

**A REVISION OF BADUSA (RUBIACEAE, CONDAMINEAE, PORTLANDIINAE)**

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SUMMARY

The genus *Badusa* is transferred from the Cinchoneae to the Condamineae subtribe Portlandiinae: it is closely related to *Morierina*. A new species *B. palawanensis* is described from Palawan, and a new subspecies from Biak, *B. corymbifera* ssp. *biakensis*.

Sorting through the materials of *Cinchona* from Malesia an unusual plant from Palawan was found which had been pre-identified to this genus. Flowering material was found under indeterminate specimens of *Bikkia*. Subsequently it was clear that these specimens were a new species of *Badusa*, so far known from Tonga, Fiji through to Solomon I. and Micronesia, with one collection from Biak, New Guinea. However, further material is possibly reported in the older literature.

*Badusa philippica* was supposedly collected near Manila by Nees, the identity and locality being questioned by Merrill. Unfortunately the type material could not be traced in Madrid. *Badusa* and *Bikkia* are two genera with short intrapetiolar cup-like stipules and I suspect that *Macrocnemon parviflorum* from the Moluccas also belongs to *Badusa*, but again no type material has so far been traced.

**BADUSA A. Gray (Tribe Condamineae)**

*Badusa* A. Gray, Proc. Am. Acad. Arts 4 (1859) 308; Hook. f. in Benth. & Hook. f., Gen. Pl. 2 (1873) 42; K. Schum. in Engl. & Prantl, Nat. Pfl. Fam. 4, 4 (1891) 54; Gillespie, Bishop Mus. Bull. 74 (1930) 28; Lemée, Dict. 1 (1929) 480. — *Bathysograya* O. Kuntze, in Post & Kuntze, Lexic. (1903) 62. — T y p e s p e c i e s: *B. corymbifera* A. Gray.

Small trees. Terminal vegetative *bud* shortly trigonal. *Stipules* inter- and intra-petiolar, connate at the base and sheathing the stem, annular, shallowly undulate to deltoid, inside with colleters at the base. *Leaves* opposite, petiolate. *Inflorescence* an axillary thyrs. *Flowers* (4– or) 5–merous, pedicelled. *Corolla* infundibular to hypocrateriform, inside pubescent; lobes imbricate, quincuncial. *Stamens* inserted at the base of the corolla, usually shortly united at the base, filaments long exerted, included part pubescent; anthers basifixed, introrse. *Style* exerted. *Disc* small. *Ovary* 2-locular, placenta Y-shaped, attached to septum at junction of arms, ovules acropetally imbricate. *Fruit* a capsule splitting septicidally and loculicidally. *Seeds* small, slightly winged or crested at one end.

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## KEY TO THE SPECIES

- 1a. Calyx with filiform lobes 5–6 mm long. Palawan . . . . . **1. *B. palawanensis***  
 b. Calyx margin undulate or with triangular lobes less than 4 mm long . . . . . 2  
 2a. Corolla tube over 10 mm long. Calyx 3–4 mm; lobes narrowly triangular, 2–2.5 mm long. Palau . . . . . **2. *B. palauensis***  
 b. Corolla tube 5–8 mm long. Calyx less than 2 mm long. . . . . **3. *B. corymbifera***

**1. *Badusa palawanensis* Ridsd., *sp. nov.* — Fig. 1.**

Frutices vel arbores mediocres. *Stipulae* annulae, undulatae, dorso glabrae. *Folia* elliptica 7–10 × 2–3 cm, chartacea utrinque glabra, apice acuminata, basi cuneata, nervis lateralibus 7–10 paribus, domatia pubescentia; petioli (1.5–) 2–3 cm longi. *Inflorescentia* lateralia, axes floriferae solitariae.

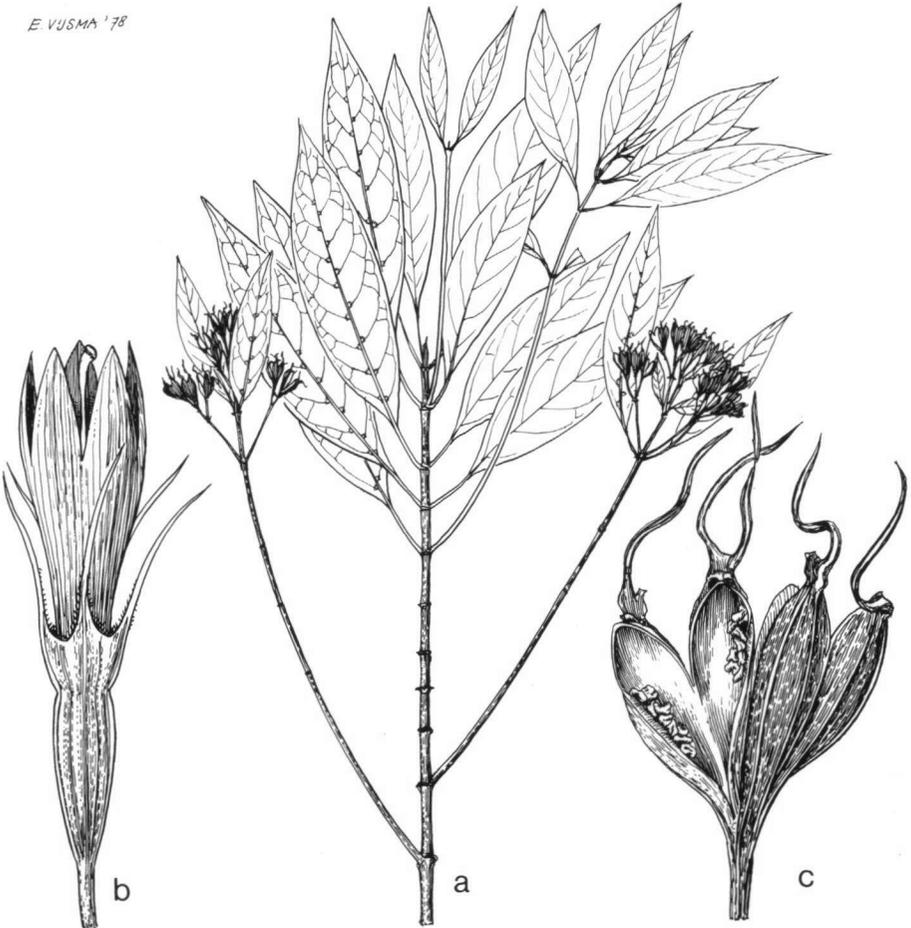


Fig. 1. *Badusa palawanensis*. — a. habit ×  $\frac{1}{2}$ ; b. flowers × 4; c. fruit (a. PNH 93357; b, c. PNH 80766).

*Flores* 5-meri. *Hypanthium* 2 mm longum. *Calyx* 1.5 mm longus, lobis filiformis, 5–6 mm longis. *Corolla* infundibularis, nondum bene evoluta, tubo 6 mm longo, extus glabra intus leviter pubescens, lobis oblongis 5 × 2 mm. — *T y p u s*: *PNH 80766* (L).

Shrub 2 m high, 3 cm diam. *Stipules* annular, 1 mm long, shallowly undulate, glabrous. *Leaves* elliptic, 7–10 × 2–3 cm, chartaceous, above and below glabrous; apex acuminate; base cuneate; lateral nerves 7–10 pairs, inconspicuous, with densely hairy domatia in the axils. Petiole (1.5–) 2–3 mm long. *Inflorescence* terminal on lateral shoots, these bearing normal and reduced leaves, rather compacted and branching from upper 1 or 2 nodes. *Flowers* only known in bud, 5-merous. *Hypanthium* 2 mm, glabrous. *Calyx* glabrous; tube 1.5 mm long; lobes filiform, 5–6 mm long. *Corolla* infundibular; tube 6 mm, outside glabrous, inside pubescent; lobes oblong, 5 × 2 mm. *Capsule* oblong, 6 mm long, crowned by persistent calyx remnants.

*D i s t r i b u t i o n*. Palawan, Lipuon Peak (*PNH 80766, 91357*).

*E c o l o g y*. Rocky summit of limestone hill.

*N o t e*. Decoction of roots used to cure malaria.

## 2. *Badusa palauensis* Veleton

*Badusa palauensis* Veleton, Engl. Bot. Jahrb. 63 (1930) 299; Kanehira, Bot. Mag. Tokyo 45 (1931) 348; Fl. Micronesica (1933) 353, fig. 183; J. Dept. Agric. Kyushu Imp. Univ. (Enum. Micron. Pl.) 46 (1935) 415. — *L e c t o t y p e*: *Kraemer s.n.* anno 1910 (?† - photo L). — *S y n t y p e s*: *Ledermann 14098, 14150* (n.v.).

Small tree 5–15 m high. *Stipules* deltoid, 3–5 mm long. *Leaves* elliptic (–oblong), 6–13 × 3–5.5 (–6.5) cm, somewhat coriaceous, above and below glabrous; apex acute; base acute; lateral nerves 8–11 pairs, usually drying pallid, with densely villose domatia in axils. Petiole 1–3 cm long. *Inflorescence* axillary, up to 20 cm long with 2–3 major nodes, these sometimes bearing reduced leaves up to 5 × 2 cm. *Flowers* 5-merous. *Pedicele* 5–6 mm long. *Hypanthium* 6–7 mm long. *Calyx* 3–4 mm long; lobes narrowly triangular, 2–2.5 mm long. *Corolla* hypocrateriform; tube 10–12 mm long; outside glabrous, inside pubescent; lobes linear, 12–15 × 2–3 mm, often twisted or rolled. *Stamens* 14–16 mm exerted, anthers 9 mm long. *Style* 12–14 mm exerted, stigma obovoid. *Disc* small, glabrous. *Capsule* 10–12 mm long.

*D i s t r i b u t i o n*. Micronesia: Palau.

*E c o l o g y*. Kanehira notes that the plant grows on coral rocks.

*N o t e*. A photograph and some sketches were recently found among Veleton's manuscripts at the Rijksherbarium which included notes for 'Fl. Mikronesien' (Bot. Jahrb. 63 (1930) 288–233). Also sketches of some species of *Randia*, *Oldenlandia*, *Amaracarpus*, and *Tarenna* have been found.

## 3. *Badusa corymbifera* (Forst. f.) A. Gray

*Cinchona corymbifera* Forst. f., Nov. Act. Soc. Sci. Uppsala 3 (1780) 176; Linn., Sp. Pl. Suppl. (1781) 144; Forst. f., Fl. Inst. Austr. Prodr. (1786) 15; Vitm., Sum. Pl. 1 (1789) 461; Vahl, Skrift. Nat. Hist. Selskab. København 1 (1790) 22; Symb. Bot. 2 (1791) 37; Gmel., Syst. Nat. 1 (1792) 361; Linn., Syst. Veg. ed. 15 (Murray) (1797) 222; Lambert, Descr. Genus Cinchona (1797) 14,

25, fig. 5; Forst. f., Herb. Austr. (1797) 7, 16; Willd., sp. Pl. 1, 2 (1798) 959; Vitm., Suppl. Sum. Pl. (1802) 263; Rohde, Monogr. Cinchonae (1804) 36, 73; Pers., Synop. Bot. 1 (1805) 197; Lamarck, Encycl. Method. 6, 1 (1806) 36; Forsberg, Dissert. Bot. Cinch. (praside C. Thunberg) part 1 (1811) 6, 9. — *Exostemma corymbifera* Roem. & Schultes, Syst. Veg. 5 (1819) 20; Steudel, Nom. Bot. ed. 1, 1 (1821) 331; Von Bergen, Monograph. Chinae (1826) 227; DC., Prodr. 4 (1830) 358; G. Don, Gen. Hist. 3 (1834) 482; Endlicher, Bemerck. Fl. Süds. (1836) 175; Steudel, Nom. Bot. ed. 2, 1 (1840) 623. — *Badusa corymbifera* A. Gray, Proc. Am. Acad. Arts 4 (1859) 308; Horne, A year in Fiji (1881) 257; Drake del Castillo, Ill. Fl. Ins. Mar. Pacific (1890) 1853; Gillespie, Bishop Mus. Bull. 74 (1930) 28, fig. 37; Fosberg, Bull. Torrey Bot. Club 67 (1940) 418; Yuncker, Bishop Mus. Bull. 220 (1959) 246; Parham, Pl. Fiji Is. (1964) 187, fig. 67; rev. ed. (1972) 264, fig. 78; Whitmore, Guide to Forests Brit. Solom. I. (1966) 168. — T y p e: *Forster*, Tonga (n.v.).

*Badusa occidentalis* Guill., J. Arn. Arb. 13 (1932) 3. — T y p e: *Guillaumin* 393 (n.v.).

#### KEY TO THE SUBSPECIES

- 1a. Corolla lobes 5–8 mm long. Calyx lobes undulate to shallowly dentate. Tonga, Fiji to Solomon I. . . . . subsp. **corymbifera**  
 b. Corolla lobes over 12 mm long. Calyx lobes deltoid. Biak. . . . . subsp. **biakensis**

#### 3a. subsp. **corymbifera**

Tree up to 7 m high, d.b.h. up to 8 cm; outer bark light brown, fissured; inner bark soft, yellowish white; wood hard, yellowish brown. *Stipules* deltoid, 3–5 mm long, outside glabrous, inside with colleters at the base. *Leaves* (elliptic–) oblong to obovate (–oblong), 5–15 × 3–7(–9) cm, chartaceous; above and below glabrous; apex acute to acuminate; base acute to attenuate; lateral nerves 6–8 pairs, usually drying pallid. Petiole 1–3 cm long. *Inflorescence* axillary, (2–)5–20 cm long, with 3 major nodes, these sometimes bearing bracts or reduced leaves up to 5 × 1.5 cm. *Flowers* usually 5-merous (come 4-merous flowers sometimes present in same inflorescence). *Pedice*l (3–)5–15 mm long. *Hypanthium* 3–5 mm long, glabrous. *Calyx* 0.5–1.5 mm long, somewhat cupular, outside glabrous, inside pubescent; lobes undulate to shallowly dentate, apex glandular. *Corolla* hypocrateriform; tube 5–7 mm long, outside glabrous, inside pubescent; lobes ovate-oblong, 5–8 × 1.5–3 mm. *Stamens* 8–10 mm exerted; anthers 4–5 mm long. *Style* 5–7 mm exerted, stigma clavate. *Disc* small, glabrous. *Capsule* cylindrical, 8–10 mm long, crowned by persistent calyx and disc remnants, dehiscing septicidally and slightly loculicidally.

**Distribution.** Tonga; Fiji: Ovalau, Viti Levu; New Hebrides; Aneityum, Espiritu Santo; Solomon I: Guadalcanal, Nggela, Malaita, New Georgia.

**Ecology.** Commonly reported from secondary beach and ridge forest. Gillespie notes plant growing on limestone in Tonga and *Chew Wee-Lek RSNH 312* notes plant growing on coral limestone in Solomon I. but here also reported on plutonic rocks near beach (*BSIP 12302*).

#### 3b. subsp. **biakensis** Ridsd., *subsp. nov.*

Differt ab subsp. *corymbifera* corollae lobis majoribus 13 mm longis. — T y p u s: *BW 2365* (L).

Tree 20 m; bole 6 m, 18 cm diam.; outer bark greyish brown with many shallow fissures, slightly peeling, inner bark whitish yellow; heartwood pallid yellowish brown. *Stipules* deltoid, 3–4 mm long, apiculate. *Leaves* elliptic (–oblong), 7–16 × 3–6 cm.

*Inflorescences* axillary cymes, 10–25 cm long, with 3 major nodes bearing reduced leaves up to 4 × 4 cm. *Flowers* 5-merous. *Hypanthium* 2–3 mm. *Calyx* 1.5 mm; lobes deltoid, 0.5 mm long. *Corolla* tube 6–7 mm; lobes 13 mm long. *Stamens* 14 mm exerted; anthers 4–5 mm long. *Capsule* 5–8 mm long.

**D i s t r i b u t i o n.** New Guinea: Biak, Arjombokar.

**E c o l o g y.** Secondary forest on limestone.

**N o t e.** In the form of the calyx and corolla this subspecies is rather intermediate between *B. corymbifera* and *B. palauensis*.

#### DUBIOUS SPECIES

##### 1. *Macrocneumon parviflorum* Roxb.

*M. parviflorum* Roxb. [Hort. Beng. (1814) 85, *nom. nud.*], Fl. Ind. ed. 1, 2 (1824) 144; Spreng., Syst. Veg. Curae Post (1827) 73; G. Don, Gen. Hist. 3 (1834) 512; Steudel, Nom. Bot. ed. 2, 2 (1841) 88. — **T y p e:** *Roxburg s.n.* (not traced).

Shrubby, leaves short-petiolate, lanceolate, entire, smooth. *Stipules* annular, truncate. *Peduncles* axillary, many-flowered. *Corolla* acetabuliform. A native of Moluccas.

**N o t e.** No further collections known from the Moluccas.

##### 2. *Badusa philippica* (Cav.) Vidal

*Cinchona philippica* Cav., Ic. 4 (1797) 15, t. 329; Rohde, Monogr. Cinchonae (1804) 36, 71; Pers., Synop. Bot. 1 (1805) 196; Forsberg, Dissert. Bot. Cinch. (praside C. Thunberg) part 1 (1811) 6, 9. — *Exostemma philippica* Roem. & Schultes, Syst. Veg. 5 (1819) 20; Steudel, Nom. Bot. ed. 1, 1 (1821) 331; Von Bergen, Monograph. Chinae (1826) 226; DC., Prodr. 4 (1830) 360; G. Don, Gen. Hist. 3 (1834) 482; Steudel, Nom. Bot. ed. 2, 1 (1840) 106; F.-Vill., Novis. App. (1880) 106. — *Badusa philippica* Vidal, Rev. Pl. Vasc. Filip. (1888) 150; Merr., En. Philip. 3 (1923) 576. — **T y p e:** *Nees s.n.* prope Manila in Santa Cruz de la Laguna (not traced in Madrid).

**N o t e.** Merrill excluded this species as nothing approaching it had been recollected from the area and, as the plant was outside the then known range of *Badusa*, suggested that the locality mentioned was in error. However, this standpoint should be questioned.

#### SYSTEMATIC POSITION

*Badusa* has always been placed in the Cinchoneae where it has been compared to the American genus *Exostemma*. I have always considered that *Badusa* is a very atypical member of this tribe, particularly in the nature of the seeds. Further, few genera of the Cinchoneae have basifixed anthers with filaments attached to the base of the corolla; those known to me are *Coutarea*, *Exostemma*, *Hintonia*, and *Schmidotia*. *Badusa* has imbricate aestivation of the corolla lobes; when the corolla is 5-merous, it is quincuncial. It is interesting to note that Aiello (1979) reports the same aestivation in all the genera allied to *Portlandia* which she studied. Unfortunately I have not been able to examine young buds of *Bikkia*.

*Badusa* has a Y-shaped placenta attached to the septum in the central portion (here T-shaped in section) and bears more or less horizontal, scarcely winged seeds attached at one edge, comparable to that illustrated for *Bikkia (Grisea)* by Hallé. The ovules are acropetally imbricate, comparable perhaps to *Cigarella* and *Ceuthocarpus* (Aiello, J.

Arn. Arb. 60, 1979: 38–126), slightly mucronate at free and which develops into the short 'wing'. Aiello excludes *Cigarella* from Condamineae suggesting a place in Hedyotideae or Cinchoneae; presence or absence of raphides was not mentioned. Despite this I consider that the correct position of *Badusa* is in the Condamineae subtribe Portlandiinae where it most closely approaches the New Caledonian genus *Morierina*; indeed there appear to be few differences between these two genera, except the size of the floral parts.

In aestivation the subtribe Portlandiinae differs from the remainder of the Condamineae; *Coutarea*, *Exostemma*, *Hintonia*, and *Schmidotia* differ from this subtribe only in the orientation of the seeds and their mode of attachment. However, the remainder of the Cinchoneae is also heterogeneous in this respect (Ridsdale & Friskus, unpublished observations). Further study might well indicate that the Portlandiinae are worthy of recognition at tribal level.