

TWO NEW SPECIES OF *GARDENIA* (*RUBIACEAE*) FROM BORNEO AND NOTES ON *GARDENIA* *PTEROCALYX*

Y. W. LOW & K. M. WONG

Two new species of *Gardenia* (*Rubiaceae*), *Gardenia beamanii* Y.W.Low and *Gardenia chanii* Y.W.Low, endemic to Borneo, are described. These species are distinguished from *Gardenia griffithii* Hook.f. and *Gardenia pterocalyx* Valetton, respectively, to which they are superficially similar in calyx characters. *Gardenia pterocalyx* is lectotypified.

Keywords. Borneo, *Gardenia*, *Gardenieae*, Malay Peninsula, *Rubiaceae*.

INTRODUCTION

With about 250 species recorded from the Old World tropics, from Africa to Hawaii, the genus *Gardenia* Ellis (*Rubiaceae*) consists mainly of shrubs and trees. It includes a number of well-known horticultural species, widely cultivated for their fragrant flowers that change from white to yellow and later orange as they age. Probably the species that is most well known as a cultivated ornamental is *Gardenia augusta* Merr. (syn. *G. jasminoides* Ellis, the type of the conserved genus name *Gardenia*), a shrubby species that is widely distributed in China, Japan, the Ryukus and Taiwan (Smith, 1974). In Malaysia, two other species, *Gardenia carinata* Wall. and *G. tubifera* Wall., have been introduced for garden and roadside planting.

Merrill (1921) enumerated 12 species of *Gardenia* for Borneo. Of these, one (*Gardenia anisophylla* Jack) had been transferred to *Porterandia* Ridl. and so listed by Masamune (1942), who made an attempt at updating Merrill's original work. Although Masamune himself listed 11 species of *Gardenia*, a number of these are in fact wrongly placed in that genus and have been or will be removed to other genera (Tirvengadam, 1978, 1983; J. Pereira, pers. comm.). This is perhaps understandable as both Merrill's and Masamune's lists are essentially bibliographic enumerations rather than taxonomic revisions. *Gardenia* is still poorly known for Borneo (Puff & Wong, 1993) and adjacent islands, although it has been revised for Peninsular Malaysia (Wong, 1982, 1989).

A revision of *Gardenia* for Sundaland, including mainly Sumatra, Java, the Malay Peninsula and Borneo, has been initiated. In the course of this work it became evident that there were two undescribed large-flowered species of *Gardenia* in Borneo. Their distinction was evident from calyx characters which were also much

relied upon for distinguishing a number of other *Gardenia* species by Smith (1974), Wong (1982) and Jongkind (2005). In various species the calyx can sheath the very base of the corolla tube or can sheath a significant portion of it. In a number of species the keels extend along the calyx tube to different levels. It is such characters that aid the recognition of distinct species, as discussed below.

The two new species are described here. Because one of them has been much confused in herbaria with a distinct species from peat swamps called *Gardenia pterocalyx*, notes are also provided on the nomenclature and ecology of this species.

NEW SPECIES

***Gardenia beamanii* Y.W.Low, sp. nov. Fig. 1.**

G. griffithii Hook.f. similis sed foliis subtus puberulis, limbo calyces breviori (4–4.5 cm longo) conspicue infundibulari 1/4 longitudine tubo corollae, lobis corollae brevioribus et latioribus (1.5–2.3 cm longis, 2.3–2.5 cm latis) differt. – Type: Brunei, Mile 18½, Labi Road, primary forest on yellow sandy clay, hillside, 600 ft [183 m], 20 v 1957, *Ashton* BRUN 10 (holo K; iso BO, KEP, SING).

Tree, to c.23 m high, trunk to c.45 cm diameter, not buttressed. *Bark* smooth, light grey-brown to dark brown. *Stipules* connate into a cylindrical tube, 0.5–1 cm long, apex weakly 2-lobed to subtruncate, outside glabrous and generally coated with resin (this sloughing off in older material), inside with a mixture of dark-coloured colleters and scattered fine translucent trichomes densely covering the basal half (trichomes twice as long as the colleters) and glabrous in the upper half. *Petiole* 1–2(–3.5) cm long, 2–3 mm thick, sometimes conspicuously resin-coated. *Leaf* lamina coriaceous, obovate, 11.5–17(–22.5) cm long, (4–)5–7(–9) cm wide, base cuneate, apex cuspidate, conspicuously coated with resin when young; midrib prominent and glabrous on both sides; secondary veins 9–13 pairs, prominent on both sides, vein axils on the lower side with ciliate pit-domatia; tertiary venation scalariform. *Flowers* solitary, terminal on branchlets. *Pedicels* 0.5–0.8 cm long and 3–4 mm thick in open flowers, reaching 0.5–2 cm long and 4–6 mm thick at fruit maturity. *Calyx* limb narrowly to broadly infundibular, medium green; 4–5 cm long, 7–9 mm wide at the base, becoming 20–25 mm wide at the apex; outside completely glabrous, often coated with resin, inside glabrous for the most part, densely covered with a mixture of dark-coloured colleters and translucent trichomes in the lowermost 0.5 cm only (trichomes longer than colleters and especially conspicuous as a dense fringe at the very base of the calyx); lobes inconspicuous (the limb often wavy on the margin); surface smooth, without keels. *Corolla* hypocrateriform, cream turning light yellow, then deep to orange yellow; tube to 9–10 cm long, 4–5 mm wide at the mid-portion, 10–12 mm wide at the throat, outside completely glabrous, inside largely glabrous except for a 1–1.5 cm zone of scattered ribbon-like translucent hairs at the throat to about 0.5 cm below the stamens; lobes 8–10, obovate to rounded, 25–30 mm long, 25–29 mm wide, contorted to the left in the bud stage, glabrous on both sides. *Stamens* 8–10, inserted

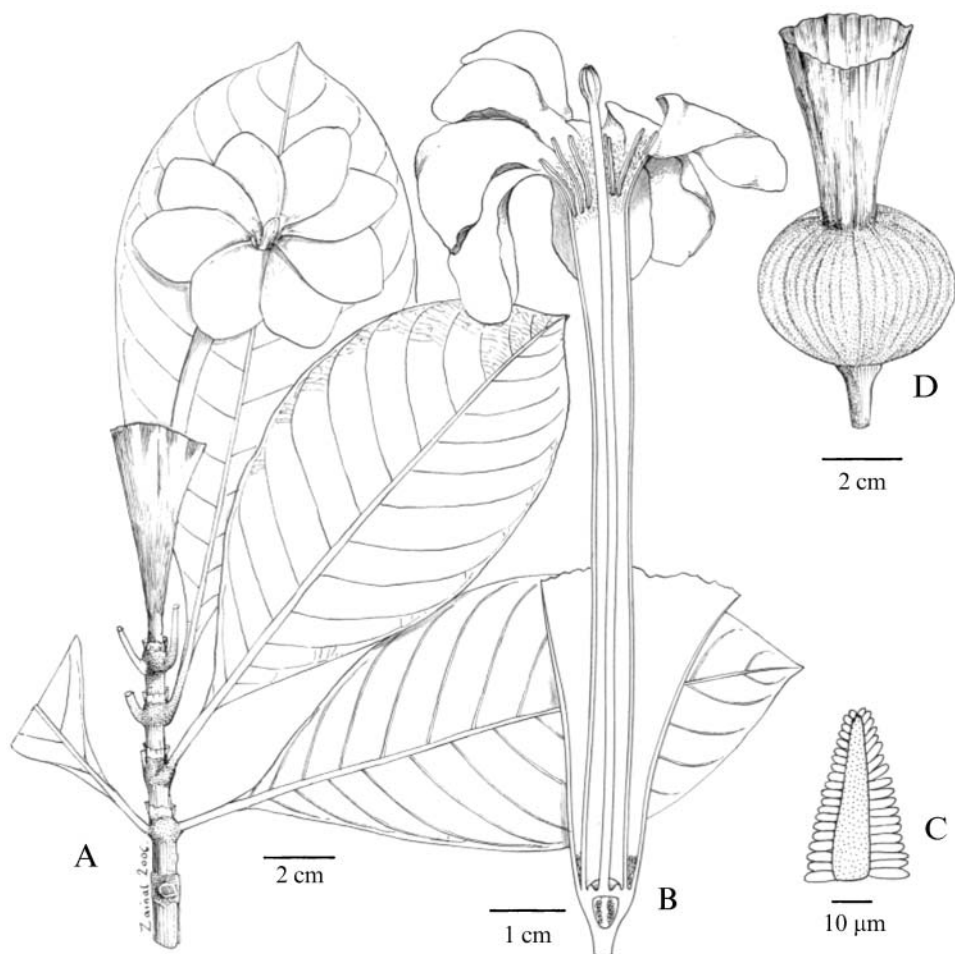


FIG. 1. *Gardenia beamanii* Y.W.Low. A, leafy branch terminated by a solitary flower; B, half-flower (small dark structures at the base on the inside of the calyx are colleters); C, schematic optical longitudinal section of a colleter (shaded part is the axis of longitudinal cells, with outer palisade-like layer of large cells); D, fruit with persistent calyx.

just below the corolla throat and between corolla lobes; filaments very short to inconspicuous; anthers dorsifixed, 9–11 mm long, c.half of their length exerted; pollen issued in tetrads. *Style* 11.5–12 cm long, glabrous; stigma club-like with 5–7 lobes initially cohered together, 5–7 mm long, 3–4 mm wide, wholly exerted; ovary with several parietal placentas. *Fruits* globose to depressed globose, 3–4.5 cm long, 3.5–5.5 cm wide, surface in mature specimens smooth, slightly ribbed or unevenly longitudinally ridged; calyx persistent at fruit apex, the limb to 2.5–5.5 cm long, flared to 2–4 cm wide at the mouth. *Seeds* many, embedded in a pulp-like placenta, irregularly angular-elliptic, flattened, 6–8 mm long, 4–6 mm wide, testa surface fine-areolate.

Distribution. Endemic to Borneo, restricted to the northern (Sabah and East Kalimantan) and northwest parts (Brunei; possibly also adjacent parts of Sarawak) (Fig. 2).

Habitat and ecology. A typical lowland mixed dipterocarp forest species.

Etymology. This species is named after Professor John H. Beaman, well-known scholar of the Sabah and Sarawak flora.

Proposed IUCN conservation status. Vulnerable due to fragmented and declining area (VU B1).

The differences between *Gardenia beamanii* and *G. griffithii* (including *G. griffithii* var. *maingayi* Hook.f. which is not distinct from *G. griffithii* var. *griffithii*) are highlighted in Table 1. *Gardenia beamanii* differs by having a shorter calyx limb, which abruptly flares out towards the calyx mouth and sheaths only a quarter of the corolla tube. *Gardenia griffithii* has a longer calyx limb that gradually widens from the base towards the calyx mouth, sheathing about three-quarters of the corolla

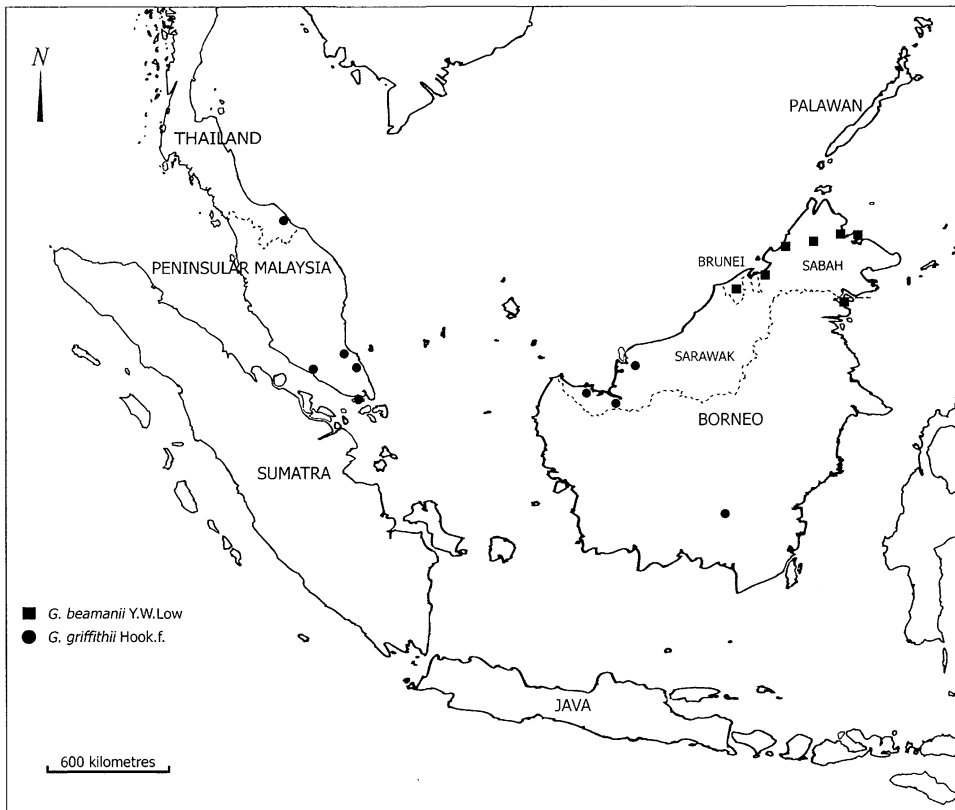


FIG. 2. Distribution of *Gardenia beamanii* and *G. griffithii* in the Sundaland area.

TABLE 1. Morphological comparison of *Gardenia beamanii* and *G. griffithii*

Character	<i>G. beamanii</i>	<i>G. griffithii</i>
Lower leaf surface	Puberulent (hairs minute, \pm powdery under lens)	Short-hairy (hairs fine but distinct under lens)
Domatia in axils of secondary veins on lower leaf surface	Present as ciliate pit-domatia	Present as hairy pocket-domatia
Calyx limb: length relative to corolla tube, and shape	Sheathing a quarter of the corolla tube; uppermost part of limb flared out conspicuously	Sheathing three-quarters of the corolla tube; limb gradually widened from base
Calyx limb length (cm)	4–4.5	6.5–7(–9)
Corolla lobe size (length \times width) (cm)	(1.5–2.3) \times (2.3–2.5)	(3–4.6) \times (1.5–2)

tube. Also, *Gardenia beamanii* has shorter and broader corolla lobes than *G. griffithii*. The lower leaf surface of *Gardenia beamanii* is puberulent, while that of *G. griffithii* is short-hairy.

Additional specimens examined (Gardenia beamanii). BORNEO. **Sabah**: Papar, 26 x 1962, *Talip* SAN32221 (KEP); Sipitang, Merintaman Forest Reserve, 22 ix 1972, *Saikoh* SAN72347 (SAN, SING); Ranau, TM1, 21 ii 1990, *sine coll.* SAN128840 (K, KEP, L); Beluran, Bongaya Forest Reserve, 22 vii 1975, *Kodoh & Aban* SAN82018 (KEP); Sandakan, Bukit Pasir Lungmanis, viii 1962, *Mikil* SAN31128 (KEP, L, SAN, SING). **Brunei**: Belait, Andulau Forest Reserve, 15 vii 1957, *Ashton* BRUN274 (KEP), Andulau Forest Reserve, compartment 7, 3 v 1988, *Wong* WKM86 (SAN, SING), track leading into Andulau Forest Reserve, 24 vii 1989, *Puff* 890724-1/5 (K). **Kalimantan**: Nunukan Island, 30 x 1953, *Kostermans* 8638 (BO, SING).

Specimens examined (Gardenia griffithii). THAILAND. Narathiwat, Sungai ko-lok, 17 vii 1983, *Niyomdham* 759 (BKF).

PENINSULAR MALAYSIA. **Melaka**: Merlimau, 1892, *Derry* 1045 (SING), vi 1889, *Derry* 223 (SING); 1861–1862, *Griffith* KD2821 (K) (type), 24 vii 1867, *Maingay* KD841 (K) (type of *Gardenia griffithii* var. *maingayi* Hook.f.). **Pahang**: Rompin, Sungai Sekin, 19 ii 1980, *Maxwell* 80-47 (L). **Johor**: Lenggong Forest Reserve, 28 viii 1997, *Teo & Tetu* KL4735 (KEP, KLU).

SINGAPORE. Chan Chu Kang, 21 iv 1888, *Hullett* 611 (SING); Bukit Madai, 1891, *Ridley* 6673 (SING), 22 v 1889, *Ridley* s.n. (SING), 1891, *Ridley* 2857 (SING).

BORNEO. **Sarawak**: Kuching, Astana Road, 11 x 1964, *Bujang* S20882 (SAR, SING), 4½ Miles, Matang Road, Ulu Sungai Midin, 13 v 1970, *Bujang* S29362 (SAR); Simanggang, one mile from Triso, 13 iv 1960, *Anderson* 9797 (SAR, SING); Binatang, 23 xi 1959, *Sanusi* 12265 (L, SAR, SING); 1954, *Brooke* 8784 (SING). **Kalimantan**: Central Kalimantan, Arboretum Nyaru Menteng, 18 ix 1993, *Sidiyasa & Arifin* 1082A (BO), 30 x 1996, *Kessler et al.* PK1559 (BO, L).

***Gardenia chanii* Y.W.Low, sp. nov. Fig. 3.**

G. pterocalyci Valetton similis sed foliis apice acutis, laminis longioribus (typice 14–24 cm), fructibus pedicellis brevioribus (infra 1 cm) et tubo calycis carinato distincto (carinis non prolongatis usque ad hypanthium vel fructum) differt.

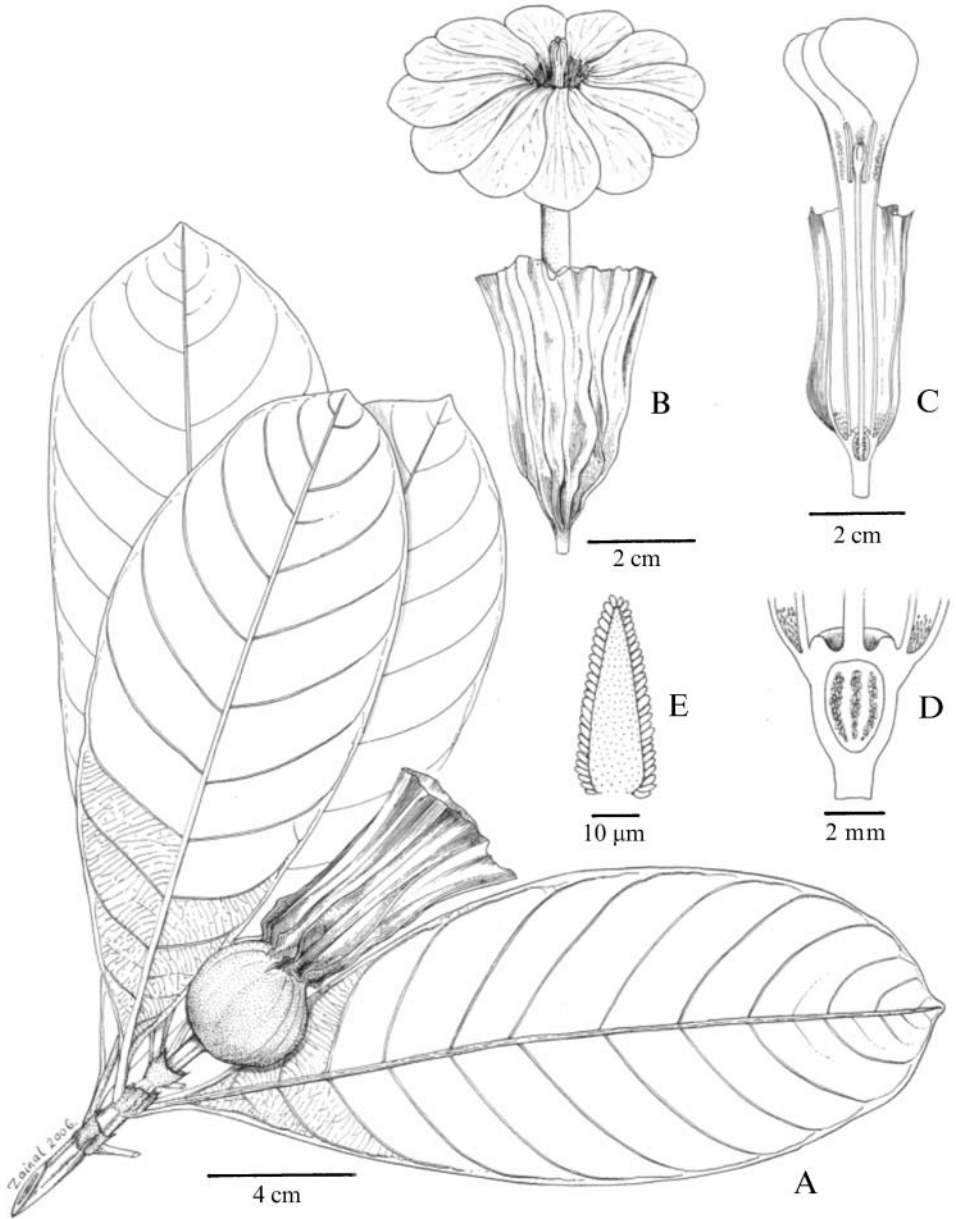


FIG. 3. *Gardenia chunii* Y.W.Low. A, leafy branch terminated by fruit; B, flower with keeled campanulate calyx; C, half-flower; D, detail of longitudinal section of lower part of flower (small dark structures at the base on the inside of the calyx are colleters); E, schematic optical longitudinal section of a colleter (shaded part is the axis of longitudinal cells, with outer palisade-like layer of large cells).

– Type: Brunei, Belait district, Badas Forest Reserve, peat swamp, 13 vii 1988, Wong WKM205 (holo SING; iso BRUN, KEP, SAN).

Gardenia pterocalyx auct. non Valeton (1912): Anderson, Checkl. Trees Sarawak: 296 (1980); Coode et al., Checkl. Fl. Pl. Gymnosperms Brunei Darussalam: 270 (1996), quoad *Bruenig* S1191, *Corner* BRUN5346, *Wong* WKM205.

Tree, to c.15 m high, trunk to c.73 cm diameter, not buttressed. *Bark* smooth to sometimes flaky, light- to grey-brown. *Stipules* connate into a cylindrical tube, 0.6–0.9 cm long, apex weakly 2-lobed to subtruncate or (rarely) slightly cleft on one side, outside glabrous and generally coated with resin (this sloughing off in older material), inside with a mixture of dark-coloured colleters and scattered fine translucent trichomes densely covering the basal half (trichomes shorter than the colleters) and glabrous in the upper half. *Petiole* 0.5–1(–2.5) cm long, 3–5 mm thick, sometimes conspicuously resin-coated. *Leaf* lamina coriaceous, obovate to elliptic, (11–)14–24(–26) cm long, (4.5–)6–7(–10) cm wide, base cuneate, apex obtuse, tip rounded to pointed to short-cuspidate, conspicuously coated with resin when young; midrib prominent and glabrous on both sides; secondary veins 7–14 pairs, prominent on both sides, vein axils on the lower side without domatia or occasionally with glabrous or subglabrous shallow pocket-domatia; tertiary venation scalariform. *Flowers* solitary, terminal on branchlets. *Pedicels* 0.4–0.6 cm long and 3–4 mm thick in open flowers, reaching 0.7–1 cm long and 4–7 mm thick at fruit maturity. *Calyx* limb campanulate (conspicuously flared outwards at the apex), rarely broad-cylindric (apex only slightly flared outwards), often recurved at the margin, medium green; to 4–5 cm long, 5–10 mm wide at the base, becoming 15–35 mm wide at the apex; outside completely glabrous, coated with resin, inside glabrous for the most part, densely covered with a mixture of dark-coloured colleters and translucent trichomes in the lowermost quarter only (trichomes shorter than colleters); lobes inconspicuous or (more often) 8–9, triangular, to 5–8 mm long and wide; keels present, resembling narrow longitudinal wings along the limb from its base to the apex, not extending downwards to the hypanthium, 3.6–4.4 cm long, 4–6 mm wide in the basal third, narrowing gradually towards the apex and rather abruptly at the base. *Corolla* hypocrateriform, cream turning light yellow, then deep to orange yellow; tube to 4–8 cm long, 5–7 mm wide at the mid-portion, 10–15 mm wide at the throat, outside completely glabrous, inside largely glabrous except for narrow patches of ribbon-like translucent hairs in between stamens and just below the corolla throat; lobes 10–13, oblanceolate to obovate, 25–39 mm long, 10–20 mm wide, contorted to the left in the bud stage, glabrous on both sides. *Stamens* 10–13, inserted just below the corolla throat and between corolla lobes; filaments very short to inconspicuous; anthers dorsifixed, 12–14 mm long, c.three-quarters of their length exerted; pollen in tetrads. *Style* 4.7–7 cm long, glabrous; stigma club-like with 5–7 lobes initially cohered together, 10–11 mm long, 5–7 mm wide, wholly exerted; ovary with several parietal placentas. *Fruits* globose to depressed globose, 2.5–4 cm long, 3–6 cm wide, mature specimens developing 10–16 prominent longitudinal

ridges on the surface; calyx persistent at fruit apex, the limb to 4.5–6 cm long, flared to 2–5 cm wide at the mouth, with keels resembling narrow longitudinal wings from its base to the mouth, not extending downwards to the fruit proper, 3.9–5.5 cm long, 4–7 mm wide in the basal third, narrowing gradually towards the apex and rather abruptly at the base. *Seeds* many, embedded in a pulp-like placenta, irregularly angular-elliptic, flattened, 8–10 mm long, 6–8 mm wide, testa surface fine-areolate.

Distribution. Endemic to Borneo (southwest Sabah, Brunei and Sarawak and Central Kalimantan) (Fig. 4).

Habitat and ecology. In peat swamp forest.

Etymology. This species is named after Datuk Chan Chew Lun, eminent botanical illustrator, naturalist and patron of science, who has supported this study in many ways.

Proposed IUCN conservation status. Vulnerable due to fragmented and declining area (VU B2).

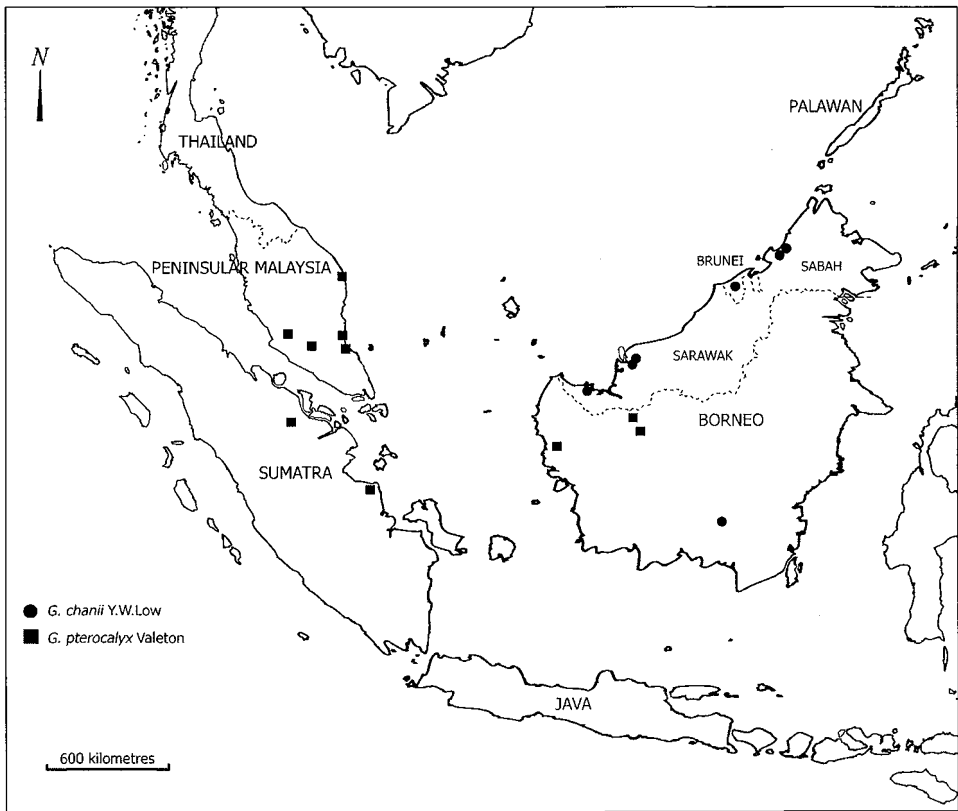


FIG. 4. Distribution of *Gardenia chanii* and *G. pterocalyx* in the Sundaland area.

The differences between *Gardenia chanii* and *G. pterocalyx* are highlighted in Table 2. *Gardenia chanii* differs by having a trumpet-shaped calyx that flares out conspicuously towards the calyx mouth. Keels are present only on the calyx limb and do not extend down the hypanthium or fruit. The calyx of *Gardenia pterocalyx* is tubular and the keels extend from the calyx mouth towards the base, including down the hypanthium or fruit. The corolla tube length of *Gardenia chanii* is also much longer than *G. pterocalyx*. *Gardenia chanii* also has a much shorter mature fruit pedicel compared with *G. pterocalyx*. In addition *Gardenia chanii* differs by having mostly pointed (rarely rounded) leaf tips and longer and broader leaf blades compared with *G. pterocalyx*, which has rounded leaf tips and much smaller leaf blades.

Additional specimens examined. BORNEO. **Sabah:** Beaufort, 3 miles East of Seratok Camp, 7 v 1963, *Meijer* SAN33512 (SAN); Papar, Kimanis Forest Reserve, 20 iv 1964, *Ampuria* SAN41419 (SAN); Bukau, 12 viii 1932, *Melegrito* 2512 (K, L). **Brunei:** Belait, Bukit Sawat, 24 viii 1996, *Joffre et al.* BRUN17740 (K, L, SING), Anduki FR, 22 ii 1959, *Corner* BRUN5346 (BO, KEP, SING); no locality, 1958, *Bruenig* S1191 (SAR). **Sarawak:** Batang Baram, 23 ix 1955, *Anderson* S2886 (KEP, SAR, SING); Binatang, Pulau Bruit, vi 1957, *Rambli* S4976 (SAR, SING), 25 ix 1957, *Sanusi* S9228 (KEP, SAR, SING), 8 ix 1957, *Anderson* S9026 (L, SAR, SING); Sg. Kelepu, 10 ix 1957, *Anderson* 8034 (SAR); Sibul, Kayangeran FR, 29 vi 1954, *Anderson* S1562 (KEP, SAR, SING); Sg. Putus, iii 1971, *Silviculturist Staff* S30446 (SAR); Sg. Assan, 24 xi 1970, *Bujang* S30574 (SAR); 3rd Division, Batu Igan, 21 xi 1970, *Ahmady* S30551 (SAR); Tuso, Sg. Tissak, 23 xi 1955, *Anderson* S3198 (SING); Lower Rejang, Batang Belawai, 11 viii 1963, *Anderson* S18551 (L, SAN, SAR, SING); Kuching, without date, *Haviland* 821 (SAR). **Kalimantan:** Central Kalimantan, Kab. Palangkaraya, 19 ii 1994, *Argent & Wilkie* 9475 (SAN).

TABLE 2. Morphological comparison of *Gardenia chanii* and *G. pterocalyx*

Character	<i>G. chanii</i>	<i>G. pterocalyx</i>
Leaf apex	Obtuse, with acute to pointed tip	Obtuse, with rounded tip
Domatia in axils of secondary veins on lower leaf surface	Absent, or occasionally present as glabrous or subciliate pocket-domatia or shallow pit-domatia	Consistently present as ciliate pit-domatia
Mature leaf blade length (cm)	(11.5–)14–24(–26)	4.5–12.5(–15)
Fruit pedicel length (cm)	< 1 (short)	≥ 2.5 (long)
Calyx shape	Trumpet-shaped, flared out conspicuously towards the mouth	Tubular
Keels (wings) on the calyx	Keels only along the calyx limb, not extending down the hypanthium or fruit	Keels extending along the calyx limb and down to the base of the hypanthium or fruit
Corolla tube length (cm)	4–7.5	3.5–4.5

NOTES ON *GARDENIA PTEROCALYX*

Gardenia pterocalyx Valeton, Icon. Bogor. t. 339 (1912). – Type: Borneo: Sungei Kenepai, 23 i 1894, *Hallier* 1416B (lecto L [sheet no. L0518199], designated here; isolecto BO, K, L [sheet no. L0518196]).

Distribution. Peninsular Malaysia (east coast of Pahang and Terengganu), Sumatra (east coast of Riau and Jambi) and Borneo (West Kalimantan) (Fig. 4).

Habitat and ecology. In peat swamp and *kerangas* forest.

Proposed IUCN conservation status. Vulnerable due to fragmented and declining area (VU B1).

Valeton's (1912) paper described a species of swamp gardenia with conspicuous longitudinal keels along its calyx and fruit. The specimens cited included the Bornean specimens *Teysmann* 8267 and 8333, *Jaheri* 1893 and *Hallier* 1416B, and a Sumatran collection by Buurman v. Vreede. Since there was no type indicated by Valeton, all his cited specimens are treated as syntypes. As discussed in Article 9.9 of the International Code of Botanical Nomenclature (Greuter *et al.*, 2000), lectotypification is possible for this name. *Hallier* 1416B is selected as the lectotype because it includes well-preserved fruiting material that shows the diagnostic calyx characteristics clearly. The *inschedula* name '*Gardenia pseudocarinata* BC Stone' dated 1979 was seen on two sheets of *G. pterocalyx* specimens at the University of Malaya Herbarium (KLU) but this unpublished name has no bearing on the nomenclature.

Wong (1982) recorded *Gardenia pterocalyx* while reviewing the genus for the Malay Peninsula. The specimens he examined were mainly collected from swamps on the east coast of the Malay Peninsula. However, a specimen said to be collected near Gunung Ulu Kali, on the border of Selangor and Pahang states at about 1200 ft (366 m), was also cited by him. After studying the Malayan material and their overwhelming distribution in coastal peat swamp forests, it is considered that this montane record is possibly in error; it is not impossible that the specimen has been affixed with the wrong label. This species has certainly not been found in the Ulu Kali area after repeated visits there.

All cited specimens by Wong match Valeton's description and cited specimens in his 1912 article. In addition Wong (1982) also considered some Bornean specimens thought to be *Gardenia pterocalyx* (a distinct species here described as *G. chanii*, above) and noted that Malayan specimens 'have rounded leaf apices while Bornean specimens seen have leaves with a short tip'. *Gardenia chanii* has also been generally misidentified in regional herbaria as *G. pterocalyx*. *Gardenia pterocalyx* has a wider distribution than *G. chanii* (Fig. 4, see above), ranging from Sumatra to the east coast of the Malay Peninsula and West Kalimantan in Borneo.

Additional specimens examined. PENINSULAR MALAYSIA. **Terengganu:** Kuala Terengganu, Paya Bukit Pakbeh, 6 ix 1955, *Sinclair & Kiah* SFN40733 (L, SING). **Selangor/Pahang:** Road to

Gunong Ulu Kali, 1200 ft [366 m] [locality statement on specimen likely in error], v 1970, *Mahmud* s.n. (KLU). **Pahang:** Tasek Bera, 29 i 1967, *Stone* BCS6614 (KLU), 30 vii 1970, *Stone* BCS9484 (KLU), 28 x 1961, *Poore* 951 (KLU); Pos Iskandar, 1 vii 2006, *Wong* s.n. (KLU), 15 x 1930, *Henderson* SFN24138 (SING), 7 ix 2005, *Low et al.* LYW68 (KLU); Sungai Bebar, 9 iv 2005, *Low et al.* LYW27 (KLU), LYW30 (KLU); Rompin, Menchali Forest Reserve, 17 iv 2004, *Ong* EL41 (KLU), 18 vi 2004, *Chan & Wong* CML18 (KLU), 17 iv 2004, *Chan* s.n. (KLU); On the way to Rompin from Pasir Panjang, 16 xi 2003, *James* s.n. (KLU).

SUMATRA. **Riau:** Siak, xi 1897, *Ridley* 8997 (SING). **Jambi:** Taman Nasional Berbak, 18 xii 2005, *Arief & Widjaja* AH1040 (KLU).

BORNEO. **Kalimantan:** West Kalimantan, Kapoeas, Landak, without date, *Teysmann* 8267 (BO); Semitau, 12 viii 1932, *de Wol* b.b.17087 (BO, SING); Poeloe Madjang, without date, *Jahehi* 1893 (L), 6 x 1949, *Polak* 1889 (BO, L), without date, *sine coll.* (L), 12 xi 1924, *Boschproefstation* BB7690 (BO, L); Kajoe Landak, without date, *Teysmann* 8333 (BO, L); Danau Sentarum Wildlife Reserve, Lake Sekawi, 2 xii 1993, *Zulkarnain & Giesen* 429 (L).

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