

## NEW DIPTEROCARP SPECIES FROM THE PHILIPPINES

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### ABSTRACT

Four new species of plants under the family Dipterocarpaceae from the Philippines are here described: *Hopea reynosoi* Gut., Rojo & Madulid; *Hopea santosiana* Gut., Rojo & Madulid, *Shorea arsorianoii* Gut., Rojo & Madulid and *Vatica mendozae* Gut., Rojo & Madulid

**KEYWORDS:** Dipterocarpaceae, Hopea, Vatica and Shorea, Philippines

### INTRODUCTION

Since Ashton's revision of the Dipterocarpaceae in the Malesian region in 1982 no other taxonomic account was published pertaining to Philippine dipterocarps. In 1983 Hermes G. Gutierrez defended his Ph.D. dissertation entitled "The Philippine Dipterocarpaceae (Philippine Mahogany Family)" to the Graduate School of the University of Santo Tomas, Manila. In his dissertation he recognized 54 species, four of which he proposed as new to science. These taxa have never been published. Gutierrez later migrated to the United States but before leaving he asked DAM and JPR to review the new taxa for eventual publication.

#### 1. *Hopea reynosoi* Gutierrez, Rojo & Madulid, sp. nov. Plate 1

*H. foxwothyi* Elmer affinis sed folia, stylopodus, ramuli inflorescentiae differt.- *Typus:* E.J. Reynoso & De la Cruz, PNH 125470 (PNH, Holo). Philippines, Eastern Samar, Balangiga, Bo. Sta. Rosa, March, 1978.

Medium size tree to 15 m tall, stem to 35 cm in diameter at breast height. Branchlets glabrous, lenticellate, dark-brown to dark-chocolate in color. Leaf-blade chartaceous to sub-coriaceous, glabrous, narrowly elliptic, rarely slightly ovate-lanceolate, (4-) 5.5 to 6.5 (-7.5) cm long, (1.3-) 2-2.5 (3) cm wide, approximately thrice as long as broad, apex caudate-acuminate, obtuse, the

caudate tip about one-fifth to one-sixth the length of the blade, the base slightly cuneate, obtuse, equal or faintly unequal; midvein depressed above, distinctly keeled beneath, lateral veins arching, reaching near slightly inrolled margin, 6 to 8 on each side, with one rarely two, inconspicuous alternating veins, reticulate venules not distinct; domatia absent. Petioles 0.5 to 0.7 cm long, glabrous, or covered with minute simple hairs, becoming glabrous with age, faintly sulcate to terete, sometimes faintly ridged. Stipules not seen. Inflorescences glabrous or sparsely covered with minute, glabrescent, simple hairs, short, up to 1.5 cm long. Panicles up to 5 branches, borne singly, rarely in pairs, ramiflorous, in the axils of leaf scars, rarely of leaves, when in pairs arranged side by side, racemes bearing 1 to 5 subsessile flowers; bracts not seen; bracteoles obsaggitate, ovate, apparently connate, about 0.5 mm long. Flowers at anthesis not seen; buds tawny; pubescent on the petals; pedicels about 0.3 mm long, lepidote, glabrescent, cylindric. Calyx lepidote outside, glabrescent, glabrous inside, the outer 2 sepals ovate, acute, about 1.5 mm long and wide; the 3 inner sepals sub- to orbicular, pointed at the apex, about 1.5 mm long and wide, with few hairs on the margins. Petals about 2 mm long, 1 mm wide, oblong, oblique, obtuse, hairy on the outside exposed in bud. Stamens 15, in 3 whorls of 5, 3 to each petal, outer and inner rows opposite the petals, the middle apparently opposite the sepals; filaments of different lengths, as long as to slightly more than twice the length of the anthers, flattened at base, tapering shortly below the anthers; anthers oblong to orbicular about 0.3 mm long; the awnlike terminal appendage glabrous, 0.4-0.5 mm long, about twice the length of the anther. Stigma minute; style glabrous, broader at base, tapering to the top, 0.3 mm long, about twice the length of the stylopodium. Stylopodium densely lepidote, large, apparently forming an hour-glass shape gynoecium, about 0.5 mm long; ovary glabrous, subspherical, about 1 mm long by 0.8 mm wide. Fruit unknown.

**Specimens examined:** Eastern Samar, Balangiga, Bo. Sta. Rosa, PNH 125470 E.J. Reynoso & De la Cruz, March, 1978.

**Local name:** Salngan-Siyao (Samar-Bis.)

**Distribution:** Samar, Balangiga, Sta. Rosa. Endemic.

**IUCN Red List Category:** Critically Endangered

**Relationships:** *Hopea reynosoi* is one of three species of the genus *Hopea* that have depressed midrib above and keeled beneath. It is closest to *Hopea foxwothyi* Elmer in the size and in the shape of the leaves. However, it has less distinct veins and has no domatia. Inflorescences are largely ramiflorous, ovary surmounted by a large, lepidote stylopodium.

The bark is similar to *H. Foxworthy* in being thin, dark-brown to dark-chocolate in color, flaking irregularly in relatively small chips.

**Etymology:** This species is named in honor of Ernesto J. Reynoso, former botanical collector and museum technician of the Philippine National Herbarium, National Museum.

**2. *Hopea santosiana* Gutierrez, Rojo & Madulid, sp. nov. Plate 2**

*H. quisumbingiana* Gutierrez affinis sed foliorum nervaturam distincta, nervus medius elevatus, stylopodium, appendix terminalis, scaberulus ciliatus differt. - *Typus:* E.J. Reynoso & De la Cruz, PNH 125468 ( PNH, Holo). Philippines, Eastern Samar, Balangiga, Bo. Sta. Rosa, March, 1978.

Medium size tree to 10 m tall, stem to 25 cm in diameter at breast height. Branchlets glabrous, occasionally with few simple minute hairs, glabrous rescent, dark-chocolate in color. Leaf-blade chartaceous to coriaceous, glabrous, elliptic to suborbicular-acuminate, 7.5-9.5 cm long, 4-5.5 cm wide, approximately twice as long as broad, apex caudate-acuminate, obtuse, the caudate tip about one-fifth the length of the blade, base faintly cuneate, obtuse, equal to slightly unequal; midvein distinct on both sides, lateral veins arching, reaching near slightly inrolled margin, 8-12 on each side, with many long and short alternating minor veins, reticulate venules not distinct; domatia hollow depressions, confined to the axils of lateral and minor veins up to 13 on each side, provided with tufts of hairs on the margin. Petioles 0.8-1 cm long, glabrous, sulcate, rather terete when dry. Stipules not seen. Inflorescences glabrous or sparsely covered with minute, glabrescent, simple hairs, terminal and/or axillary, short, about 2 cm long. Panicles up to 3 branches, borne singly or in pairs in the axils of leaves or leaf scars, when in pairs arranged side by side, racemes bearing 1-3 pedicellate flowers; bracts not seen. Flowers at anthesis not seen; buds tawny pubescent on the petals; pedicles about 1.5 mm long, covered with minute, simple hairs, glabrescent, cylindrical. Calyx lepidote, the 2 outer sepals ovate to suborbicular, glabrous inside, with few hairs on the margins, about 3 mm long and wide; the 3 inner sepals sub-to orbicular, hairy towards the center outside, glabrous inside, about 2.5 mm long and wide, with few hairs on the margins. Petals about 4 mm long, 2 mm wide, oblong, oblique, lanceolate, hairy on the outside exposed in bud, and on the middle portion of the margin inside, otherwise glabrous. Stamens 15, in 3 whorls of 5, 3 to each petal, outer and inner rows opposite the petals, the middle apparently opposite the sepals; filaments of different lengths, flattened at base, tapering shortly below the anthers; anthers oblong to orbicular, about 0.5 mm long; the awnlike terminal appendage scabrous, and ciliate towards the tip, about twice the length of the anther. Stigma minute; style glabrous, broader at base, tapering to the top, 0.8 mm long, as long as the stylopodium. Stylopodium columnar, hairy, and down to the base of the 1 mm long by 0.8 mm wide, conical to ovoid ovary. Fruit unknown.

**Specimens examined:** Eastern Samar, Balangiga, Bgy. Sta. Rosa. PNH 125468 E.J. Reynoso & De la Cruz, March, 1978, in flower buds.

**Local name:** Siyao (Samar-Bis.).

**Distribution:** Samar, Balangiga, Sta. Rosa. Endemic.

**IUCN Red List Category:** Critically Endangered

**Relationships:** *Hopea santosiana* is the only species in the Philippines with distinctly dryobalanoid venation. It is similar to *Hopea quisumbingiana* Gut. in the shape of the leaves and in having a hairy ovary. It differs from the latter, however, in the size of its leaves; the raised midrib, the presence of a columnar stylopodium, and the scabrous, ciliate, terminal appendages.

The bark is similar to *Hopea malibato* Foxw. and *Hopea dalingdingan* Gutierrez. The wood is hard. It is found along river side.

**Etymology:** This species is named in honor of Dr. Jose Vera Santos†, formerly Professor Emeritus, University of the Philippines, Diliman, Quezon City who was a guiding inspiration to his students in botany.

### **3. *Shorea arsoriano* Gutierrez, Rojo & Madulid sp. nov. Plate 3**

*Shorea virescens* Auct. non\_PARIJS, ASHTON, Fl. Mal. Prec. Dipt. Gard. Bull. Sing. 31 (1978) 44; ROJO, Kalikasan, Philipp. J. Biol. 5 (1976) 99.

*S. malaanonan* (Blanco) Blume affinis sed staminum, pistilli differt. - *Typus:* Gutierrez, Reynoso & Aga, PNH 123122, (PNH, Holo). Philippines, Mindanao: Surigao del Sur, Bislig, PICOP April, 1977.

Large tree, 30-50 m tall, stem up to 100 cm in diameter at breast height. Branchlets brown to dark-chocolate in color, densely covered with fine tufted, stellate hairs, becoming glabrous with age; stipules, petiole, midvein above and beneath, lateral veins, tertiary veins and reticulate venules, inflorescence, bracts, bracteoles, pedicles, calyx, petals similarly haired, but differs in density, with age. Stipules oblong, obtuse, recurved, at apex, up to 6 mm long, 3 mm wide. Leaf-blade coriaceous, greenish-brown to brown above, darker shade beneath, oblong, or oblong-elliptic to elliptic, rarely suborbicular, shortly acuminate, or acute, usually folded when pressed at apex, base obtuse, occasionally subcuneate, (6-) 11.5 to 15.5 (-21) cm long, (3-) 6.5 to 7.5 (-8) cm wide; the midvein sunken above, prominent and keeled beneath, lateral veins prominent, raised beneath, faintly distinct above, (14-) 17-18 (-21) on each side, arching toward near margin, not forming intramarginal veins; tertiary veins, scalariform, distinct below, faintly distinct above in thinner leaves, reticulate venules indistinct. Domatia absent. Petioles furrowed, sulcate, hairs becoming glabrous, or nearly so, with age, 1.5-2 cm long. Inflorescences terminal and axillary panicles, up to 18 cm long, with few

distantly placed branches, rarely re-branched, slender, loosely hanging, bearing 3-4, pedicellate, distantly apart, alternate flowers. Bracteoles narrowly elliptic-oblong, obtuse at apex, 10 mm long, 4 mm wide, sparsely hairy inside. Flowers yellow, slightly fragrant, up to 2.5 cm long at anthesis, the buds ovate-elongate. Pedicels 1.5-2 mm long. Calyx lobes hairy on the outside, confined on the upper half portion inside, 3 outer sepals ovate-oblong, obtuse at apex, 5 mm wide, about 2 mm at its widest, the 2 inner sepals ovate-lanceolate, acute at apex, 4 mm long, about 2.5 mm wide. Petals linear-oblong, twisted medially, obtuse at apex, geniculate near base, spreading, starlike at top view, hairy on the outside exposed in bud, glabrous inside, except along right side, near margin, with 12, or more distinct longitudinal nerves, 2 cm long, 0.5 cm wide. Stamens 15; seemingly in 3 series, 10 in pairs, 5 alternating singles; filaments of two different lengths, from 1 mm to 1.5 mm long, broadened at base, tapering above the middle or shortly filiform below the anthers. Anthers equal, oblong, 1 mm long, 0.4 mm wide; appendage to connective scabrous, filiform, erect to reflexed, from outer to inner rows, 1.5-1.8 mm long, about one and one half times the length of the anther. Ovary suborbicular, finely hairy, 0.8 mm long, 1 mm wide; style stout, long, glabrous above the middle, distinctly tricolpate, densely hairy below, 2.25 mm long, approximately two and one half times the length of the ovary; stigma distinctly trifid. Fruit with 5 accrescent sepals, subcoriaceous, 3 long, and 2 short, the 3 long wings linear-oblong to suboblanceolate, obtuse or blunt at apex, narrowed toward the saccate base, with 7-8 longitudinal nerves, reticulate venules not uniformly horizontal, netlike, glabrous, or rarely with few scattered hairs, 7-8.5 cm long, 1-1.5 cm wide, the 2 shorter wings linear-lanceolate, acute at apex, parallel, slightly narrowed toward saccate base, 2.5-3 cm long, 0.3-0.5 cm wide, glabrous, or nearly so; the saccate bases of sepals enclosing two thirds the length of the nut. Nut conical to subspherical, rather resinous, covered with fine adpressed hairs, about 1.5 cm long, 1 cm wide, pointed at the top. Style subpersistent.

**Specimens examined:** Mindanao: Surigao del Sur, Bislig, PICOP, PNH 123122 Gutierrez, Reynoso & Aga, Apr., 1977, in flower, (Type: PNH); PNH 123124 Gutierrez, Reynoso & Aga, Apr., 1977, sterile, (PNH); Mangagoy, PNH 124982 Gutierrez & Reynoso, Sept. 8, 1977, sterile, (PNH); PNH 125813 Wyatt Smith, May, 1978, sapling, fruit, dried leaves, (PNH); Davao del Norte; Asuncion, ADECOR, PNH 125721 J.P. Rojo, Apr. 20, 1971, in fruit, (PNH); Davao City, Bunawan, Galacia, DASTECO, PNH 123132 Gutierrez, Reynoso & Aga, Apr. 1977, in fruit, (PNH).

**Local names :** Manggasinoro (Bis.); manggasinorong-lakihan (Tag., official common name), San Vicente (Bis., refers to the wooden statues of Saint Vincent made from this species).

**Distribution :** Mindanao (Surigao del Sur: Bislig; Davao del Norte, Asuncion; Davao City, Bunawan, Galicia). Endemic

**IUCN Red List Category:** Endangered

**Relationships:** *Shorea arsoriano* was erroneously placed under *Shorea virescens* Parijs, in an article published by Rojo (1976), and erroneously authenticated by Ashton. The report was based on fruiting materials only. This time, flowers are available and examination of the material showed that it is entirely different from *Shorea virescens*.

*Shorea arsoriano* differs from *Shorea virescens* Parijs, in having elongate flower buds, which are ellipsoid in the latter; linear-oblong petals, as against narrowly lanceolate; scabrous appendage to connective, and not exceeding the style apex, as against glabrous and exceeding style apex; suborbicular ovary, style long and stout, densely hairy, about two-thirds the length below, and longer than the ovary, as against ovoid filiform style, glabrous and as long as the ovary.

Manggasinorong-lakihan as called by Rojo (1976), refers to the large size of the leaves as compared with the other species of the manggasinoro Group.

**Economic Uses:** San Vicente is the local name in Barrio Guinobatan, Bunawan, Davao City. as it is this wood used for curving the statue of St. Vincent, the Patron Saint of the Barangay. The wood is suited for building construction, furniture and cabinet making, interior finish, boat planking and decking, sash and mill work, and veneer and plywood. It is mentioned by Rojo that the light to pale yellow wood produces a pleasing and contrasting effect when used alternately with reddish or dark woods in paneling. The logs do not split during felling and hauling from the forest to the mill. It may be due to the interlocked grains of the wood.

**Etymology:** The species is named in honor of Don Andres R. Soriano, Sr., whose family owns the forest concession where the specimens of the species were collected.

#### **4. *Vatica mendozae* Gutierrez, Rojo & Madulid, sp. nov. Plate 4.**

*V. mangachapoi* Blanco affinis sed staminum, pistilli differt. - *Typus:* J.P. Rojo, PNH 121551 (PNH, Holo; CLP, Iso). Philippines, Quezon; Real, Kinalumbakan, May 26, 1972.

Small tree, about 15 m tall, the stem about 2m in diameter at breast height. Branchlet brown to dark-brown, occasionally farinaceous, covered with stellate hairs, becoming glabrous with age. Leaf blade coriaceous, glabrous, narrowly elliptic to elliptic or elliptic-lanceolate, acuminate, the caudate tip obtuse, (7-) 9-11 (-12) cm long, 3-4 cm wide, the base cuneate to acute; midvein distinct on both sides, lateral veins distinct, ascending and arching towards the margin, not forming intramarginal veins, 9 to 10 on each side, reticulate venules conspicuous. Petioles sulcate, somewhat angled,

densely covered with stellate hairs, glabrescent, 1-1.3 cm long. Stipules not seen. Inflorescences terminal and axillary, paniculate, 3-5 cm long, densely covered with stellate hairs, becoming glabrous with age, or nearly so, gradually towards the top. Flowers light yellow, fragrant, about 1.3 cm long at anthesis; pedicels short, to 1 mm long, densely covered with stellate hairs, terete. Calyx lobes stellate-haired on both sides, united above the pedicel, forming a cup at base, 2 slightly longer than the other 3, oblong, obtuse, 3.2 mm long, 1.5 mm wide, the other 3 sepals, lanceolate, pointed at the tip, 3 mm long, 1.5 mm wide. Petals linear-oblong, slightly oblique, obtuse, 13-14 mm long, 4 mm wide, stellate-haired on the surface exposed in bud, glabrous inside. Stamens 6, five inner, one apparently outer pairing with an inner, closely arranged, covering the ovary and style entirely, except spaces between the bases of filaments; filament as long as the anther, broadened at base, tapering shortly below the anther. Anther cells very unequal, 0.5 mm long, oblong; appendage to connective about 0.2 mm long, obtuse, projecting distinctly beyond the anther. Stigma glandular, obscurely 5-lobed; style glabrous, angled, short, 0.5 mm long; the ovary flattened, conoidal, with ridges and depression formed by the impression of the clasping anthers, half immersed in the receptacle, densely with stellate hairs, exposed part about 0.4 - 0.8 mm thick, 1.2-1.5 mm wide. Fruit unknown.

**Specimens examined** : Prov. Quezon; Real, Kinalumbakan, PNH 121551, J.P. Rojo, May 26, 1972, in flower.

**Distribution** : Luzon: Quezon, Real, Kinalumbakan. Endemic.

**IUCN Red List Category**: Critically Endangered

**Relationships**: *Vatica mendozae*. is the only species in the Philippines with 6 stamens, flattened ovary, short style, obscurely 5-lobed glandular stigma. It is similar to *Vatica mangachapoi* Blanco in the shape and size of the leaves, but differs entirely in the characters of and number of stamens, and of the pistil. The calyx lobes, by the nature of the base, is probably cup-forming, similar to *Vatica mindanensis* Foxw.

**Etymology**: This species is named in honor of Demetrio R. Mendoza, former Chief, Botany Division, National Museum, Manila.

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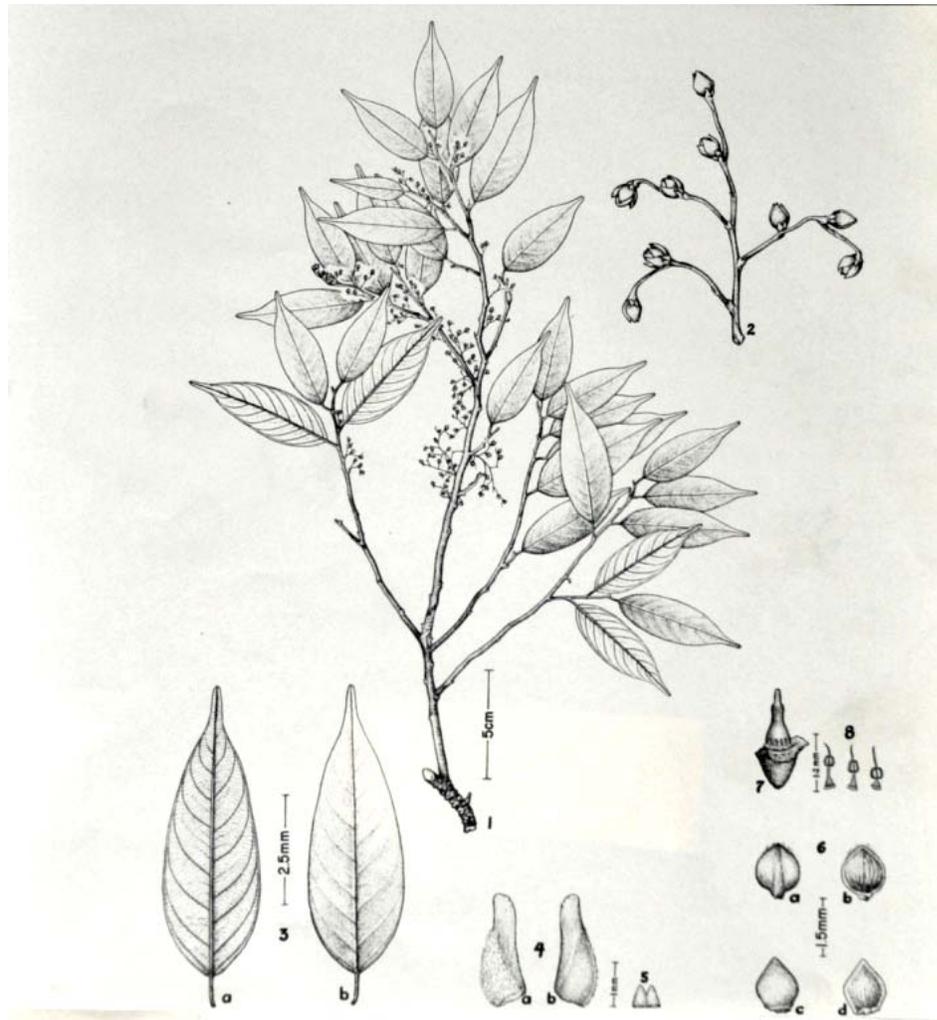


Plate 1. *Hopea reynosoi* Gutierrez, Rojo & Madulid, sp. nov.

1. Habit; 2. Portion of inflorescence; 3. Leaf, (a) lower surface, showing features of venation, (b) upper surface, showing sunken midrib; 4. Petal (bud), (a) dorsal view, (b) ventral view; 5. Bracteoles, dorsal view; 6. Sepals, (a & b) inner sepal, dorsal and ventral view; (c & d) outer sepal, dorsal and ventral view; 7. Pistil; 8. Stamens, showing differences in height, features of appendage to connective and filaments.

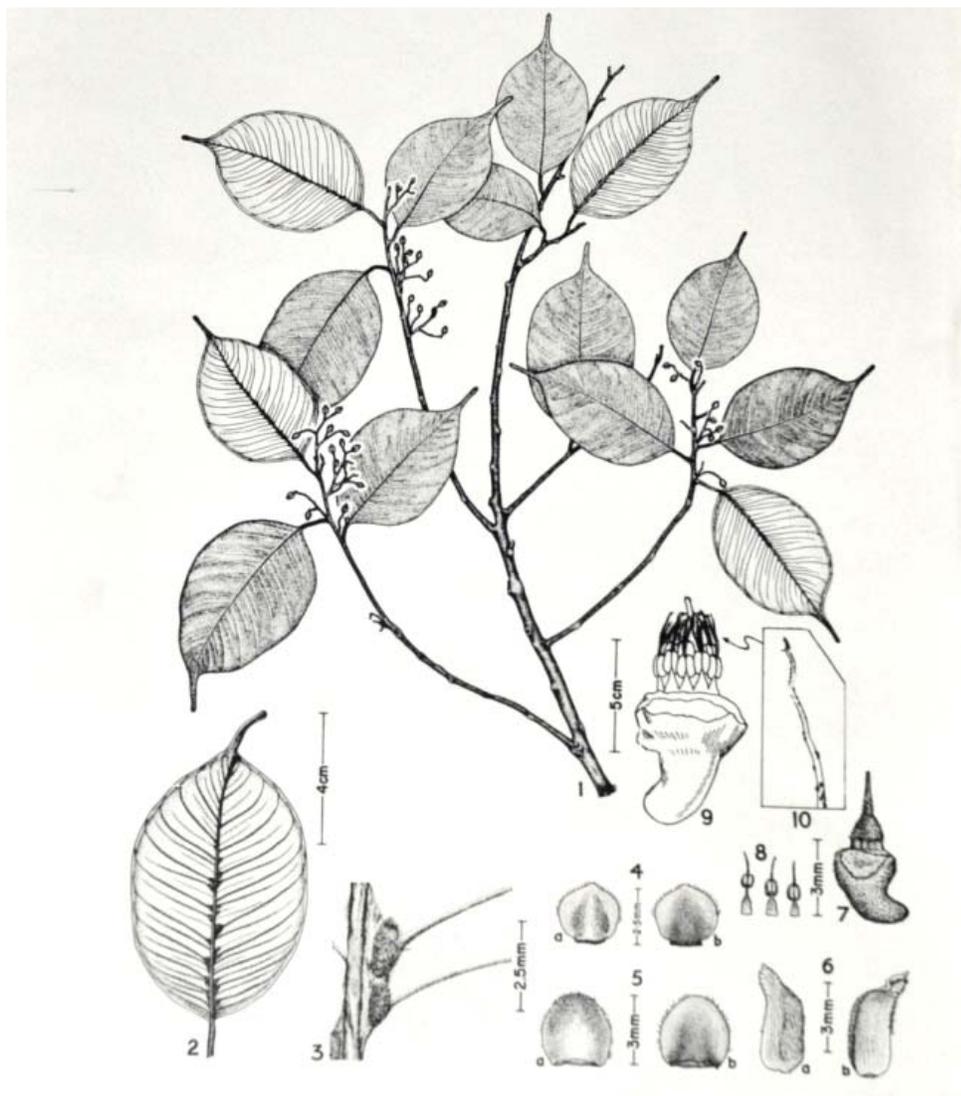


Plate 2. *Hopea santosiana* Gutierrez, Rojo & Madulid, sp. nov.

1. Habit; 2. Leaf, lower surface, showing domatia, and feature of venation; 3. Leaf-portion, showing hairy on axils of lateral veins; 4. Inner sepal, (a) dorsal view, (b) ventral view; 5. Outer sepal, (a) dorsal view, (b) ventral view; 6. Petal, (a) dorsal view, (b) ventral view; 7. Pistil; 8. Stamens showing differences in height; features of appendages to connectives and filaments; 9. Schematic drawing, showing stamens and pistil; 10. Appendage to connective with cilia and tuberoles

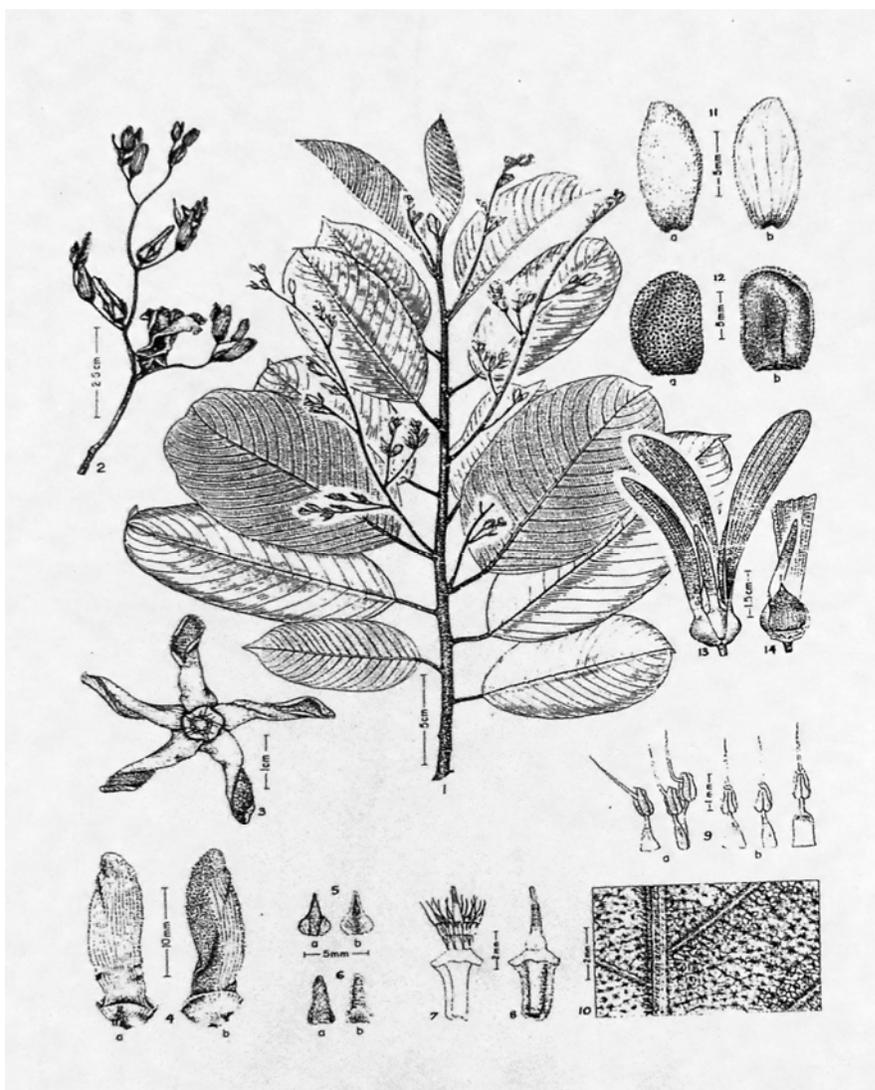


Plate 3. *Shorea arsorianoi* Gutierrez, Rojo & Madulid, sp. nov.

1. Habit; 2. Portion of inflorescence; 3. Top view of corolla and stamens, adpressed but not adnate; 4. Petal, (a) ventral view, showing disposition of 3 stamens to each petal, (b) dorsal view; 5. Inner sepal, (a) dorsal view, (b) ventral view; 6. Outer sepal, (a) dorsal view, (b) ventral view; 7. Schematic drawing, showing stamens and pistil; 8. Pistil; 9. Stamens, (a) showing different heights and appendages representing pairs and singles, (b) ventral view, showing features of filaments; 10. Leaf portion, lower surfaces, showing indumenta, and features of venation. 11. Bract, (a) dorsal view, (b) ventral view; 12. Stipule, (a) dorsal view, (b) ventral view; 13. Fruit; 14. Nut, with some accrescent sepals removed.

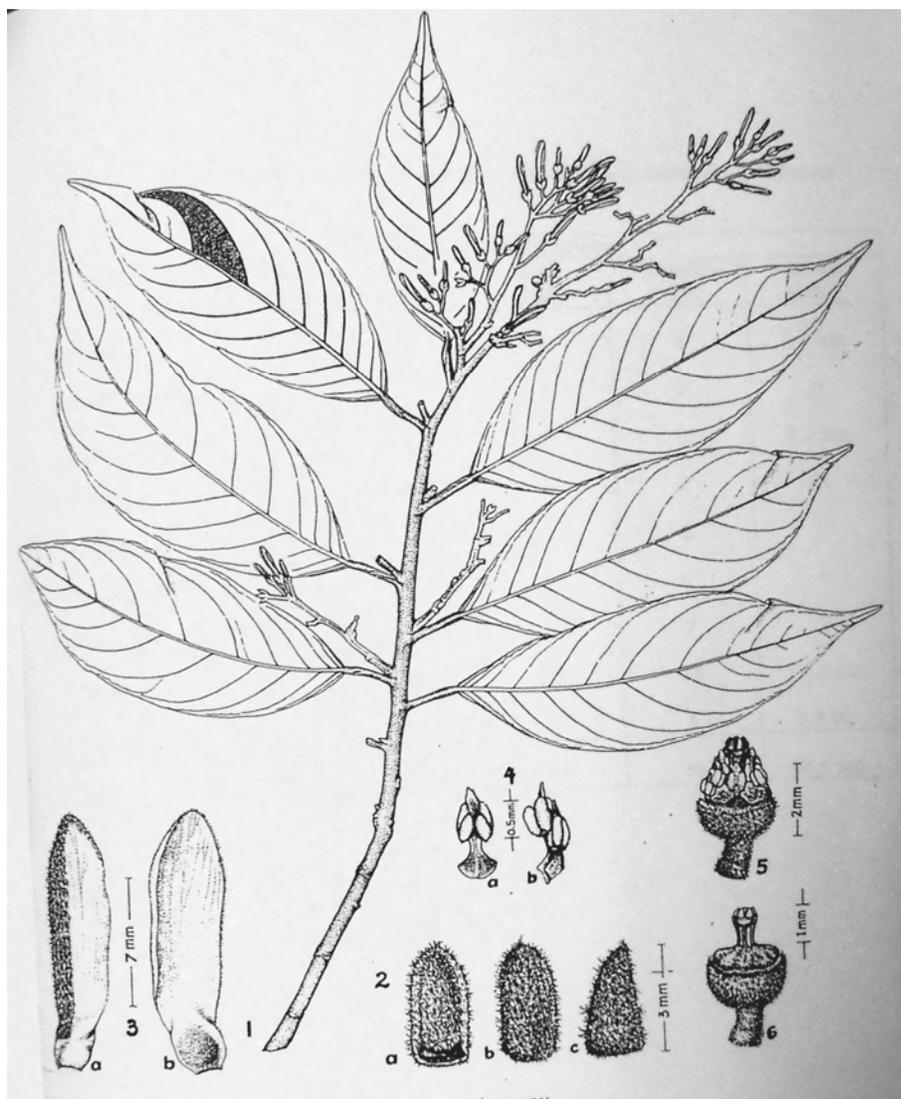


Plate 4. *Vatica mendozae* Gutierrez, Rojo & Madulid sp. nov.

1.Habit; 2. Sepals, (a&b) broaden sepals, ventral and dorsal view, (c) narrow sepal, dorsal view; 3. Petals, (a) dorsal view, (b) ventral view; 4. Stamens, (a) ventral view of a stamen, (b) lone pair of stamens, showing disposition of the sixth, apparently representing outer row; 5. Pistil and stamens showing their arrangement on the receptacle; 6. Pistil with the flattened apparently lobed ovary, half sunken on the receptacle.