907 (Lectotype L [L0005361], Isolectotype A [A00021475], K [K000901539], selected by Kiew, Sandakania 5 (1994) 8).

Scrambling glabrous shrub. *Stem* terete, drying pale brown. *Leaves* unifoliolate; petioles 1–1.5 cm long; lamina ovate-elliptic, 9.5–13 × 5–6 cm, chartaceous, base rounded, apex acuminate; venation pinnate, lateral veins 5–7 on either side of the midrib, lowest pair ascending less than halfway, prominent above and beneath; without domatia. *Inflorescences* axillary and terminal, a lax dichasium with 3–7 flowers, 3–8.5 cm long; bracts acute, *ca*. 2 mm long; pedicels 20–25 mm long. *Flowers*: *calyx* tube campanulate, *ca*. 5 mm long, *ca*. 5 mm wide, teeth 4–5, 1–2 mm long; *corolla* tube *ca*. 15 mm, *ca*. 3 mm wide, lobes 6–9, thin (not fleshy), 20–35 × 4–6 mm, apex attenuate. *Fruit* unknown.

Distribution. Endemic in Papua New Guinea (Madang).

Ecology. Forest 300 m asl.

Notes. Collected in 1907, it is one of the rarest of all the New Guinea jasmines being known only from the type locality. In common with *Jasminum turneri,* in its exceptionally long pedicels and corolla lobes, it exhibits characters of the hawk-moth pollination syndrome. However, its flowers differ from those of *J. turneri* in its broad corolla lobes 20–35 × 4–6 mm. All other New Guinea jasmines have corolla lobes 1–2(–3) mm wide. Among Malesian species, only *J. crassifolium* Blume from the Philippines, Borneo, Sumatra, Java and N Sulawesi has large, broad corolla lobes. *Jasminum magnificum* differs from *J. crassifolium* in the texture of the leaves (chartaceous, not thickly coriaceous) and corolla lobes (thin, 4–6 mm wide with an attenuate apex, not thick and fleshy, 6–10 mm wide with a rotund apex as in *J. crassifolium*).

6. JASMINUM PAPUASICUM Lingelsh.

Jasminum papuasicum Lingelsh., Bot. Jahrb. Syst. 61 (1927) 19; Kobuski, J. Arn. Arbor. 21 (1940) 330; Kiew, Sandakania 5 (1994) 9. — Type: NE Papaua New Guinea, Waube River *Schlechter 19434* 21 Nov 1907 (Lectotype L, Isolectotype BM, K [K000901541], LAE, S, US, selected by Kiew, Sandakania 5 (1994) 9). Synonym: *Jasminum roseo-album* Lingelsh. Bot. Jahrb. Syst. 61 (1927) 19. — Type: NE Papua New Guinea, April River *Ledermann 9625* 12 Nov 1912 (presumed lost in fire at B; duplicates not found B.E. Leuenberger, *pers. comm*. 30 May 1994).

Scandent shrub, to 2 m long. *Stem* terete with white bark. *Leaves* unifoliolate; petioles glabrous or pubescent, 0.3–2 cm long; lamina ovate, 4.2–10 × 2.7–4.5 cm, subcoriaceous, glabrous, base rounded, apex attenuate to acuminate; venation pinnate, lateral veins just visible above, obscure beneath, 3–7 on either side of the midrib. *Inflorescences* axillary and terminal, a dichasium with *ca*. 9 flowers, 1.5–4.5 cm long, glabrous; lower bracts leaf-like, *ca*. 1.2 × 2 mm long, upper bracts linear, *ca*. 5 mm long; pedicels 5–7 mm long. *Flowers* fragrant; *calyx* glabrous, tube campanulate, 1–3 mm long, teeth 4–5, straight, erect or diverging at 45° from corolla tube, 3–8 mm long; *corolla* white, deep reddish purple outside, tube 14–20 mm, *ca*. 2.5 mm wide, lobes 5–8, linear 10–15 × 2–4 mm, apex acuminate; *stamens*: anthers sessile, narrowly ellipsoid, *ca*. 3 mm long; *ovary* globose, *ca*. 1 mm diam., style to 18 mm long. *Fruits* bilobed, lobes *ca*. 10 × 5 mm, purplish brown.

Distribution. Endemic in Papua New Guinea, including Manus Island.

Ecology. Primary and secondary forest, also in savannah vegetation, 25–1,300 m asl.

Notes. *Jasminum roseo-album* is similar to *J. papuasicum* in leaf, inflorescence and flower characters. Lingelsheim (1927) distinguished *J. roseo-album* from *J. papuasicum* by its longer calyx lobes (5–8 mm *vs*. 2–5 mm in *J. papuasicum*), longer corolla lobes (10 mm *vs*. 15 mm long) and the presence of leaf-like bracts in *J. roseo-album*. However, as more specimens are available for examination, specimens intermediate in these characters demonstrate that these two taxa are not distinct. *Jasminum roseo-album* was described from a single specimen (*Ledermann 9625*) that is presumed destroyed in Berlin and duplicates have not been located in other herbaria so *J. papuasicum* is chosen as the name for this taxon because its type is still extant and *J. roseo-album* becomes a synonym.

From Lingelsheim's description, *J. roseo-album* had reddish flowers (presumably referring to the outer surface of the corolla), hence the specific epithet. The flowers of *J. papuasicum* are also deep reddish purple outside. The flowers are especially striking and would make it an attractive jasmine in cultivation. Flowers of several other species are pinkish or rosy-purple in bud, such as *J. domatiigerum.*

The *Brass 8672* and *8682* specimens from the Wassi Kuassa River determined by Kobuski (1940) as *J. papuasicum* in fact belong to *J. simplicifolium*.

New Guinea specimens. PAPUA NEW GUINEA. Gati Mt. *Schlechter 16865* (BM, BRI, K, L). Abau *Kanis 1014* (CANB, K, L, LAE). Boridi *Carr 13457* (BM, K, L, LAE), *16345* (K). Kiunga *Streiman et al. LAE 51873* (L, LAE). Koitaki *Carr 12742* (BM, K, L, LAE). Markham River *Harley TGH 10216* (LAE). Menyamya *Streiman & Stevens LAE 53918* (BRI, CANB, K, L, LAE). Mori River *Pullen 8215* (CANB, L, LAE).

7. JASMINUM PIPOLYI Takeuchi

Jasminum pipolyi Takeuchi, Sida, 18(4) (1999) 948, Fig. 3. — Type: Papua New Guinea, Border of Chimbu and Gulf Provinces, Crater Mountain Wildlife Management Area, *Takeuchi 11866* 23 Mar 1997 (Holotype LAE, Isotype A, K [K000224287], L [L0538662], NY). Synonym: *J. didymum* G. Forst. subsp. *didymum auct non*: Green, Kew Bull. 56 (2001) 905.

Sprawling or shrubby or scandent climber, with a series of side branches. *Stem* glabrous, terete. *Leaves* trifoliolate (rarely unifoliolate), glabrous; petioles plane above, 1.2–2.3 cm long; laminas coriaceous, base cuneate or rounded, margin reflexed, apex gradually acuminate, terminal leaflet or unifoliolate lamina elliptic, 8–12 × 2.5–5 cm; lateral leaflets generally lanceolate, 6.5–9 × 1.75–3 cm; venation pinnate with lateral veins slightly ascending, midrib impressed above, prominent beneath, lateral veins plane or prominent, 5–8 on either side of the midrib; domatia present. *Inflorescences* axillary and terminal, cymose monochasial or more often dichasial, to 17 cm long; bracts linear, to 6.5 mm long; pedicels 4–7 mm long. *Flowers*: *calyx* glabrous, tube campanulate, 2–3 mm long, to 2.5 mm wide, teeth 5–6, obscurely filiform, 0.2–1 mm long; *corolla* white, tube *ca.* 10 mm, *ca.* 2 mm wide, lobes (4–) 5, elliptic-oblong, 6–8 × 3–5 mm, apex mucronulate; *stamens* 2–3, filament *ca.* 0.5 mm long, (short-styled flower); anthers ellipsoid, *ca.* 3.5 mm long; *ovary* globose, *ca.* 1 mm diam., glabrous, style *ca.* 0.5 mm long (short-styled flower), stigma punctiliform. *Fruits* bi- or tri-lobed, lobes globose, 31–35 mm diam., waxy white suffused with green mottling.

Distribution. Endemic in Papua New Guinea, known only from the type locality, Crater Mountain Wildlife Management Area.

Ecology. Locally common on forest margins and along stream banks but also in closed forest.

Notes. *Jasminum pipolyi* is remarkable among Malesian jasmines for its exceptionally large, waxy white fruits. Most jasmines have fruits about 10 mm long. In addition, very few species have fruits that ripen waxy white as opposed to deep purple or black, for example, of the 18 species in Peninsular Malaysia only two, *J. decussatum* Wall. *ex* G.Don and *J. longipetalum* King & Gamble, have white fruits. Green (2001) was clearly mistaken in synonymising this species with *J. didymum* with which it shares nothing in common except the trifoliolate leaves.

Possession of two stamens is characteristic of the family. It is very rare to find the occasional jasmine flower with three stamens as in this species, but it has also been observed in *J. carissoides* Kerr (Kiew, 2020). Takeuchi (1999) also observed trilobed fruits, which he noted as aberrant. He considered the leaf that crinkled along veins when dry as characteristic of this species, but this appears to be an artefact of the drying process.

8. JASMINUM RUPESTRE Blume (Fig. 1d)

Jasminum rupestre Blume, Mus. Bot. Lugd.-Bat. 1 (1850) 280; Miquel, Fl. Ned. Ind. 2 (1856) 531. — Type: New Guinea, *Zippelius 216/6*. (holo L, 908.158…850; iso A [A00112237]). var. *contractum* Blume, Mus. Bot. Lugd.-Bat. 1 (1850) 280. — Type: New Guinea, *Zippelius s.n*. (Holotype L, 908.158…852; Isotype A [A00112238], GH [GH00011238]). Synonym: *J. didymum* G.Forst. subsp. *didymum auct non*: Green, Kew Bull. 56 (2001) 905.

Climber. *Twigs* terete, subpuberulus. *Leaf* trifoliolate; petiole 8–10 mm, apical petiolule 0.5–7 mm, lateral petiolule 1–2 mm; leaflets coriaceous, glabrous, narrowly lanceolate, base rounded, apex mucronate, basal pair of veins ascending three quarters of lamina length before joining *ca.* 2 pairs lateral veins at the margin, terminal leaflet 8–10 × 1.5–2 cm, lateral leaflets 5.5–8 × 1–1.5 cm. *Inflorescences* terminal and axillary, lax many-flowered thyrse, 1.5–6 or 14–16 cm long, bracts linear 1–5 mm long, pedicels 1.5–5 mm. *Flower*: *calyx* cupulate, puberulous, teeth acute; *corolla* tube 8–10 mm long, lobes 4–7. *Fruit* not known.

Distribution. PAPUA – South and South West New Guinea (van Steenis-Kruseman, 1950).

Note. Green (2001) listed *Jasminum rupestre* as a synonym of *J. didymum.* It is similar to *J. didymum* in the trifoliolate leaf, lamina texture, absence of domatia, inflorescence, calyx and corolla shape and lobe size. However, leaflet shape, size and venation (Fig. 1) are strikingly different from subspecies of *J. didymum* in being narrow, five times longer than broad, with a mucronate apex (Fig. 1d) and in its slightly longer corolla tube (8–10 mm *vs.* 5–8 mm long). It is therefore taken out of synonomy with *J. didymum* and treated as a distinct species as no other Malesian or Australian species has this leaf form.

The two specimens identified by Blume (1850) as this species display a great difference in inflorescence length: the typical variety has inflorescences 14–16 cm long, and the one specimen he labelled *J. rupestre* var. *contractum* has inflorescences 1.5–6 cm long. Unfortunately the specimen labels provide no data as to the precise locality where they were collected and the area from where Zip(p)elius collected this taxon is little known. No other specimens have since been collected. Until more material becomes available and the variation within this taxon is understood, differences at subspecific rank are not recognised and var. *contractum* is treated as a synonym.

9. JASMINUM SIMPLICIFOLIUM G.Forst.

Jasminum simplicifolium G.Forst., Fl. Ins. Austr. Prodr. (1786) 3; Green, Allertonia, 3 (6) (1984) 419. — Type: ‘Amicorum Insulae’ [Tonga *Forster s.n.* (Isotype K [K000901589]). Synonym: *Jasminum volubile* Jacq., Pl. Hort. Schoenbr. 3 (‘1798’) 39, t. 321; Green, J. Arn. Arbor. 43 (1962) 119. — Type: not traced.

subsp. *australiense* P.S.Green, Allertonia 3 (1984) 419, Fig. c-d; Kiew, Sandakania 5 (1994) 10. — Type: Australia, Queensland *Speck 1924* 28 Oct 1963 (Holotype K [K000901574], Isotype BRI, CANB, MEL).

Shrub or climber to 1 m tall. *Stem* terete, slender, glabrous. *Leaves* unifoliolate; petioles 0.7 –1.2 cm long; lamina ovate, 5–9.5 × 2.5–5 cm, chartaceous, glabrous, base rounded, sometimes attenuate, apex acute; venation pinnate, lateral veins 3–5 on either side of the midrib, lower pair ascending, conspicuous above and beneath; domatia present. *Inflorescences* axillary and terminal, a thyrse terminating in cymules, 2.5–5 cm long, glabrous; bracts apiculate, *ca.* 1 mm long; pedicels 6–12 mm long. *Flowers* fragrant; *calyx* tube campanulate, 2–3 mm long, with minute teeth less 1 mm long or teeth absent; *corolla* white, tube 10–15 mm, lobes 5–6, ligulate narrowing to an acuminate apex, 6–9 × 2–3 mm; *stamens*: filament *ca.* 1 mm long; anthers narrowly ellipsoid, 2–4 mm long; *ovary* globose, *ca.* 1 mm diam., style 8–13 mm long, stigma narrowly

ellipsoid, *ca.* 2–3 mm. *Fruits* bilobed, lobes more or less globose, 7–11 × 5–11 mm, ripening black.

Distribution. Australia, Papua New Guinea (Western and Morobe Provinces), Lord Howe Island and Norfolk Island.

Ecology. Monsoon forest in savannah areas, grassland and river edge, below 100 m.

Notes. Only subsp. *australiense* occurs in New Guinea where it is restricted to open areas such as grassland (*NGF 19689*), monsoon forest (*NGF 12223*) or river edge (*NGF 35881*). It is not found in rain forest.

New Guinea specimens. PAPUA NEW GUINEA Markham River *Hartley TGH 10216* (L), *TGH 12223* (BRI, K). Menamya *Streiman & Kairo NGF 35881* (BO, K). Nadzab *Sayers NGF 19689* (BO, BRI, K). *van Royen NGF 16489* (K). Wassi Kuasa River *Brass 8672* (BRI, K, L), *8682* (BM, BRI).

10. JASMINUM TURNERI C.T.White

Jasminum turneri C.T.White, Proc. Linn. Soc. New South Wales 51 (1926) 297, t. 17, J. Arn. Arbor. 10 (1929) 259; Kobuski, J. Arn. Arbor. 21 (1940) 332; Kiew, Sandakania 5 (1994) 12. — Type: Papua New Guinea, Rigo. *Turner s.n.,* 1 January 1924 (Holotype BRI [BRI-AQ0279445], Isotype K [K000901538]). Synonym: *Jasminum pseudanastomosans* Lingelsh., Bot. Jahrb. Syst. 61 (1927) 20, Nova Guinea Bot. 14 (1927) 330, t. 39. — Type: NE Papua New Guinea, near Djamu-Klamm *Schlechter 16601* 30 Sept 1907 (Lectotype LAE, Isolectotype A, BM, BRI, K [K000901537], L, S, here selected). *Jasminum longipetalum auct non* King: Green, Allertonia 3 (6) (1984) 427, Fig. 14C&D.

Slender climber to 5 m tall, or a scandent shrub. *Stem* terete, glabrous. *Leaves* unifoliolate, glabrous; petioles 0.2–0.8 cm long; lamina lanceolate to elliptic, 6–15 × 3.5–6.5 cm, to narrowly elliptic, 7.5–10 × 2–3 cm, membraneous to subcoriaceous, base rounded or attenuate, apex acute, acuminate to caudate; venation pinnate with lowest pair ascending parallel to margin, lateral veins 2–3 on either side of the midrib, tertiary venation conspicuous beneath; without domatia. *Inflorescences* terminal (sometimes axillary), with (2–4)5–7 flowers, a lax dichasium, either sessile or with a peduncle 1–4(–8) cm long, glabrous; bracts minute *ca.* 1 mm long; pedicels slender, 20–30(–45) mm long. *Flowers* fragrant; *calyx* glabrous, tube campanulate, *ca.* 2 mm long, teeth 4–6, 1–2 mm long; *corolla* white, buds pinkish outside, tube (10–)13–20 mm, slender *ca.* 2 mm wide, lobes 8–12, narrowly linear, ligulate, 16–25(–45) × 1–2 mm, apex attenuate to acute; *stamens*: anthers oblong lanceolate, 3–4 mm long; *ovary* globose, *ca.* 1 mm diam., glabrous, style slender *ca.* 13 mm long, stigma narrowly ellipsoid, *ca.* 3 mm long. *Fruits* bilobed, lobes 10–19 × 10–17 mm, drying black.

Distribution. Papua New Guinea, and according to Green (1984a), known from two collections from Australia (Cook District in Queensland and Darwin and Gulf District in Northern Territory).

Ecology. Open areas, such as edge of lakes or rivers, grassland or rain forest, from sea level to 1,300 m.

Notes. This is a most distinctive species quite unlike other New Guinea species in its exceptionally long, slender pedicels and star-like flowers with very long narrow corolla lobes. The distinctive flower with long pedicels and long narrow corolla lobes led it to being confused with *J. longipetalum* King & Gamble from Peninsular Malaysia (Green, 1984a). White (1926) had drawn attention to its similarity to *J. dolichopetalum* Merr. from the Philippines that also has flowers with many, exceptionally long narrow corolla lobes, long slender pedicels and leaves with a pair of ascending lateral veins. However, *Jasminum dolichopetalum* is a different species with narrower leaves 1.5–3 cm wide (not 3.7–6 cm as in *J. turneri*) and the inflorescence with 2–4 flowers (not 5–7 flowers); while *J. longipetalum* is also different in its longer calyx teeth, 1.5–3 mm long, and longer corolla tube, 18–23 mm long, compared with calyx teeth to 1 mm and a corolla tube 10–20 mm long in *J. turneri*. The similarity between these unrelated species is postulated to be due to their being adapted to hawk-moth pollination (Kiew, 2020), although there are as yet no observations to support this.

New Guinea specimens. PAPUA NEW GUINEA Aitapa *Darbyshire & Hoogland 8063* (BM, BO, BRI, CANB, K, L, LAE, S). Bulolo *Rau 192* (K). Fife Bay *Turner 115* (BM, BRI). Fly River *Brass 8000* (BM, BRI, K, LAE). Jimi Subprov. *Kerenga & Landsberg LAE 56778* (K). Lae *Sayers NGF 19689* (LAE). Mamberamo River *Thomsen 857* (L), *Turner s.n.* (K). Markam River *Harley TGH 12223* (L, LAE). Menyamya *Streiman & Kairo NGF 35881* (CANB, L, LAE, S). Milne Bay *Frodin UPNG 964* (L, LAE). Port Morseby *Brass 880* (BRI), *Pullen 3685* (CANB, L, LAE), *Womersley NGF 19113* (BRI, CANB, K, L, LAE, S). Rigo *Streiman & Kairo NGF 30795*

(BO, BRI, K, L, LAE). Sitipa River *Takeuchi 6668* (K); Suba *Takeuchi 6678* (K). NORMANBY IS. *Brass 25491* (L, PNH).

Excluded Species

Jasminum nitidum Skan, Bull. Misc. Infor. Kew (1898) 225; Schumann & Lauterbach, Nachtr. Fl. Schützgeb. Südsee (1905) 348; Lingelsheim, Bot. Jahrb. Syst. 61 (1927) 20. —Type: Cultivated Chelsea, W. Bull & Son *s.n*. (Holotype K [K000691512]).

The original description attributed this species to the Admiralty Islands, although Lingelsheim (1927) considered this doubtful. Nothing resembling this species has been collected from New Guinea and neighbouring islands. Green (1984b) has concluded that *Jasminum nitidum* is in fact a form of *J. laurifolium* Roxb., a species that is native in Assam and Bangladesh.

2. LIGUSTRUM

Ligustrum L., with about 40 species, is a genus of shrubs or small trees with greatest diversity in temperate Asia and a geographical range from Europe to Japan and south through Malesia (7 species) to Australia (Kiew, 1978). It is readily distinguished from other New Guinea Oleaceae by its habit (shrub or small tree) and terminal inflorescences. Three species are recorded from New Guinea, two of which are endemic. One, *Ligustrum glomeratum*, is widespread from Southern Thailand throughout Malesia to New Guinea; *L. novoguineense* is more common and is endemic in New Guinea (both in Indonesian New Guinea and Papua New Guinea) and the third is a new species, known from two localities in Papua New Guinea, which is described here. All three species shun the deep shade of rain forest but instead are found in open forest, on forest margins, in secondary vegetation or regrowth or in open grassland.

LIGUSTRUM L.

Ligustrum L., Sp. Pl. 1 (1753) 7; Blume, Mus. Bot. Lugd. Bat.1 (1850) 311; Knoblauch *in* Engler & Prantl, Nat. Pflanzenf. IV, 2 (1895) 13; Lingelsheim, Bot. Jahrb. 61 (1927) 15; Backer & Bakhuizen *f*., Flora Java 2 (1965) 215; Kiew, Blumea 24 (1978) 143, Tree Flora Sabah & Sarawak 4 (2002) 159; Green in Kadereit (ed), Fam. Gen. Vasc. Pl. 7 (2004) 302.

Shrubs or small trees. Young twigs hairy or glabrous. *Leaves* simple and entire, elliptic to more or less ovate, rarely linear. *Inflorescences* terminal, sometimes also axillary, paniculate, usually hairy, bracts foliaceous, caducous. *Flowers* bisexual, to 8 mm long; pedicel short or flower subsessile; *calyx* shortly tubular with 4 small teeth, persistent; *corolla* glabrous, tubular with 4 lobes as long as or longer than tube, lobes oval to lanceolate, induplo-valvate in bud, opening more or less horizontally, white or yellow; *stamens* with thin filaments, anthers elliptic-elongate, projecting beyond corolla tube; *ovary* globose, 2–locular, style 1–2 mm long, projecting beyond calyx after the corolla has fallen, stigma shortly bifid; ovules 2 per locule. *Fruit* fleshy, ripening dark purple or black, drupaceous, ellipsoid to subglobose, to 1 cm long. *Seeds* 1 to 3, endosperm bony.

Distribution. About 40 species, the majority in temperate Asia, extending into Europe, and through Malesia to Australia. Three species recorded from New Guinea, of which two are endemic.

Ecology. Usually in open places in the lowlands, sometimes in montane forest. *Ligustrum novoguineense* has been more commonly collected and is more often recorded from forest margins, while *L. glomeratum* appears to be found more often in open habitats like regrowth or grassland. Both species occur over a wide altitudinal range from the lowlands to above 1,800 m asl.

Note. Leaf size is variable and although the extreme sizes separate *L. glomeratum* and *L. novoguineense* there is much overlap between them. In *Ligustrum,* inflorescence characters, *e.g.* length from lowest branch to apex and especially length of lowest branches, are reliable (Table 3). Fruit size and shape depends on fruit ripeness

Key to *Ligustrum* species

1a. Lamina to 3.5 cm long. Inflorescence 2–5 cm long with lowest branch to 2 cm long ……...……..... 3. *L. parvifolium*

1b. Lamina more than 6 cm long. Inflorescence 5–17 cm long with lowest branch 1.5–10 cm long ……...……..... 2

2a. Flowers closely packed together, sessile or occasionally pedicel to 0.5 mm long. Lamina 6–7 × 2–3 cm. Inflorescences 4.5–8.5 cm long, lowest branch 1.5–3 cm long, a third length of the inflorescence …….... 1. *L. glomeratum*

2b. Flowers well-spaced, pedicel 1–3 mm long. Lamina 7–15 × 3–6.5 cm. Inflorescence 5–17 cm long, lowest branch 5–10 cm long, more than half or the same length as the inflorescence …… 2. *L. novoguineense*

Table 3. Comparison of diagnostic characters of New Guinea *Ligustrum* species.

Species character	*L. novoguineensis*	*L. glomeratum*	*L. parvifolium*
Inflorescence length[1] (cm)	5–17	4.5–8.5	2–5
Length lowest branch (cm)	5–10	1.5–3	0.7–2
Pedicel (mm)	1–3	Sessile to 0.5	Subsessile to 2
Lamina size (cm)	7–15 × 3–6.5	6–7 × 2–3	1.5–3.2 × 0.9–1.3
Fruit, shape and size (mm)	Ellipsoid 7–8 × 4–5	Globose *ca.*7.5 × 7.5	Subglobose *ca.* 5.5 × 4.5

[1] measured from lowest branch to apex

1. LIGUSTRUM GLOMERATUM Blume

Ligustrum glomeratum Blume, Mus. Bot. Lugd. Bat. 1 (1850) 314; Backer & Bakhuizen *f.*, Fl. Java 2 (1965) 215; Steenis, Mountain Fl. Java (1972) pl. 30-8, Kiew, Blumea 24 (1978) 147, Tree Fl. Sabah & Sarawak 4 (2002) 159, Fig. 6. — Type: Indonesia, Java *Blume 945* (Lectotype L [L0005371]). Synonym: *Ligustrum undulatum* Blume, Mus. Bot. Lugd. Bat. 1 (1850) 314; Lingelsheim, Bot. Jahrb. 61 (1927) 16. — Type: Indonesian New Guinea, *Herb. Zippelius s.n.* (L).

Shrub *ca.* 2 m to small tree to 15 m tall, bole to 5 m tall and 8 cm diam. Twigs slender, pale brown, densely hairy near apex, lenticellate. *Leaf*: petiole slender, 0.45–1.2 cm long, glabrous; lamina ovate-lanceolate to oblong elliptic, glabrous, glossy above, 6–7 × 2–3 cm, membranous to subcoriacous, base cuneate to decurrent, sometimes rounded, margin not recurved, apex acuminate to cuspidate (rarely obtuse), midrib impressed above, beneath glabrous or densely hairy; lateral veins 6–7 on either side of the midrib, minutely raised above and beneath. *Inflorescence* axillary and terminal panicle 4.5–8.5 cm long, with 5–7 tiers of branches, lowest branch 1.5–3 cm long, branches decreasing in length towards the apex, spreading, ascending or perpendicular to rachis with second order branching, peduncle 2.5–5 cm long, main axis pubescent to villous. *Flowers* crowded at the tips of the branches, mature buds 2–2.5 mm long, subsessile or pedicel to 0.5 mm long, sweetly scented. *Calyx* scarcely lobed, tube *ca.* 1 mm long, glabrous, lobes shallowly acute. *Corolla* white or yellow, 2–4 mm long, tube *ca.* 1 mm long. *Stamens* with filaments 1–2 mm long, anthers at anthesis projecting beyond the corolla tube. *Ovary* globose, less than 1 mm long, glabrous, style 1–2 mm long. *Fruit* globose, *ca.* 7.5 mm diam., pericarp fleshy, ripening dark purple, tasting bitter sweet, stalk 2–5 mm long.

Distribution. Widespread, from Southern Thailand, throughout Malesia to New Guinea.

Ecology. Primary and secondary forest or in open places from lowlands to 2,650 m on mossy ridges.

Etymology. Latin, *glomeratum* = collected closely together in a head, referring to the crowded flowers at the tips of the branches.

New Guinea specimens. PAPUA NEW GUINEA. Boridi *Carr 41780* (CANB, LAE), *Foreman LAE 60043* (BRI, K, LAE). Bulolo *Hartley 10895* (BRI, CANB, K, LAE), *Katik et al. LAE 74802* (K), *Streimann & Havel NGF 21013* (BRI, CANB, K, L), *Womersley NGF 15386* (K, LAE). Chuave *Womersley NGF 14120* (A, CANB, K, L, LAE). Mumeng *Miller & Dockrill NGF 12056* (BRI, CANB, K, L). Port Morseby *Isles & Vinas NGF 32424* (BRI, L, LAE). INDONESIAN NEW GUINEA. *Zippelius s.n.* (L). Vogelkop *van Royen & Sleumer 6705* (A, K, L).

Notes. The most widespread Malesian species, apparently ecologically adaptable as it not only grows over a wide elevation but is also able to thrive in drier conditions in open areas and secondary forests.

2. LIGUSTRUM NOVOGUINEENSE Lingelsh.

Ligustrum novoguineense Lingelsh., Bot. Jahrb. 62 (1927) 15; Kiew, Blumea 24 (1978) 148. — Type: North East New Guinea, banks of Saki. *Schlechter 18286*, 25 September 1908 (A, B (presumed destroyed), BM, BRI [BRI-AQ0360797], K [K000196830], L, S).

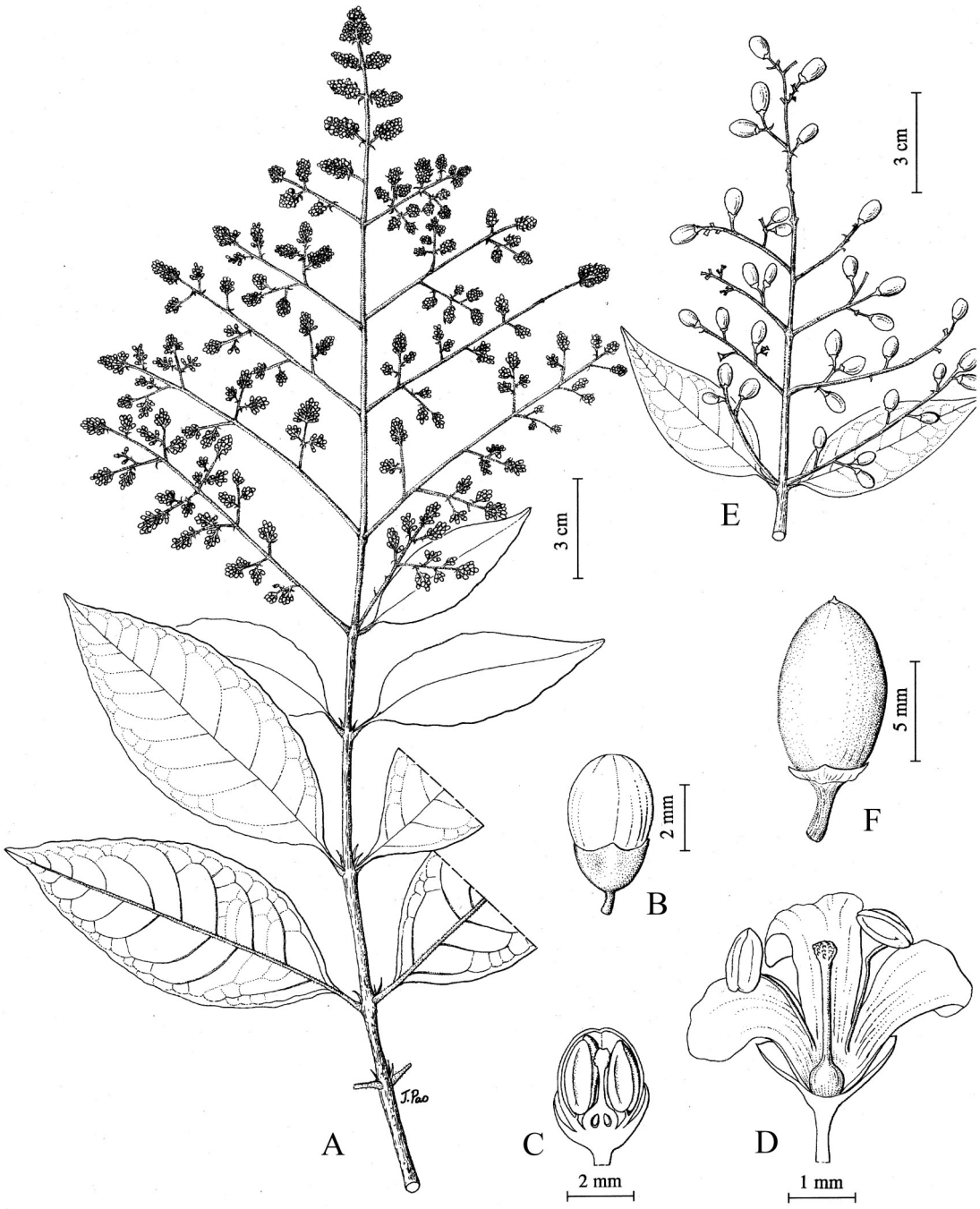

Fig. 2. *Ligustrum glomeratum* Blume. A. Flowering leafy twig. B. Flower bud. C. Longitudinal section of flower bud. D. Longitudinal section of flower with one corolla lobe removed. E. Infructescence. F. Fruit (A–D from *SAN 123276*, E–F from *SAN 124962*). Reproduced with permission from the *Tree Flora of Sabah and Sarawak* 4 (2002) 160.

Shrub to small tree to 12 m tall. *Twigs* slender, drying pale brown, lenticellate, glabrous. *Leaf*: petiole 0.5–1.5 cm long; lamina elliptic-lanceolate, glabrous, 7–15 × 3–6.5 cm, membranous to subcoriacous, dark green above, much paler beneath, base cuneate to sometimes rounded, margin not recurved, apex acuminate, midrib slightly impressed above; lateral veins 5–9 on either side of the midrib, minutely raised above and beneath. *Inflorescence* axillary and terminal panicle, 5–17 cm long, with 7–9 tiers of branches, lowest branch 5–10 cm long, upper branches decreasing in length, spreading ascending or perpendicular to rachis with second order branching, peduncle 3.5–4.5 cm long, main axis glabrous to minutely pubescent. *Flower* buds 1–1.5 mm long, widely spaced; pedicel (1–)2(–3) mm long, sweetly scented. *Calyx* scarcely lobed, tube *ca.* 1 mm long. *Corolla* white, 2–4 mm long. *Stamens* with filaments 1 mm long, anthers *ca.* 1 mm long, at anthesis scarcely projecting beyond the corolla tube. *Ovary* globose. *Fruit* ellipsoid, 7–8 × 4–5 mm; stalk 3–5 mm long.

Distribution. Endemic in New Guinea, both in Indonesian New Guinea and Papua New Guinea.

Ecology. Primary forest, lowlands to *Castanopsis*-oak forests, lowlands to 1,400 m asl.

Etymology. Of New Guinea.

New Guinea specimens. PAPUA NEW GUINEA. Bornguinea River *Brass 1623* (A, BRI, K). Boridi *Carr 14656* (CANB, K, L), *Carr 14780* (K). Bulolo *Floyd 5253* (A, BM, BRI, CANB, K, LAE), *Fryer 3964* (A, BM, CANB, K, L, LAE), *Fryer 3965* (A, BRI, CANB, K, LAE), *Havel NGF 17300* (BRI, K, CANB, LAE), *Millar NGF 14475* (K), *Vinas 242* (K), *Womersley & Ingle NGF 37206* (BRI, K, LAE). Domara *Brass 1663* (A, BRI, K). Hovea/Evi Divide *Carr 13595* (CANB, K, LAE). Kassan *Brass 32426* (A, CANB, K, L, LAE), *Coode NGF 32691* (CANB, K, BRI), Modeni *Cruttwell 643* (K, L). Nawandowan *Cruttwell 942* (K, LAE). Saki *Schlechter 18286* (BM, BRI, K, L), Umi River *Brass 32518* (A, CANB, K, L, LAE), *Millar & van Royen NGF 15636* (BRI, CANB, K, L, LAE). Wau *Streiman NGF 44595* (BRI, L, K, L, LAE). INDONESIAN NEW GUINEA. Manokwari *Johns 8313* (K), *Sands 6603* (K), *Sands 6576* (K).

Notes. Many specimen labels note the strong fragrance that is typical of privet (*Ligustrum* spp.). However, there are no observations of potential pollinators. Compared with the widespread *L. glomeratum* that grows in more open places or secondary forest, *L. novoguineese* occurs in forest. Apart from having larger leaves and inflorescences, although with some overlap in size (Table 3), *L. novoguineense* is immediately distinct in its longer pedicels and well-spaced flowers that reliably separate it from *L. glomeratum* with crowded, sessile flowers.

3. **Ligustrum parvifolium** Kiew*, spec. nov.* — TYPE: PAPUA NEW GUINEA, Nawandowan Gorge, *Cruttwell 783,* 23 June 1956 (Holotype K).

It most resembles *Ligustrum glomeratum* in its shorter inflorescence with short lower branches and crowded, sessile or shortly stalked flowers but it is clearly different from *L. glomeratum* in its smaller leaves (1.5–3.2 cm long *vs.* 6–7 cm in *L. glomeratum*), and shorter inflorescences (2–5 cm long *vs.* 4.5–8.5 cm) with short side branches (0.7–2 cm *vs.* 1.5–3 cm).

Shrub 2–3 m tall, much branched. Bark light brown, flakey. Twigs slender, drying fawn, lenticellate, minutely pubescent. *Leaf*: petiole slender, 0.2–0.5 cm long, minutely pubescent; lamina ovate or elliptic, 1.5–3.2 × 0.9–1.3 cm, subcoriacous, base slightly rounded to cuneate, margin strongly recurved, apex acute, tip apiculate to rounded, drying brown above, slightly paler beneath; midrib impressed above, prominent and densely pubescence beneath, lateral veins *ca.* 4 on either side of the midrib, plane or slightly impressed above and prominent beneath. *Inflorescence* terminal on side branches, panicle 2–5 cm long with 3–5 tiers of branches, lowest branch 0.7–2 cm long, ascending, branched once, densely and minutely pubescent; peduncle lacking. *Flowers* crowded at the tips of the branches, lower flowers with pedicel to 2 mm long, upper ones subsessile, sweetly scented (privet scented). *Calyx ca*. 1 mm long, scarcely lobed, tube *ca*. 1 mm long, glabrous. *Corolla* creamy white, *ca.* 4.5 mm long, tube short *ca*. 1 mm long, lobes oblong, spreading. *Stamens* with filaments *ca*. 3 mm long, anthers *ca*. 1.5 mm at anthesis projecting beyond the corolla tube. *Ovary* globose, *ca*. 1 mm long, glabrous, style slender, *ca*. 1.5 mm long, projecting beyond the calyx tube after the corolla has fallen. stigma *ca*. 0.5 mm long. *Fruit* subglobose, 5.5 mm long, 4.5 mm broad, stalk 2–5 mm long.

Distribution. Endemic in Papua New Guinea, known from two localities.

Ecology. Primary forest (stunted forest of steep slope of gorge) or open country, 500–7,000 m asl.

Etymology. Latin, *parvis* = small, *folios* = leaf.

New Guinea specimens. PAPUA NEW GUINEA. Central Province, Koitaki. *Carr 12002*, 22 April 1935. Open country, alt. 1500 ft., flowers white, shrub *ca.* 7 ft tall. (K). Milne Bay Province, Nawandowan Gorge, *Cruttwell 783*, 23 June 1956. Stunted MF on steep slope to gorge. Shrub to 10 ft, leaves dark green, flowers creamy white, privet scented. (K). Nawandowan Gorge, *Cruttwell 1725*, 6 July 1974. 7000 m, shrubbery at edge of moss forest on steep slope. Shrub 10 ft, leaves dark green, flowers creamy white, typical privet smell (K).

Notes. The exceptionally small leaves are unusual in *Ligustrum.* However, this new species is unlikely to be an edaphic form of the widespread and variable *L. glomeratum* that grows as high as 2,650 m asl. because leaf size in the latter does not diminish with increasing elevation. Besides, *L. parvifolium* is distinct in its inflorescence characters (Table 3).

3. MYXOPYRUM

Myxopyrum is a small genus of climbers with four species and two subspecies (Kiew, 1984). It extends from India and China to New Britain and the Admiralty Islands. It is distinctive in its climbing habit, quadrangular stems, tripliveined leaves and small flowers. Two species occur in New Guinea, neither endemic.

MYXOPYRUM Blume

Myxopyrum Blume, Bijdr. Fl. Ned. Ind. 13 (1826) 683, Mus. Bot. Lugd.-Bat. 1, 20 (1850) 320; Lingelsheim, Bot. Jahrb. Syst. 61 (1927) 2; Hill, Bull. Misc. Inform. Kew (1910) 37; Backer & Bakhuizen f., Fl. Java 2 (1965) 215; Kiew, Blumea 29 (1984) 499; Green, in Kadereit (ed.), Fam. Gen. Vasc. Pl. 7 (2004) 304.

Evergreen, woody climbers or scandent shrubs. Indumentum of uniseriate hairs or lacking. *Stems* and especially twigs acutely quadrangular. *Leaves* opposite, simple, petiolate, lamina broadly ovate to narrowly lanceolate, base cordate or cuneate, margin entire or toothed towards the apex, apex acute to acuminate, glabrous, coriaceous or membranous; venation tripliveined; domatia absent. *Inflorescences* axillary, sometimes terminal on side branches, much branched, many-flowered lax thyrsoid panicle, bracts small and linear. *Flowers* small, 2.5–7 mm long, bisexual, actinomorphic, sessile. *Calyx* shortly campanulate, sometimes minutely pubescent outside, divided almost to base, lobes 4(–5), short and acute, persistent. *Corolla* campanulate or urceolate, lobes 4(–5), valvate in bud, glabrous or rarely pubescent, either tube thick and fleshy, lobes ovate-triangular and shorter than tube, or tube thin, lobes ligulate and longer than tube. *Stamens* 2(–3), either included in the corolla tube, or just exserted; anthers subsessile, broadly elliptic, dehiscing longitudinally. *Ovary* superior, small, ovoid, glabrous, locules 2, ovules 2 per locule, stigma subsessile, shortly bilobed. *Fruit* a drupe, globose to slightly ellipsoid, 5–10 mm diam., not bilobed, pericarp fleshy, ripening orange, red or purple, endocarp woody. *Seeds* 1 or 2, endosperm copious.

Distribution. India (including Andaman Is.), Sikkim, Bangladesh, Myanmar, Thailand, Indo-China, China (Canton, Hainan), Peninsular Malaysia, Sumatra, Java, Borneo, the Philippines, Lesser Sunda Islands, Kei Islands, New Guinea, Admiralty Islands and Bismarck Archipelago (Kiew, 1984). Four species, of which two occur in New Guinea.

Ecology. In Malesia, in primary lowland or alluvial forest including beach and riverine forest, below 650 m asl. Judging from the paucity of specimens, it is nowhere common.

Etymology. Greek, *muxa* = mucus or slime; *pyrum* = wheat or fruit. Seeds of *Myxopyrum nervosum* subsp. *nervosum* are very occasionally covered by viscous oil but in subsp. *coriaceum* the fruit contains so much viscous oil that it seeps into the herbarium sheet (Kiew, 1984).

Key to Myxopyrum species

1a. Leaves chartaceous or coriaceous, lanceolate or elliptic, margin toothed towards the apex, base cuneate or rounded. Corolla lobes (0.5–1.5 mm long) much shorter than tube (2–4 mm long)…….. ……..... 1. *M. nervosum* subsp. *nervosum*

1b. Leaves subcoriaceous to thickly coriaceous, ovate, margin entire, base broadly rounded sometimes broadly cordate, rarely cuneate. Corolla lobes longer than tube……..... 2. *M. ovatum*

1. MYXOPYRUM NERVOSUM Blume

Myxopyrum nervosum Blume, Bijdr. Fl. Ned. Ind. 13 (1826) 683, Mus. Bot. Lugd.-Bat. 1, 20 (1850) 320, t. 51; Hill, Bull. Misc. Inform. Kew (1910) 42; Backer & Bakhuizen f., Fl. Java 2 (1965) 215; Kiew, Blumea 29 (1984) 505, Fig. 1A, 2. — Type *Blume s.n.* Java, Salak (Lectotype L, Isolectotype K, here selected). Synonym: *M. zippelii* A.W. Hill, Bull. Misc. Inform. Kew (1910) 44. — Type

Zippel s.n., New Guinea (Holotype L, 908, 161–792).

Distribution. Peninsular Malaysia, Sumatra, Java, Borneo, the Philippines (Palawan), Sulawesi, Maluku and New Guinea (Kiew, 1984).

Etymology. Latin, *nervosus* = with conspicuous veins.

Taxonomy. Two subspecies are recognised. Subspecies *coriaceum* (Blume) Kiew is endemic in Borneo, where it commonly grows in peat swamp forest or heath (*kerangas*) forest. While it shares inflorescence, flower and fruit characters with subsp. *nervosum*, it differs in its narrowly elliptic, thickly coriaceous leaf with a recurved entire margin; in contrast subsp. *nervosum* has lanceolate, chartaceous to subcoriaceous leaves with the margin minutely serrate in the upper half of lamina.

SUBSP. NERVOSUM

Woody liana 5–25 m tall, old stem to 2 cm thick. Bark fibrous, pale brown. Young stems and branches glabrous, acutely quadrangular, drying white. *Leaf* glabrous; petiole 1–2 cm long, grooved above, drying purple; lamina lanceolate or elliptic, 10–18 × 4–11.5 cm, chartaceous or coriaceous, base cuneate or rounded, margin minutely serrate in upper half of lamina or margin prominently recurved, apex acute or acuminate, drying greenish brown above, slightly paler beneath; venation conspicuous above, prominent beneath, tripliveined, in upper half with 3–5 lateral veins on either side of the midrib, intercostal venation reticulate. *Inflorescence* a lax much-branched thyrsoid panicle, 8–14 cm long, rachis angular, shortly pubescent to subglabrous, terminating in cymules of flowers; bracts subulate, 2.5–3 mm long. *Flowers* small, subsessile or pedicel to 1 mm long. *Calyx* 0.5–1 mm long, divided almost to base, lobes 4(–5) acute, glabrous or minutely pubescent outside, *Corolla* thick and fleshy, yellowish white or pale green, tube campanulate or urceolate, 2–4 mm long, lobes 4(–5), ovate or oblong, 0.5–1.5 mm long, cucullate, hardly opening. *Stamens* 2(–3), anthers sessile, broadly ellipsoid, *ca*. 1 mm long, included, attached below the base of the corolla lobes. *Ovary* ovoid, *ca*. 1 mm long, glabrous, stigma sessile, bilobed. *Fruit* subglobose, glabrous, 13–17 × 11–20 mm, apex rounded, pericarp fleshy, ripening orange. *Seed* 1 (sometimes 2) with horny endosperm; testa papery.

Distribution. As for the species, but in New Guinea it is extremely rare and to date is known only from Vogelkop, Indonesian New Guinea.

Ecology. Elsewhere in Malesia it grows in primary lowland forest to 650 m, often in swampy places but not in swamp forest. The New Guinea specimen, *Zippel s.n.*, does not record its habitat.

Notes. This taxon is distinct in its young stems that are strongly quadrangular, slightly winged and dry white, and in its lamina margin that is toothed towards apex. Hill (1910) considered Zippel's specimen labelled as *M. smilacifolium* as a new species even though it lacked flowers and fruits. He proposed to call it *Myxopyrum zippelii* A.W.Hill. (*M. smilacifolium* Blume does not occur in New Guinea (Kiew, 1984). The Zippel specimen has leaves typical of subsp. *nervosum*, with which it is considered as synonymous.

New Guinea specimens *Zippel s.n.* Indonesian New Guinea (L, 908, 161–792).

2. MYXOPYRUM OVATUM A.W.Hill

Myxopyrum ovatum A.W.Hill, Bull. Misc. Inform. Kew (1910) 41; Lingelsheim, Bot. Jahrb. 61 (1927) 3; Kiew, Blumea 29 (1984) 507, Fig. 1b & 2. — Type *Beccari PP 6658,* VIII-1873, Kei Island, New Guinea (FI [FI013018] *n.v*; K). Synonyms: *M. cordatum* A.W.Hill, Bull. Misc. Inform. Kew (1910) 44; Lingelsheim, Bot. Jahrb. 61 (1927) 2. — Type *Moseley s.n.* Challenger Exp., Admiralty Is. (Holotype K [K000979294]); *M. macrolobum* A.W.Hill, Bull. Misc. Inform. Kew (1910) 42; Lingelsheim, Bot. Jahrb. 61 (1927) 3. — Type *Beccari PP 942* NW New Guinea, Mt. Arfak (FI *n.v.*[Erb. Coll. Beccari 6657 [K000979296] 6657A], K [K000979295]); *M. philippinensis* Elmer, Leafl. Philip. Bot. 4 (1912) 1483. — Type *Elmer 12333* Philippines, Sibuyan Island, 1 April 1910 (A, BM, GH, K, P). *M. smilacifolium* Blume, *auct non*: Warburg, Bot. Jahrb. 13 (1891) 403; Schumann & Lauterbach, Fl. Schutzgeb. Sudsee (1901) 498; Lingelsheim, Bot. Jahrb. 61 (1927) 2.

Woody liana, old stem to 2 cm thick. Bark white and flaky, developing a layer of soft cork. Young stems green, quadrangular and twining, drying dark brown, glabrous. *Leaf*: petiole 1–2 cm long, thick, grooved above, drying dark brown; lamina ovate, glabrous, 13.5–24 × 6–14.5 cm, subcoriaceous to thickly coriaceous, base broadly rounded, sometimes broadly cordate, rarely cuneate, margin entire, apex acute, sometimes acuminate, drying greenish brown above, slightly paler beneath; venation tripliveined, sometimes with the marginal loop thick and prominent in the lower half of the leaf, in upper half of lamina additional 1–3 lateral veins on either side of the midrib; midrib, lateral and tertiary veins

impressed above and prominent beneath. *Inflorescence* solitary or 2 per axil, a lax thyrse terminating in cymules of flowers, 6–20 cm long, with fourth order branching, peduncle *ca.* 3.5 cm long, glabrous or minutely pubescent, lowest branch 5–12.5 cm long; bracts linear, to 2 mm long, glabrous, persistent. *Flowers* subsessile or pedicel to 2 mm long. *Calyx* 1–1.5 mm long, with 4(–5) acute lobes, pubescent outside. *Corolla* yellow, tube campanulate, 1–1.5 mm long, lobes 4 (–5), 1.5–3 mm long, fleshy, narrowly linear, spreading or reflexed in open flower. *Stamens* 2(–3), anthers sessile, broadly ellipsoid, *ca.* 1 mm long, attached at base of corolla lobes, either included or partially exserted. *Ovary* ovoid, less than 1 mm long, stigma sessile, bilobed. *Infructescences* to 32 cm, rachis becoming thick. *Fruit* globose to ellipsoid, 9–15(–20) mm long, 8–15 mm diameter; apex rounded, pericarp fleshy, ripening orange red, rough on drying, endocarp thin and brittle or to 1 mm thick; fruit stalk 2–7 mm long. *Seed* 1 (sometimes 2) with horny endosperm; testa papery.

Distribution. Philippines, Ambon, Maluku (Buru), Kei Island, New Guinea, New Britain and Admiralty Island (Fig. 3).

Ecology. Primary lowland or alluvial forest sea level to 200 m, including beach and riverine forest.

Etymology. Latin, *ovatus* = egg-shaped, referring to the lamina that is broader towards the base.

Notes. According to Hill (1910), the flowers of *M. ovatum* are distinct from *M. macrolobum* in having larger flowers with exserted anthers, the corolla-tube 1.5–1.75 mm long and the lobes hairy, patent and about 3 mm long, compared with *M. macrolobum* that has included anthers, the corolla tube 2–2.5 mm long, and the lobes glabrous, reflexed and 3.5–4.5 mm. Without flowers there are no differences between them. Both *M. cordatum* (known only from a fruiting specimen) and *M. macrolobum* were based on a single specimen and there are still insufficient flowering specimens to be confident that these minor differences are consistent and significant. For these reasons, they were treated as synonymous with *M. ovatum* (Kiew, 1984).

New Guinea specimens. PAPUA NEW GUINEA. Busu River *Henty NGF 14834* (A, BO, K, L, LAE); Lae *Katik NGF 46864* (BO, K, L, LAE); Malu *Ledermann 8086 n.v.*; Reneiji (Keneya) *Schlechter 18392* (CAL, P), Sepik River *Ledermann 6729* (K), *Ledermann 10437 n.v.*, *Ledermann 10626 n.v*. NEW BRITIAN *Frodin NGF 26565* (BRI, CANB, LAE). ADMIRALTY IS. *Moseley s.n.,* Challenger Exped. (K). INDONESIAN NEW GUINEA. PAPUA. Mt. Arfak, *Beccari PP 942* (FI *n.v.*) [Erb. Coll.

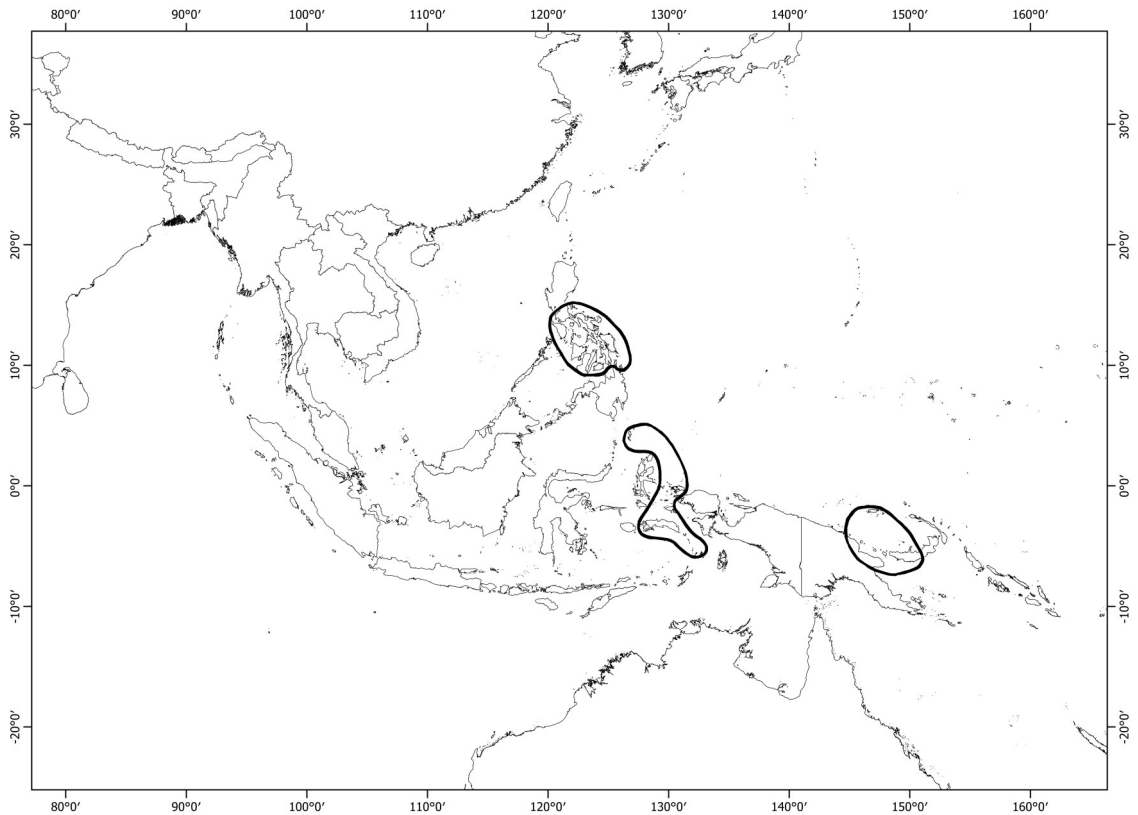

Fig. 3. Distribution of *Myxopyrum ovatum* Hill

Beccari 6675, *6657A*]. RAWAK IS. *Gaudichaud s.n.* (P). KEI IS., Finschhafen *Warburg 21350, 21351 n.v.*; *Beccari PP6698* (FI n.v., K) [Erb. Coll. *Beccari 6658*], *Jaheri s.n.* (BO).

4. OLEA

An Old World genus of about 32 species, just one species occurs in New Guinea (Kiew, 1979; 1999). *Olea paniculata* is distinguished from species of *Chionanthus*, the other tree genus in New Guinea, by its terminal inflorescences, corolla with a distinct tube, stamens with long filaments attached at top of the tube so that the versatile anthers are exserted, and by its large lepidote scales that cover even the corolla. In contrast, species of *Chionanthus* have axillary inflorescences, the corolla is often divided almost to the base, the stamens have short filaments with dorsifixed anthers that are included within the corolla, and they do not have large lepidote scales.

OLEA L.

Olea L., Sp. Pl. 1 (1753) 18; Backer & Bakhuizen f., Fl Java, 2 (1965) 214; Kiew, Blumea 25 (1979) 307, Gardens Bulletin Singapore 51 (1999) 95, Tr. Flora Sabah & Sarawak 4 (2002) 161; Green, in Kadereit (ed.), Fam. Gen. Vasc. Pl. 7 (2004) 303.

Shrubs or small to medium-sized trees. *Twigs* whitish or brown, glabrous, sometimes minutely pubescent. *Leaves* opposite, simple, margin entire or toothed towards the apex, coriaceous, sometimes membranous, elliptic-lanceolate to ovate or obovate, with minute sunken peltate trichomes or large lepidote scales; domatia rarely present. *Inflorescences* axillary, sometimes terminal, rarely ramiflorus, much branched thyrse, glabrous or minutely pubescent; bracts leaf-like, small and caducous. *Flowers* 1–5 mm long, bisexual, polygamous or unisexual, buds rounded. *Calyx* short, tubular, divided *ca.* halfway, lobes 4, persistent. *Corolla* tube short, as long or slightly longer than lobes, lobes 4, induplicate-valvate, apex cucullate and scarcely opening or flat and spreading widely, white or yellow, glabrous. *Stamens* 2, attached near base of corolla tube, filaments as long as anther or anthers subsessile, versatile or dorsifxed, broadly oblong, *ca.* 1 mm long. *Ovary ca.* 2 mm long, style very short, stigma sessile or subsessile, weakly bilobed or globose. *Fruit* a drupe, pericarp thin and fleshy, endocarp crustose or bony. *Seeds* with bony or fleshy endosperm.

Distribution. About 32 species, Old World from the Mediterranean, Africa, Madagascar, E. Asia, Malesia, Australia, New Zealand and Pacific Islands. In New Guinea represented by one species.

Ecology. In Malesia, by seashores and in primary forest from the lowlands to upper montane forest at 3,800 m asl.

OLEA PANICULATA R.Br.

Olea paniculata R.Br.**,** Prodr. (1810) 523; Backer & Bakhuizen f., Fl. Java 2 (1965) 214; Kiew, Blumea 25 (1979) 312, Gardens Bulletin Singapore 51 (1999) 95. — Type *R. Brown 2844*, Australia, East Coast, 1802, (Holotype BM [BM001040682], Isotype E). Synonym: *Linociera lauterbachii* Lingels., Bot. Jahrb. 61 (1927) 8; Kobuski, J. Arn. Arbor. 21 (1940) 335. — Syntypes *Schlechter 16984* North East New Guinea, Minjem at Kelel, 17 Dec 1907 (B+, A [A00075048], G, L, W); *Schlechter 16314* ibidem 19 July 1907 (B+).

Tree 12–30 m tall, bole to 1 m girth, often buttressed at base in larger trees. Bark brown-grey, wrinkled and pustulate. Sapwood white, turning pink on exposure. *Twigs* drying grey, lenticellate, glabrous, nodes flattened. *Leaf*: petiole 0.7–1.2(–2) cm long; lamina ovate, elliptic or lanceolate, young leaves with large lepidote scales beneath, (5–)10(–13) × 2–5.5 cm, subcoriaceous to coriaceous, base rounded, obtuse or acute, margin entire, apex with long acumen, glossy above; midrib impressed above, prominent beneath; lateral veins 8–11 on either side of the midrib, visible on both surfaces; domatia domed, wide-mouthed. *Inflorescence* terminal and axillary in upper leaf axils, thyrsoid panicle with lower branches as long as main axis, 4.5–6.5(–13) cm long with 2–3 tiers of branches, terminating in subumbels of 3 flowers, minutely hairy. *Flower buds* rounded. *Flowers* bisexual, subsessile or sessile. *Calyx* minute, cupulate, *ca.* 1 mm long, lobes acute covered by large lepidote scales. *Corolla* cream-coloured, 2–3 mm long, lobes 1.2–1.8 mm long, 1.5 mm wide, deeply lobed, lobes covered by large lepidote scales. *Stamens* 2, filaments 1.5–2 mm long, attached at the top of corolla tube between the lobes; anthers versatile, 1 –1.5 mm long, oblong, exposed as corolla lobes open. *Ovary* globose, *ca.* 1 mm long, stigma sessile, large, globose. *Fruit* ovoid-oblong or narrowly ovoid, often slightly oblique, 1.3–1.8 cm long, 0.5–0.7 mm wide, pericarp fleshy, ripening bluish-black, endocarp woody, *ca.* 1 mm thick; fruit stalk 2–4 mm long. *Seeds* with endosperm, cotyledons thin.

Distribution. W. and E. Java, Bali, Lombok, Timor, Papua New Guinea (Morobe and New Ireland), Australia (Queensland to New South Wales), New Hebrides, Lord Howe Is., New Caledonia (Fig. 4).

Ecology. Canopy tree in oak and *Araucaria* forest, 100–2,300 m asl., locally common (Bulolo), sometimes on limestone or in secondary forest.

Etymology. Latin, *paniculatus* = with flowers arranged in panicles.

Uses. In Australia, Francis (1970) reported it was used for fine carving, inlays, hard turnery and flooring. In New Guinea, it is not recorded as a commercial timber perhaps because it is neither sufficiently common nor widespread.

Notes. Among Malesian *Olea* species, *O. paniculata* is unique in its large lepidote scales that cover even the outside of the petals (Kiew & Ibrahim, 1982), the terminal as well as axillary inflorescences, stamens attached at the top of the corolla tube with a long filament that fully exposes the anther that is versatile (Kiew, 1983 Fig. 1c), the large, globose stigma, and domed wide-mouthed domatia on the leaves (Kiew, 1999). Compared with the other Malesian *Olea* species that occur outside New Guinea, its flowers are bisexual (not unisexual or andropolygamous) and the corolla lobes open widely and are not cucullate. In fact, it occupies an isolated position among *Olea* species in Malesia that fall into four distinct groups (Kiew, 1999) being the single species with the suite of characters outlined above. The other Malesian *Olea* species fall into three groups and all lack domatia, are pilose or have small peltate glands (not large lepidote scales), have axillary inflorescences, and unisexual or andropolygamous flowers with cucullate petals, and subsessile stamens with anthers that are dorsiflixed and do not project beyond the corolla tube.

New Guinea specimens. PAPUA NEW GUINEA Aseki Valley *Schodde 5061* (L, LAE). Bulolo *Anderson 21003* (CANB, K, L, LAE), *Havel NGF 9107* (LAE), *Havel & Kairo NGF 9017* (CANB, L), *Havel NGF 9914* (BRI, CANB, L), *Havel NGF 15487* (BRI, CANB, L, LAE, S), *White NGF 10141* (CANB, S). NE New Guinea, Minjem at Kelel, *Schlechter 16314* (B *n.v.*), *Schlechter 16984* (B *n.v.*, A, L, W). Omaura *Hartley 11948* (A, BRI, K, L, LAE). Sassomra *Hartley TGH 12092* (A, BRI, K, L, LAE). Wapenamanda *Robbins 2883* (CANB), Wau *White 2519* (L). NEW IRELAND Danfu River *Coode NGF 46101* (L, LAE). NEW HEBRIDES *Raynal RSNH 16027* (L). *White NGF 10141* (CANB, S).

ACKNOWLEDGEMENTS

I thank Universiti Pertanian/Putra Malaysia and the Flora of Peninsular Malaysia project through Dokumentasi dan Konservasi Biodiversiti. Kesejahteraan Hutan and Kemampanan Sumber Semulajadi (Fasa 1): Subproject 1 Diversiti, Dokumentasi dan Status Konservasi Tumbuhan bagi Pengurusan Sumber Hutan Secara Mampan

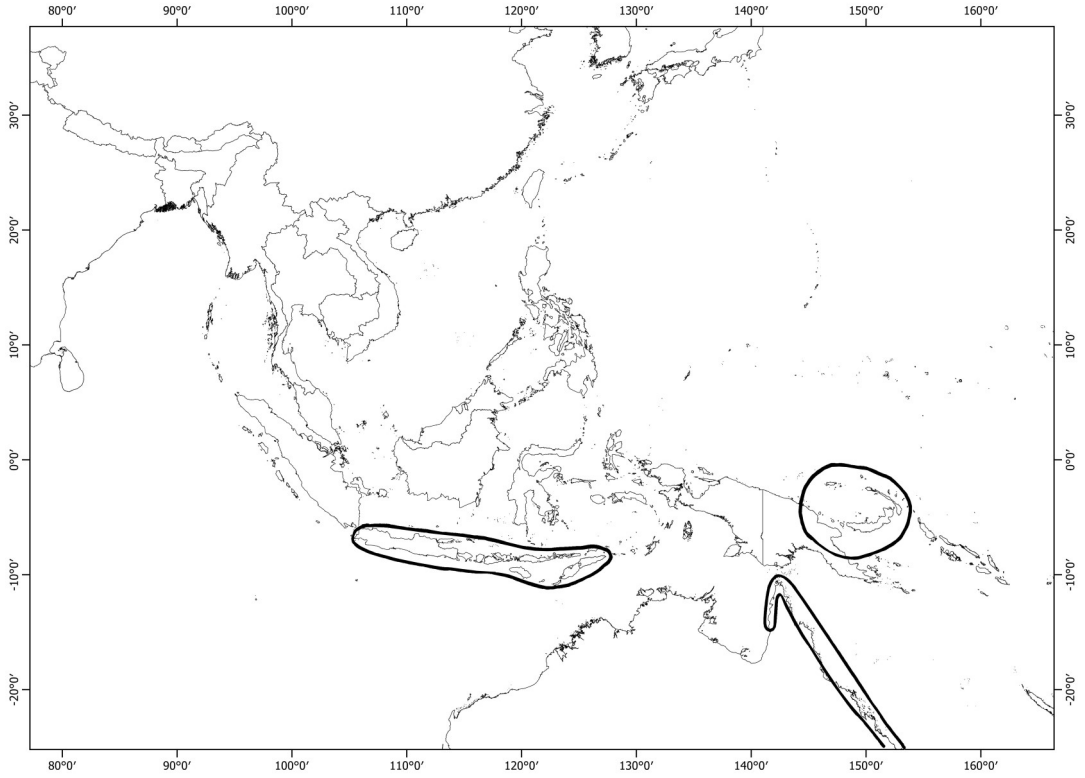

Fig. 4. Distribution of *Olea paniculata* R.Br. in Malesia and Australia

di Malaysia (SPPII No. P23085100018003) for financial support, the Royal Society, U.K., for the travel grant that enabled me to visit European herbaria, the Herbarium of the Plant Science Department, Cambridge (CBG) for facilities during my sabbatical leave, and to the Curators of A, BM, K, L, LAE, CANB, BRI, SAN, SAR and SING for permission to examine specimens in their care.

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