

Some New Dipterocarpaceae from Borneo

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A FORESTER'S MANUAL of Brunei's Dipterocarps is in preparation. The present paper provides descriptions for species which will be included in the Manual but which have not as yet been published. Of these several have been recognised for some time past by foresters; *Hopea vacciniifolia*, *Shorea geniculata*, and *S. myrionerva* were recognised but not described by Symington over twenty years ago, and these names were used by him and subsequent collectors on herbarium sheets. Wyatt-Smith prepared, but did not complete, a paper on the three *Parashorea* species, and I am grateful to him for handing this over to me for completion. *S. rubra*, *S. agami*, and *S. flaviflora* were names suggested by G. H. S. Wood, and preparatory notes were made by him for description of the latter. *S. slootenii* was described by him in ms. as *S. vanslootenii*, and *S. pilosa* as *S. tomentosa*. The very distinct *S. isoptera* was named by Wood in ms. as *Neohopea isoptera*, but I am of the opinion that its affinities are too close to *Shorea* to merit generic status.

Kepong code letters were assigned to several of the species here described:

<i>P. macrophylla</i>	=	P. sp. P.
<i>P. parvifolia</i>	=	P. sp. D.
<i>P. smythiesii</i>	=	P. sp. C.
<i>S. acuta</i>	=	S. sp. V.
<i>S. agami</i>	=	S. sp. L. and S. sp. G ₃
<i>S. amplexicaulis</i>	=	S. sp. P.
<i>S. faguetioides</i>	=	S. sp. T.
<i>S. minor</i>	=	S. sp. X ₃
<i>S. revoluta</i>	=	S. sp. V
<i>S. rubella</i>	=	S. sp. A ₃ and S. sp. H ₃
<i>S. rubra</i>	=	S. sp. J ₃
<i>S. slootenii</i>	=	S. sp. N ₁

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for his enthusiastic support and for his aid in obtaining for me the type material of *Hopea garangbuaya*, *Parashorea macrophylla*, and *Shorea bullata*; and to Dr. W. Meijer, Forest Botanist, Sandakan, for his close co-operation and for supplying notes on several species. Lastly, but by no means least, I wish to record the friendly and ever helpful partnership of Ladi anak Bikas, Asah anak Unyong, Mujah anak Guang, and Sengelang anak Nantah, who climbed the trees and obtained the collections on which these descriptions are largely based, and with whom I spent three very happy years exploring the forests of Brunei.

Thanks are also due to Mr. Brian Golding of the Botany School, Cambridge University, for his painstaking preparation of the plates.

This paper is the first of several which will be jointly published with Dr. Meijer, in order to bring our greatly increasing knowledge of Borneo Dipterocarpaceae up to date.

HOPEA FLUVIALIS Ashton s.n.

H. pedicellatae (Brandis) Sym. et *H. griffithii* Kurz affinis sed lobis minoribus calycis in fructu et lamina differt.

Ramuli, perulae, stipulae, petiolique griseo-brunneo-tomentosi; lamina primo griseo-brunneo-tomentosa, dein glabrescens. Ramuli apicem versus -1.5 mm. diam., glabrescentes, leves, lenticellis parvis inconspicuis punctati; internodis 8-20 mm. longis. Gemmae -1 mm. longae, ovoideae. Stipulae -2 mm. longae, lineares, fugaces. Lamina 7-12 $\times$ 2.8-4.8 cm., lanceolato-ovata, tenuis, basi anguste vel late cuneata, subaequali, apice in acumen caudato -1.5 cm. longum attenuato; costis lateralibus primariis utrinsecus c. 10 confertis angustis, angulo 60°-80° exorientibus, ad marginem curvatis, secundariis vix minus evolutis, basalibus marginem secundum ad 1/3 laminae elongatis; intercostis obscuris reticulatis; costa media subtus applanata vel paullum elevata, supra prominenti. Petiolus 7-10 mm. longus, -1.5 mm. diam., sicco niger. Lamina delapsa fusco-brunnea, costa intensius vel nigrescenti. Racemi -6 cm. longi, semel vel bis ramosi, stipitis basi in fructu -1.25 mm. diam., 1-3 axillares, raro terminales, ex integro teretes, semper breviter griseo-pubescentes; ramulis -1.5 cm. longis, -7 flores gerentibus; bracteolis -2 mm. longis, ovato-acuminatis, glabrescentibus. Alabastrum -4 mm. longum, ellipsoideum, breviter pedicellatum. Calyx glabrescens, ad marginem setulosus; lobis externis 2 ovato-acuminatis, internis 3 tenuioribus, elliptico-mucronatis. Corolla in vivo viridi-flava, petlis lineari-lanceolatis, externe conferte pubescentibus, intus glabris. Stamina 15, verticillis 3, bina cum solis alternata; filamentis basim versus applanato-dilatatis, superne gradatim filiformibus; antheris subglobosis, loculis interioribus quam exterioribus paullum minoribus; aristis quam antheras 2-plo longioribus. Ovarium ovoideum glabrum; stylo filiformi, tereti, ovarium aequanti; sine stylopodio distincto.

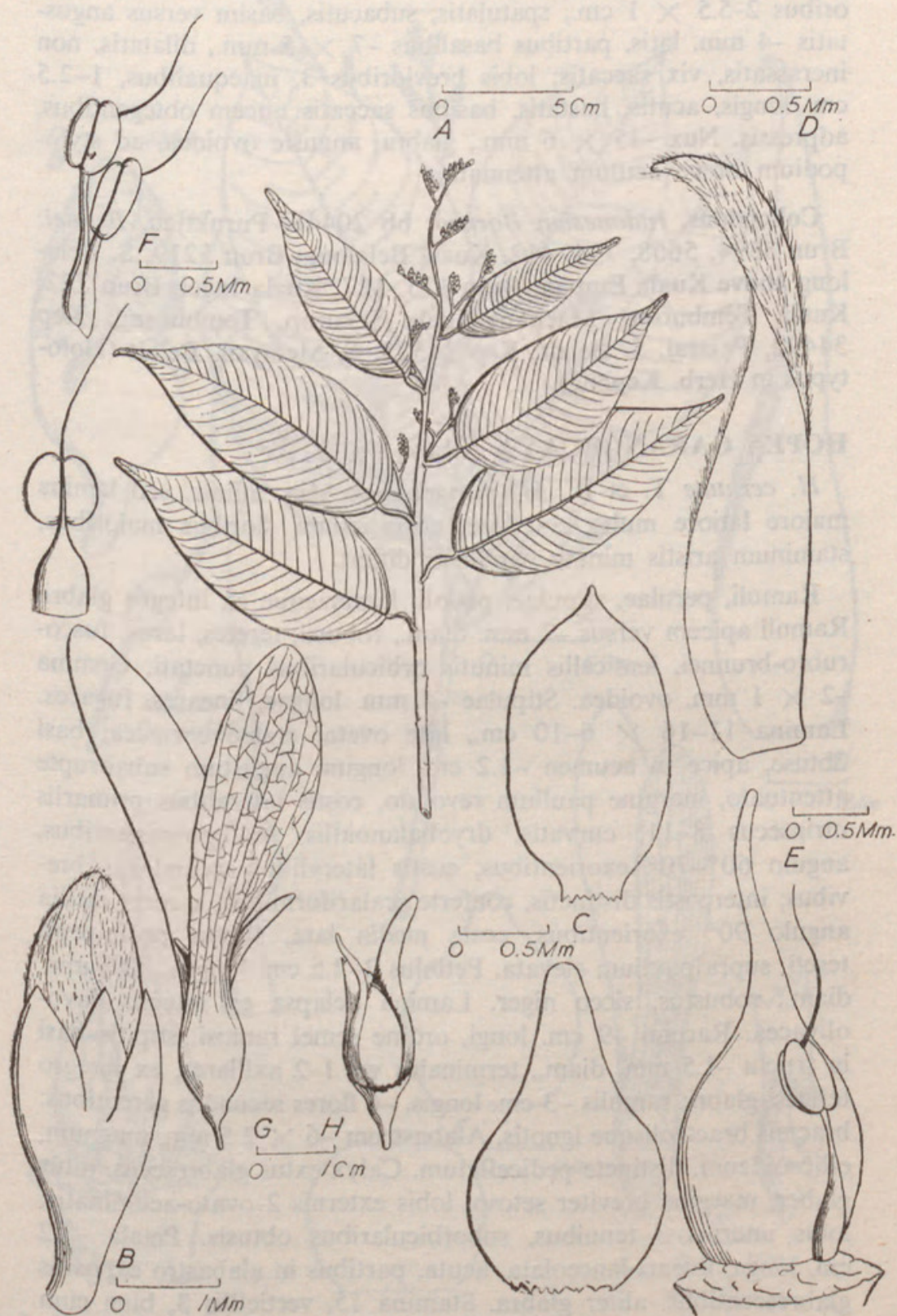


Plate 1. *Hopea fluvialis*.

- a, Flowering twig. b, Flower bud. c, Sepals (outer below, inner above). d, Petal. e, Ovary. f, Stamens (lateral view above, frontal below). g, Fruit. h, Nut.
(a-f from Kep 34492; g, h, from Brun 3394).

Pedicellus in fructu 4 mm. longus, basi 1 mm. diam., superne incrassatus. Fructus in racemo erectus. Calyx glaber; lobis longioribus $2-5.5 \times 1$ cm., spatulatis, subacutis, basim versus angustatis 4 mm. latis, partibus basalibus 7×5 mm., dilatatis, non incrassatis, vix saccatis; lobis brevioribus 3, inaequalibus, 1-2.5 cm. longis, acutis, hastatis, basibus saccatis nucem obtegentibus, adpressis. Nux 15×6 mm., glabra, anguste ovoidea, ad stylopodium breve acutum attenuata.

Collections. *Indonesian Borneo:* bb 20448, Puruktjau. *Brunei:* Brun 3394, 5668, 794, 412, Kuala Belalong; Brun 5219, S. Belalong above Kuala Empan; Brun 125, 127, Kuala Ingei; Brun 722, Kuala Temburong Machang-Kuala Sekurop, Temburong; Kep 34492, Pajarai, S. Belait; Kep 34523, S. Melayan, Belait (Holotypus in Herb. Kepong).

HOPEA GARANGBUAYA Ashton s.n.

H. cernuae T. et B., *M. mengerawan* Miq. affinis, sed lamina maiore latiore multo crassiore, coriaccissima, floribus maioribus, staminum aristis minute papillosis differt.

Ramuli, perulae, stipulae, petioli, laminaeque ex integro glabri. Ramuli apicem versus 2 mm. diam., robusti, teretes, leves, fusco-rubro-brunnei, lenticellis minutis orbicularibus punctati. Gemma 2×1 mm. ovoidea. Stipulae 4 mm. longae, lineares, fugaces. Lamina 11-16 $\times$ 6-10 cm., late ovata, crasse coriacea, basi obtuse, apice in acumen 1.2 cm. longum angustum subabrupte attenuato, margine paullum revoluta, costis lateralibus primariis utrinsecus 8-11, curvatis, dryobalanoidiis, sed prominentibus, angulo $60^\circ-70^\circ$ exorientibus; costis lateralibus secundariis brevibus; intercostis distinctis, conferte scalariformibus, a costa media angulo 90° exorientibus; costa media lata, subtus prominenti tereti, supra paullum elevata. Petiolus 2-2.5 cm. longus, 2.5 mm. diam., robustus, sicco niger. Lamina delapsa ex integro flavo-olivacea. Racemi 9 cm. longi, ordine semel ramosi, stipitis basi in fructu 1.5 mm. diam., terminales vel 1-2 axillares, ex integro teretes, glabri; ramulis 3 cm. longis, 6 flores secundos gerentibus; bracteis bracteolisque ignotis. Alabastrum 6×2.5 mm. magnum, ellipsoideum, distincte pedicellatum. Calyx extus glabrescens, intus glaber, margine breviter setoso; lobis externis 2 ovato-acuminatis; lobis internis 3 tenuibus, suborbicularibus obtusis. Petala 1.2 cm. longa, lineari-lanceolata, acuta, partibus in alabastro expositis glabrescentibus, aliter glabra. Stamina 15, verticillis 3, bina cum solis alternata; filamentis gracilibus, attenuatis; antheris oblongis, loculis exterioribus quam interioribus paullum maioribus; aristis quam antheras 2-3-plo longioribus, basi tuberculis glandulosis prominentibus punctatis. Ovarium ovoideum basi glabra, dimidio apicali conferte setoso, in stylum attenuato; stylopodio indistincto,

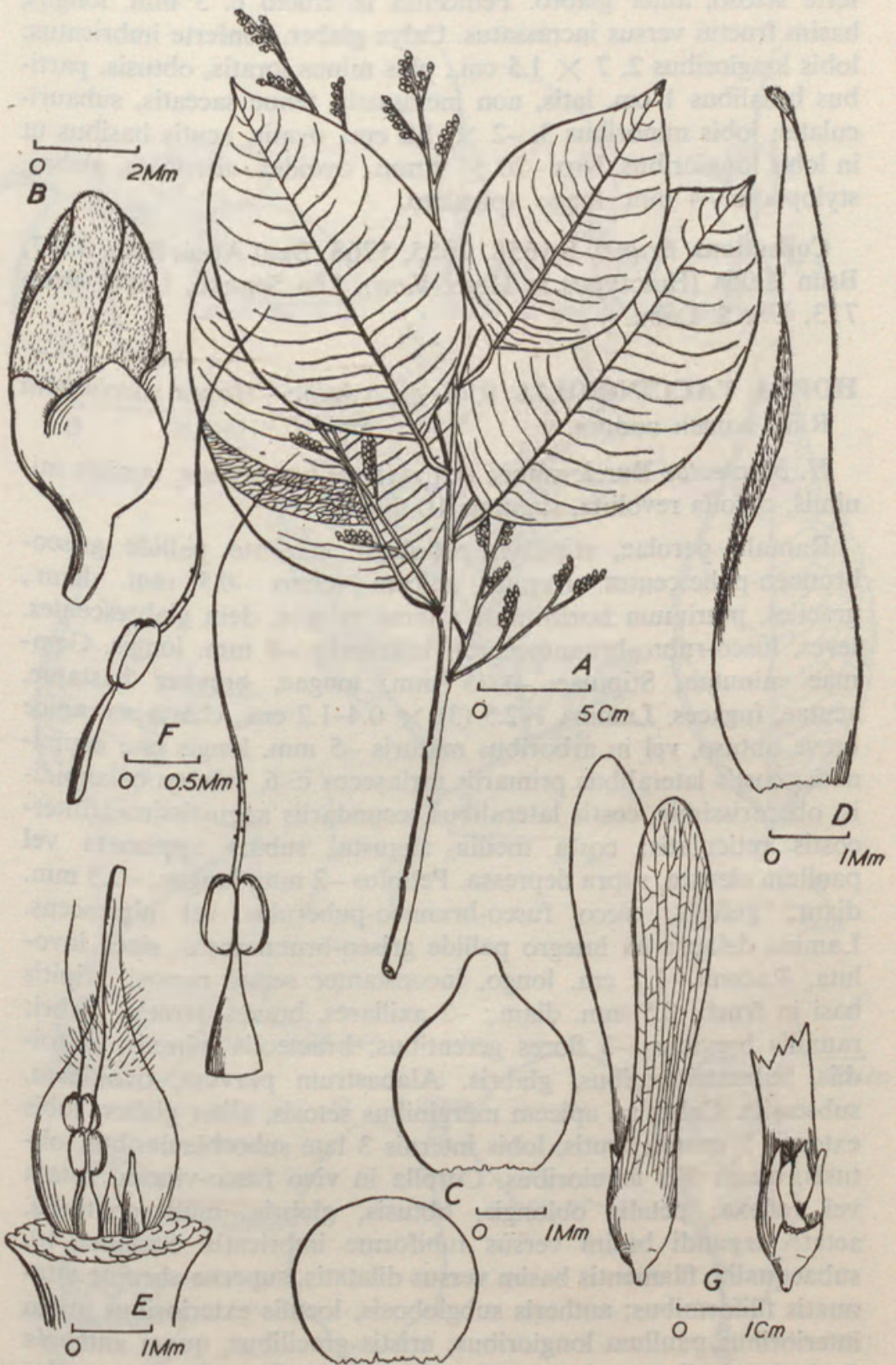


Plate 2. *Hopea garangbuaya*.

a, Flowering twig. b, Flower bud. c, Sepals (outer above, inner below). d, Petal. e, Ova and stamens. f, Stamens (left, lateral; right posterior, view). g, Left, fruit; nut. (a-e from Brun 2006a; f, g, from 2006c).

stylo ovarium aequanti, filiformi, attenuato, dimidio basali conferte setoso, aliter glabro. Pedicellus in fructu c. 3 mm. longus, basim fructui versus incrassatus. Calyx glaber, conferte imbricatus; lobis longioribus 2, 7×1.5 cm., plus minus loratis, obtusis, partibus basalibus 1 cm. latis, non incrassatis, tenue saccatis, subauriculatis; lobis minoribus 3, -2×1.2 cm., ovatis, acutis basibus ut in lobis longioribus. Nux -20×9 mm., ovoidea, attenuata, glabra, stylopodio -4 mm. longo apiculato.

Collections. *Brunei*: S 1658, 2055, 5768, Batu Apoi; Brun 3347, Brun 2006a (Holotypus in Herb. Kew), Ulu Senuko, Labu; Brun 713, Ulu S. Labu.

HOPEA VACCINIFOLIA Ridl. ex Ashton:—*Hopea vacciniifolia* Ridl. nomen nudum.

H. bracteatae Burck affinis, sed racemis brevissimis, laminis minimis, corolla revoluta, staminis 10 differt.

Ramuli, perulae, stipulae, petiolique conferte pallide griseo-brunneo-pubescentes. Ramuli apicem versus -0.5 mm. diam., graciles, plurimum horizontale alterne ramosi, dein glabrescentes, leves, fusco-rubro-brunnescentes; internodis -8 mm. longis. Gemmae minutae. Stipulae -1.25 mm. longae, breviter hastatae, acutae, fugaces. Lamina $1-2.5$ (3) $\times 0.4-1.2$ cm., chartacea, apice breve obtuso, vel in arboribus maturis -5 mm. longis late acuminate; costis lateralibus primariis utrinsecus c. 6, subdryobalanoidiis, obscurissimis; costis lateralibus secundariis angustissimis; intercostis reticulatis; costa media angusta, subtus applanata vel paullum elevata, supra depressa. Petiolus -2 mm. longus, -0.5 mm. diam., gracilis, sicco fusco-brunneo-puberulus vel nigrescens. Lamina delapsa ex integro pallide griseo-brunnescens, sicca involuta. Racemi -1.2 cm. longo, inconstanter semel ramosi, stipitis basi in fructu 0.5 mm. diam.; -2 axillares, breves, teretes, glabri; ramulis brevibus, -3 flores gerentibus; bracteolis minutis, deltoideis, subpersistentibus, glabris. Alabastrum parvum, ovoideum, subsessile. Calyx ad apicem marginibus setosis, aliter glaber; lobis externis 2 ovatis, acutis, lobis internis 3 late suborbicularibus, obtusis, quam illis tenuioribus. Corolla in vivo fusco-vinosa, rotata vel reflexa; petalis oblongis, obtusis, glabris, multo-contortis, aetate expandi basim versus tubiforme imbricatis. Stamina 10, subaequalia; filamentis basim versus dilatatis, superne abrupte attenuatis filiformibus; antheris subglobosis, loculis exterioribus quam interioribus paullum longioribus; aristis gracilibus, quam antheras 2-plo longioribus, apicem stylopodii attingentibus. Ovarium stylopodiumque cylindricum, truncatum, podio apicali puberulo, aliter glabrum; stylo brevi, abrupto. Pedicellus in fructu c. 1 mm. longus. Calyx glaber; lobis subaequalibus, -4×3.5 mm., ovatis acutis vel obtusis incrassatis, tenue saccatis. Nux -8×6 mm., ovoidea, glabra, ad apicem mucronata.

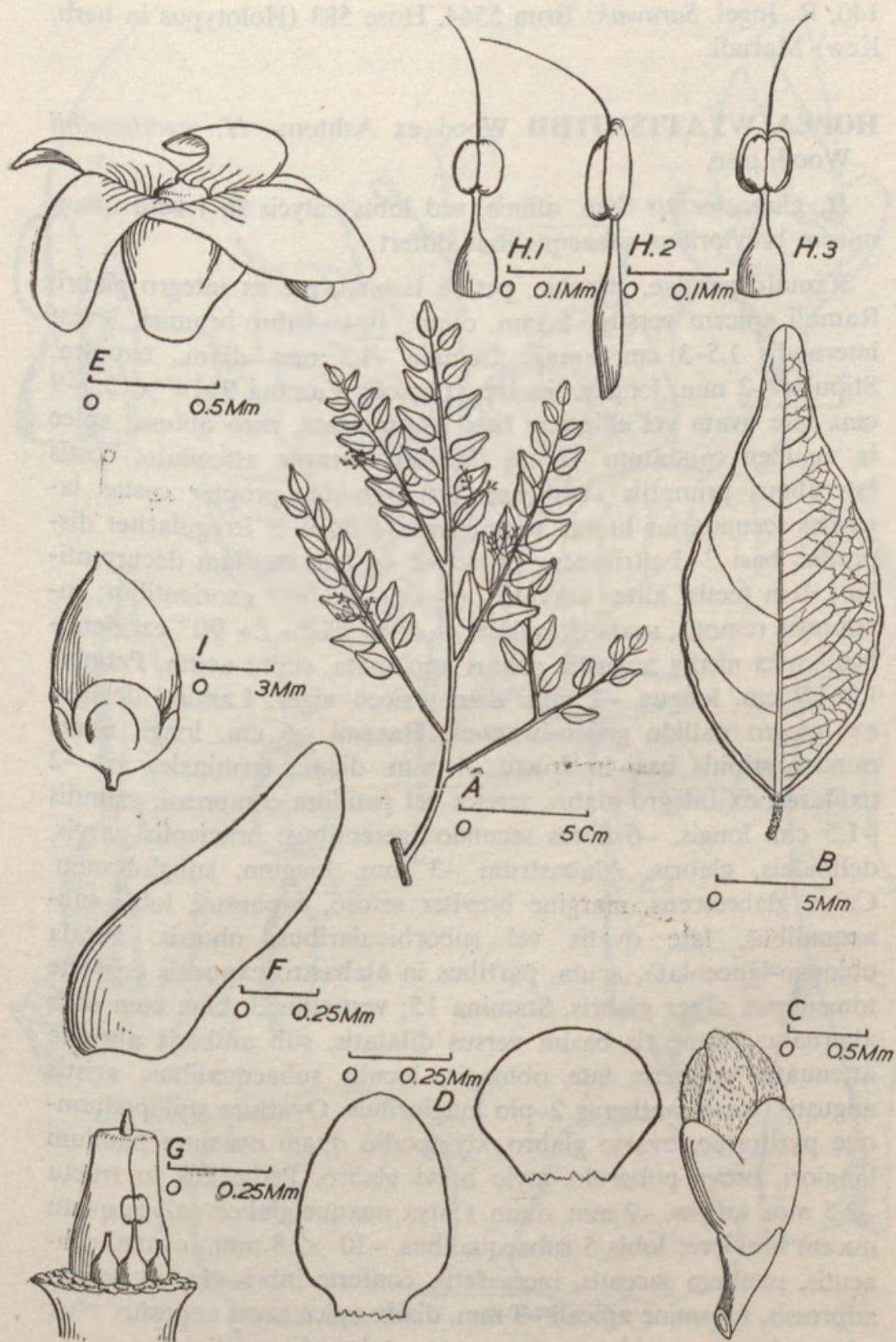


Plate 3. *Hopea vacciniifolia*.

a, Flowering twig. b, Leaf. c, Flower bud. d, Sepals (left, outer; right, inner). e, Corolla. f, Petal. g, Ovary. h, Stamens (1, frontal; 2, lateral; 3, from inside). i, Fruit.
(a-h from Brun 3035; i from Kep 35567).

Collections. *Brunei*: Kep 30614, 30630, Andulau F.R.; Kep 35567, Pengkalan Ran; SFN 10494, Brun 3035, Labi Rd, M.5; Brun 140, R. Ingei. *Sarawak*: Brun 5564, Hose 583 (Holotypus in herb. Kew) Marudi.

HOPEA WYATTSMITHII Wood ex Ashton:—*H. wyattsmithii* Wood, msc.

H. glaucescentis Sym. affinis, sed lobis calycis in fructu quam nucem brevioribus subaequalibus differt.

Ramuli, perulae, stipulae, petioli laminaeque ex integro glabri. Ramuli apicem versus -1 mm. diam., fusco-rubro-brunnei, leves; internodis 1.5-3 cm. longis. Gemma -1.5 mm. diam., ovoidea. Stipulae -2 mm. longae, lineares, fugaces. Lamina 9-14 × 5.5-9 cm., late ovata vel elliptica, basi late cuneata, raro obtusa, apice in acumen caudatum -2 cm. longum abrupte attenuato; costis lateralibus primariis utrinsecus 4-8, remotis, propter costas laterales secundarias breves prominentes diffusis et irregulariter dispositis, basi 2-3 utrinsecus primo ad costam mediam decurrentibus, dein rectis, aliter curvatis, angulo 40°-50° exorientibus; intercostis remotis, scalariformibus, a costa media > 90° exorientibus; costa media angusta, subtus applanata, supra acuta. Petiolus 1.2-1.7 cm. longus, -2 mm. diam., sicco niger. Lamina delapsa ex integro pallide griseo-brunnea. Racemi -6 cm. longi, semel ramosi, stipitis basi in fructu -1 mm. diam., terminales vel -2 axillares, ex integro glabri, teretes vel paullum compressi; ramulis -1.5 cm. longis, -6 flores secundos gerentibus; bracteolis parvis, deltoideis, glabris. Alabastrum -3 mm. longum, subglobosum. Calyx glabrescens, margine breviter setoso, expansus; lobis subaequalibus, late ovatis vel suborbicularibus, obtusis. Petala oblongo-lanceolata, acuta, partibus in alabastro expositis conferte tomentosis, aliter glabris. Stamina 15; verticillis 3, bina cum solis alternata; filamentis basim versus dilatatis, sub antheris abrupte attenuatis; antheris late oblongis, loculis subaequalibus; aristis angustis, quam antheras 2-plo longioribus. Ovarium stylopodiumque pyriforme, ovario glabro, stylopodio quam ovarium paullum longiori, breve puberulo, style brevi glabro. Pedicellus in fructu -2.5 mm. longus, -2 mm. diam. Calyx nuxque glaber, calyce quam nucem brevior; lobis 5 subaequalibus, -10 × 8 mm., ovatis, subacutis, paullum saccatis, incrassatis, conferte inbricatis, ad nucem adpressis, foramine apicali -3 mm. diam. apice nucis exposito. Nux -1 × 1 cm., ovoidea, apice acuto, stylopodio vestigiali.

Collections. *North Borneo*: San 15061, Beaufort (Holotypus in Herb. Kew); San 16467, Tawau. *Brunei*: Brun 885, Ulu Tutong at the second stone rapid; S 5589, Brun 833, Andulau F.R.; Kep 35475, S. Biang; S 5809, Bt. Patoi.

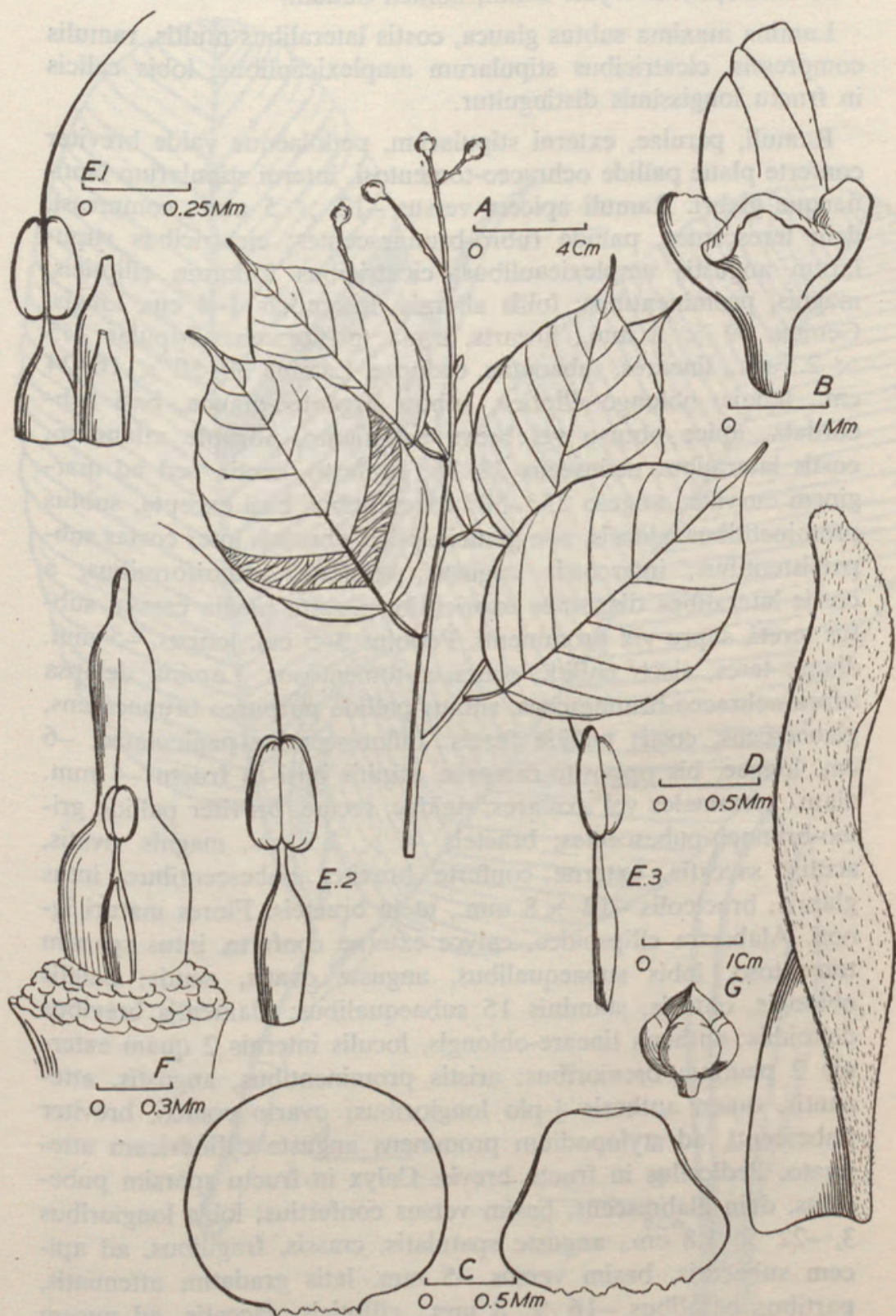


Plate 4. *Hopea wyattsmithii*.

a, Fruiting twig. b, Flower bud. c, Sepals (left, inner; right, outer). d, Petal. e, Stamen (1, frontal; 2, from inside; 3, lateral). f, Ovary. g, Fruit.
 (a, g, from San 16467; b-f from San 15061).

PARASHOREA MACROPHYLLA Wyatt Smith ex Ashton:—

P. macrophylla Wyatt Smith, nomen nudum.

Lamina maxima subtus glauca, costis lateralibus multis, ramulis compressis, cicatricibus stipularum amplexicaulibus, lobis calicis in fructu longissimis distinguitur.

Ramuli, perulae, externi stipularum, petiolaeque valde breviter conferte plane pallide ochraceo-tomentosi, interni stipularum laminaeque glabri. Ramuli apicem versus -12×5 mm., compressi, dein terescentes, pallide rubro-brunnescentes; cicatricibus stipularum angustis amplexicaulibus; cicatricibus foliorum ellipticis, magnis, prominentibus; foliis alternis; internodis 1–4 cm. longis. Gemma -9×8 mm., linearis, acuta, glaucescens. Stipulae -15×2.5 cm., lineares, subacutae, caducae. Lamina 30–50 $\times$ 16–24 cm., tenuis, oblongo-elliptica, subtus argenteo-glauca, basi subcordata, apice obtuso vel breve acuminato, abrupte attenuato; costis lateralibus utrinsecus 28–36, confertis, rectis, sed ad marginem curvatis, angulo 25° – 50° exorientibus basi excepta, subtus prominentibus, glabris, non glaucis, plicis obscuris inter costas subpersistentibus; intercostis angustis, conferte scalariformibus, a costis lateralibus diagonale exorientibus; costa media crassa, subtus tereti, supra vix prominenti. Petiolus 3–5 cm. longus, -5 mm. diam., teres, sicco pallide ochraceo-tomentosus. Lamina delapsa supra ochraceo-brunnescens, subtus pallide purpureo-brunnescens, glaucescens, costis pallide fuscis. Inflorescentiae paniculatae, -6 cm. longae, bis opposito-ramosae, stipitis basi in fructu -4 mm. diam., terminales vel axillares, rigidae, rectae, breviter pallide griseo-brunneo-pubescentes; bracteis -4×2.5 cm., magnis, ovatis, acutis, saccatis, externe conferte breviter pubescentibus, intus glabris; bracteolis -12×8 mm., ut in bracteis. Flores maturi ignoti. Alabastra ellipsoidea, calyce externe conferte, intus sparsim tomentoso, lobis subaequalibus, anguste ovatis, acutis; petalis oblongis, obtusis; staminis 15 subaequalibus; filamentis brevibus deltoidiis; antheris lineare-oblongis, loculis internis 2 quam externis 2 paullum brevioribus; aristis prominentibus, angustis, attenuatis, quam antheris $\frac{1}{2}$ -plo longioribus; ovario conico, breviter pubescenti, ad stylopodium prominens anguste cylindricum attenuato. Pedicellus in fructu brevis. Calyx in fructu sparsim puberulus, dein glabrescens, basim versus confertius; lobis longioribus 3, -22×1.8 cm., anguste spatulatis, crassis, fragilibus, ad apicem subacutis, basim versus -5 mm. latis gradatim attenuatis, partibus basalibus -16×8 mm., ellipticis, saccatis, ad nucem adpressis; lobis brevioribus 2, -12×0.7 cm., linearibus, inaequalibus, basim versus -5 mm. latis gradatim attenuatis, partibus basalibus -5×5 mm., quam illos plure saccatis. Nux -2.5×1.2 cm., ellipsoidea, conferte griseo-brunneo-tomentosa, stylopodium versus attenuata, stylopodio -6 mm. longo, lineari.

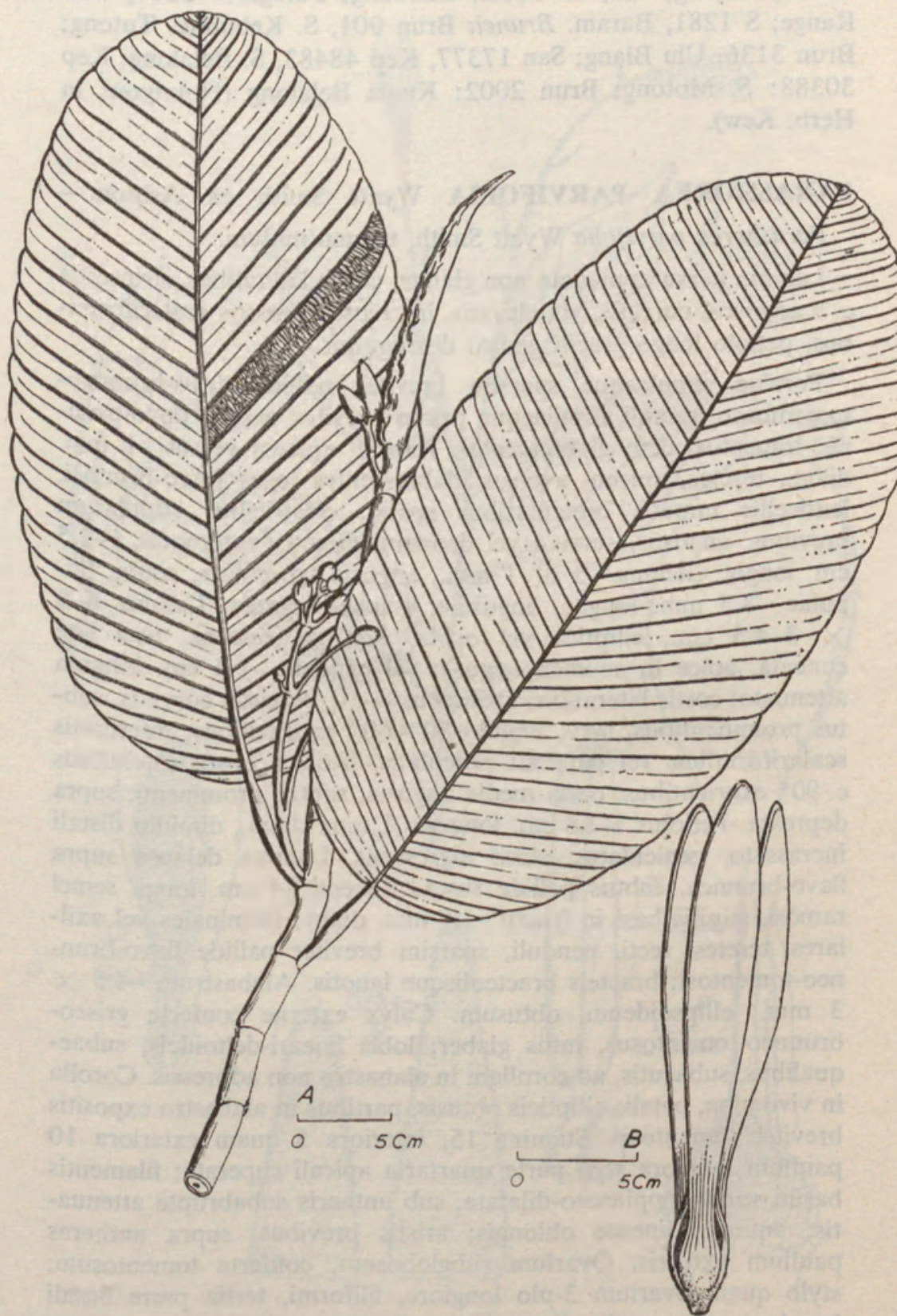


Plate 5. *Parashorea macrophylla*.

a, Flowering twig. b, Fruit.

(a from Brun 2002; b from s.n., S. Tubai.

Collections. *Sarawak*: No. 81848, S. Naut, Bakong; Brun 5423, S. Sut, Rejang; s.n., S. Tubai, Limbang; Pursglove 5207, Tau Range; S 1281, Baram. *Brunei*: Brun 901, S. Kebubok, Tutong; Brun 3136, Ulu Biang; San 17377, Kep 48483, S. Belalong; Kep 30388: S. Motong; Brun 2002: Kuala Belalong (Holotypus in Herb. Kew).

PARASHOREA PARVIFOLIA Wyatt Smith ex Ashton:—

Parashorea parvifolia Wyatt Smith, nomen nudum.

Lamina parva appplanata non glauca, costis lateralibus utrinsecus c. 9 angustis, curvatis, vix elevatis, intercostis remotis scalariformibus, petiolo longo gracili glabro distinguitur.

Perulae stipulaeque sparsim breviter pallide flavo-brunneo-tomentosae, ramuli stipulaeque primo breviter pallide flavo-brunneo-tomentosi dein glabrescentes. Ramuli apicem versus –1 mm. diam., teretes, apicem aversus glabrescentes leves fusco-brunnei, lenticellis minutis orbicularibus sparsi; cicatricibus stipularum brevibus, angustis, sursum vel deorsum directis; internodis 1–2.5 cm. longis. Gemma –3 × 1 mm., anguste lanceolata, acuta. Stipulae –3.5 mm. longae, angustae, acutae, fugaces. Lamina 6–9 × 3–4.5 cm., elliptica vel ovata, non glaucescens, basi late cuneata, apice in acumen anguste vel caudate –1.5 cm. longum attenuato; costis lateralibus utrinsecus 8–10, angustis curvatis, subtus prominentibus, laxis, angulo 50°–60° exorientibus; intercostis scalariformibus vel paullum reticulatis, laxis, a costis lateralibus c. 90° exorientibus; costa media angusta, subtus prominenti, supra depressa. Petiolus 1–1.8 cm. longus, –1 mm. diam., dimidio distali incrassato, geniculatus, sicco nigrescens. Lamina delapsa supra flavo-brunnea, subtus pallide fusca. Racemi –4 cm. longi, semel ramosi, stipitis basi in fructu –1.5 mm. diam., terminales vel axillares, teretes, recti, penduli, sparsim breviter pallide flavo-brunneo-tomentosi; bracteis bracteolisque ignotis. Alabastrum –4.5 × 3 mm., ellipsoideum, obtusum. Calyx externe conferte griseo-brunneo-tomentosus, intus glaber; lobis lineari-deltoideis, subaequalibus, subacutis, ad corollam in alabastro non adpressis. Corolla in vivo alba, petalis ellipticis obtusis, partibus in alabastro expositis breviter tomentosis. Stamina 15, interiora 5 quam exteriora 10 paullum longiora styli parte quartaria apicali superata; filamentis basim versus appplanato-dilatata, sub antheris subabrupte attenuatis; antheris lineare oblongis; aristis brevibus, supra antheras paullum extrusis. Ovarium subglobosum, conferte tomentosum; stylo quam ovarium 3-plo longiore, filiformi, tertia parte basali breviter pubescenti, aliter glabro. Pedicellus in fructu –2 mm. longus, brevis. Calyx in fructu apicem versus glabrescens, basim versus puberulus; lobis longioribus 3–8.5 × 1.7 cm., late spatulatis, obtusis, basim versus –3 mm. latis attenuatis; partibus basalibus –7 mm. lato, non dilatatis, paullum incrassatis, valvatis, a nuce

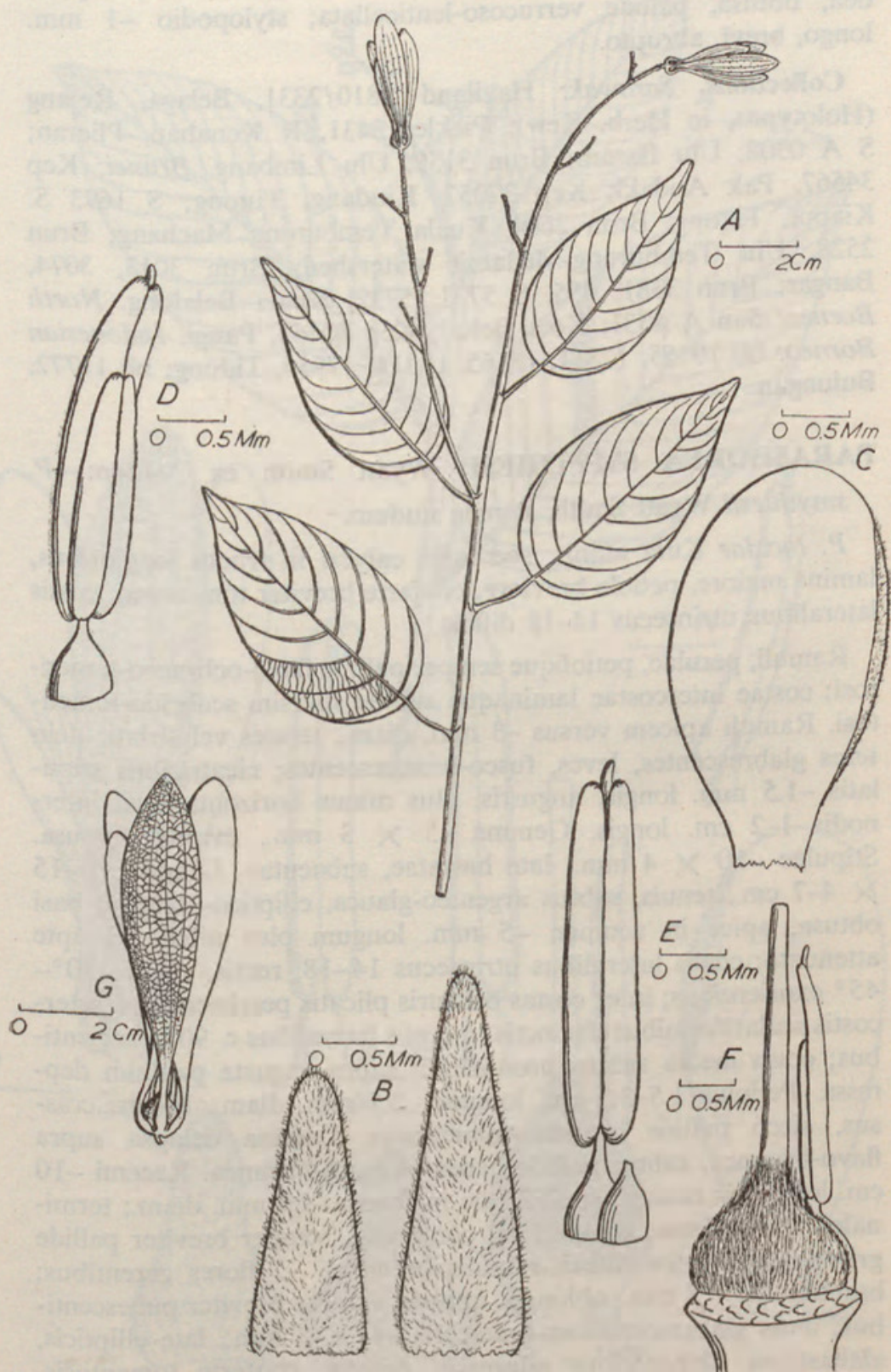


Plate 6. *Parashorea parvifolia*.

a, Fruiting twig. b, Sepals (right, outer; left, inner). c, Petal. d, Stamen (from inside). e, Stamen (frontal view). f, Ovary. g, Fruit.

(a from Brun 3074; b-f from Brun 3013; g from Brun 3381).

maturitanti repulsis; lobis brevioribus 2, -7.5 cm. longis, subaequalibus, saepe illos subaequalibus. Nux -1.5×1.3 cm., ellipsoidea, obtusa, pallide verrucoso-lenticellata; stylopodio -1 mm. longo, brevi, abrupto.

Collections. *Sarawak*: Haviland 2810/2331, Belaga, Rejang (Holotypus, in Herb. Kew); Pickles 3431, R Kenaban, Plieran; S A 0308, Ulu Baram; Brun 3159, Ulu Limbang. *Brunei*: Kep 34567, Pak Andaki; Kep 37057, Kiudang, Tutong; S 1693 S. Kiaput, Tutong; Brun 2604, Kuala Temburong Machang; Brun 2528, Ulu Temburong-Medamit watershed; Brun 3013, 3074, Bangar; Brun 3381, 455, S 5731, 5732, Kuala Belalong. *North Borneo*: San A 4331, Kota Belud; Kep 80463, Pangi. *Indonesian Borneo*: bb 10165, 17811, 18165, 18314, 17954, Tidung; bb 11772, Bulungan.

PARASHOREA SMYTHIESII Wyatt Smith ex Ashton:—*P. smythiesii* Wyatt Smith, nomen nudum.

P. lucidae Kurz affinis, sed lobis calycis in fructu longioribus, lamina maiore, petiole brevior, conferte breviter tomentoso, costis lateralibus utrinsecus 14–18 differt.

Ramuli, perulae, petiolique semper pallide flavo-ochraceo-tomentosi; costae intercostae laminaque subtus sparsim scabrido-tomentosi. Ramuli apicem versus -3 mm. diam., teretes vel striati; deinde teres glabrescentes, leves, fusco-brunnescentes; cicatricibus stipulatis -1.5 mm. longis, angustis, plus minus horizontalibus; internodiis 1–2 cm. longis. Gemma -5×3 mm., ovoidea obtusa. Stipulae -10×4 mm., late hastatae, subacutae. Lamina 10–15 $\times$ 4–7 cm., tenuis, subtus argenteo-glaucula, elliptico-oblonga, basi obtusa, apice in acumen -5 mm. longum plus minus abrupte attenuato; costis lateralibus utrinsecus 14–18, rectis, angulo 30° – 45° exorientibus; inter costas obscuris plicatis persistentibus; intercostis scalariformibus distinctis; a costis lateralibus c. 90° exorientibus; costa media subtus prominente, supra angusta paullum depressa. Petiolus 1.5–2.2 cm. longus, -2.5 mm. diam., brevis, crassus, sicco pallide brunneo-tomentosus. Lamina delapsa supra flavo-brunnea, subtus pallide hebes purpureo-brunnea. Racemi -10 cm. longi, bis ramosi, stipitis basi in fructu -1.5 mm. diam.; terminales vel axillares, angulati vel compressi, semper breviter pallide griseo-brunneo-tomentosi; ramulis brevibus, -5 flores gerentibus; bracteis -8×3 mm., oblongis, obtusis, externe breviter pubescentibus, intus glabrescentibus; bracteolis -4×3 mm., late ellipticis, alabastrum obtegentibus adpressis, externe conferte tomentosae. Alabastrum -7×4 mm., ovoideum, obtusum. Calyx externe breviter conferte pallide griseo-brunneus; lobis anguste ovatis, lobis externis 3 obtusis, quam lobis internis paullum longioribus et angustioribus; lobis internis 2 acutis, subacuminatis. Corolla in vivo alba; petalis ellipticis obtusis, partibus in alabastro expositis

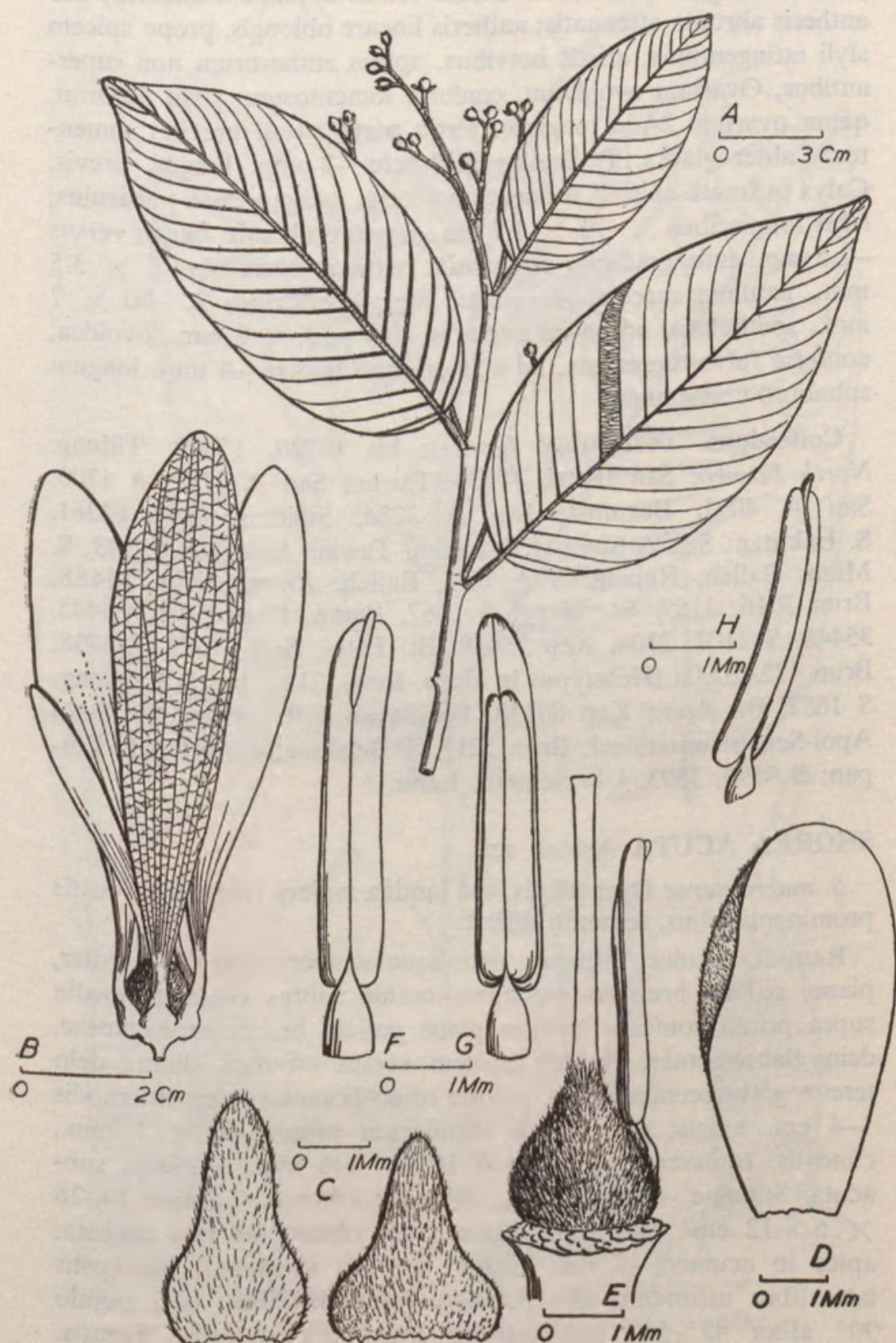


Plate 7. *Parashorea smythiesii*.

a, Flowering twig. b, Fruit. c, Sepals (outer, left; inner, right). d, Petal. e, Ovary. f, Stamen (frontal view). g, Stamen (inside view). h, Stamen (fronto-lateral view).
(a, c-h, from Brun 2000; b from Kep 35456).

breviter tomentosis. Stamina 15, interiora 5 quam exteriora 10 paullum longiora; filamentis basim versus applanato-dilatatis, sub antheris abrupta attenuatis; antheris lineare oblongis, prope apicem styli attingentibus; aristis brevibus, apices antherorum non superantibus. Ovarium ovoideum, conferte tomentosum; stylo filiformi, quam ovarium 3-plo longiore, tertia parte basali breviter tomentosa, aliter glabra. Pedicellus in fructu -2 mm. longus, brevis. Calyx in fructu apicem versus glabrescens, basim versus puberulus; lobis longioribus 3, -10×1.7 cm., anguste obtusis, basim versus -2.5 mm. latis gradatim attenuatis; partibus basalibus -6×3.5 mm., paullum saccata, incrassata; lobis brevioribus 2, -70×7 mm., spathulatis, ad basim angustis. Nux -13×9 mm., ovoidea, conferte fulvo-tomentosa, ad stylopodium lineare -4 mm. longum subabrupte attenuata.

Collections. *Indonesian Borneo:* bb 18320, 17890, Tidung. *North Borneo:* San 18604, 18720, Tawau; San A 1732, A 1703, San A 4091, Beaufort; San A 3284, Sipitang, Kep 80261, S. Lukutan; San A 3967, Kalabakan, Tawau. *Sarawak:* S 123, S. Miah, Balleh, Rejang; S A 424, Balleh. *Brunei:* Kep 35488, Brun 3016, 3169, Bt. Biang; S 1667, Biang; Kep 35456, 35445, 35448, S 2102, 2104, Kep 35458, Bt. Patoi; San 17071, S 5738, Brun 472, 2000a (Holotypus in Herb. Kew), 3129, Kuala Belalong; S 1657, Bt. Apoi; Kep 80138, Peradayan F.R.; Brun 308, Batu Apoi-Sebatu watershed; Brun 5217, S. Belalong above Kuala Empan; S 5590, 5593, Ulu Senuko, Labu.

SHOREA ACUTA Ashton s.n.

S. macropterae Dyer affinis, sed lamina maiore coriaceore, costis prominentioribus, tomento differt.

Ramuli, perulae, stipulae, petiolique semper conferte, breviter, plane, pallide brunneo-tomentosi; costae subtus costaque media supra primo conferte breviter plane pallide brunneo-tomentosae, dein glabrescentes. Ramuli apicem versus -4 mm. diam., dein teretes glabrescentes, leves, pallide roseo-brunnescentes; internodis $1-4$ cm. longis; cicatricibus stipularum primo -3×1 mm., cuneatis, transversis. Gemma $6-10 \times 4-6$ mm., ovoidea, subacuta. Stipulae -12×5 mm., oblongae, obtusae. Lamina $14-26 \times 6.5-12$ cm., ex integro glaber, basi obtusa vel late cuneata, apice in acumen -2 cm. longum anguste attenuato; intercostis lateralibus utrinsecus $10-13$, subtus prominentibus, basi angulo 90° aliter $45^\circ-55^\circ$ exorientibus; intercostis angustis, sinuatis, conferte scalariformibus, costis lateralibus diagonale exorientibus; costa media subtus prominenti, tereti, supra angusta, paullum depressa. Petiolus $1.5-2$ cm. longus, $3-4$ mm. diam., crassus, sicco pallide brunneo-pubescent vel nigrescens. Lamina delapsa supra pallide roseo-brunnea, subtus luteo-ferruginea. Racemi -18 cm.

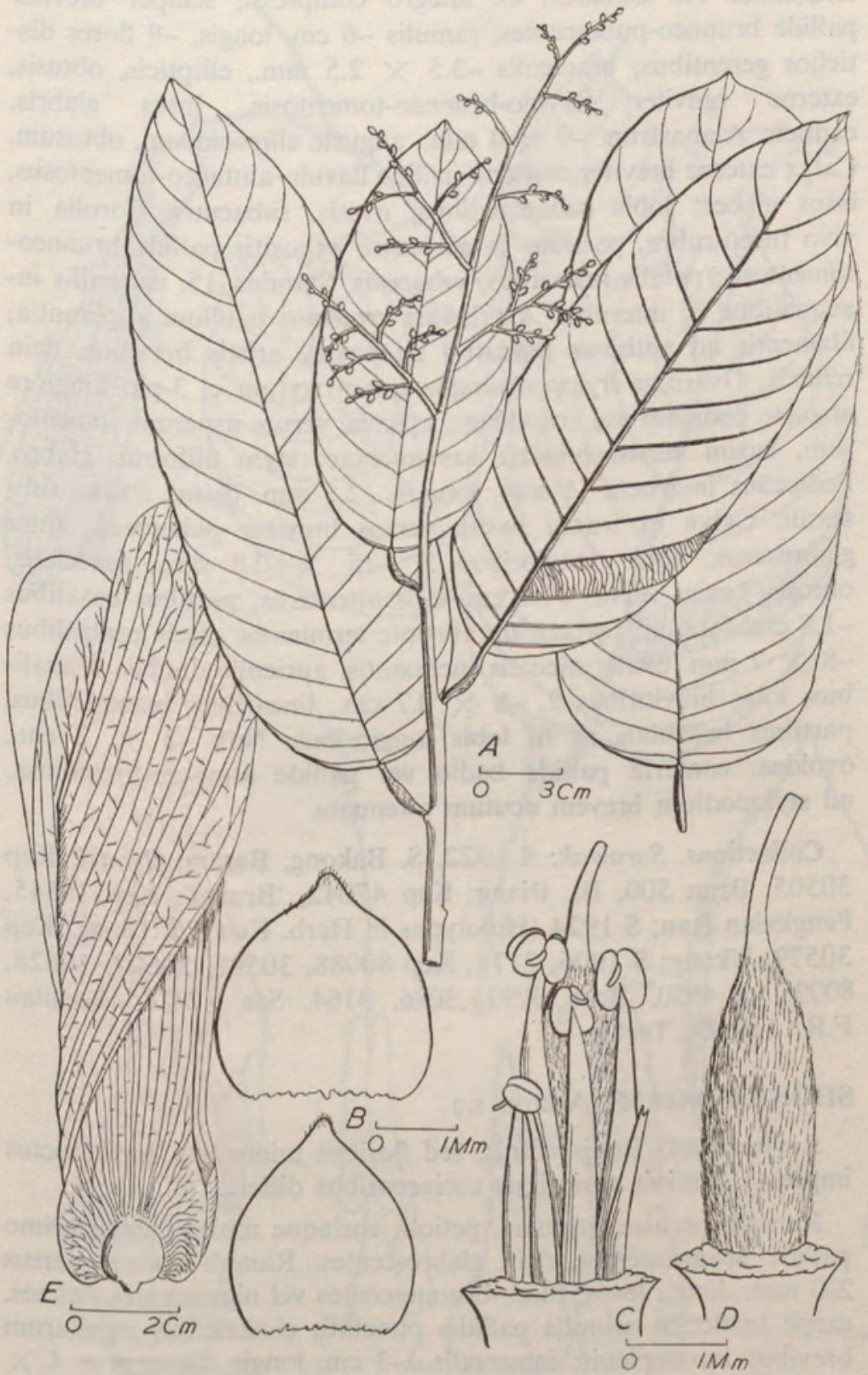


Plate 8. *Shorea acuta*.

a, Flowering twig and leaf. b, Sepals (outer, above; inner, below). c, Ovary and androecium. d, Ovary. e, Fruit.

(a-d from Brun 3076; e from s.n., Bt. Teraja).

longi, semel vel bis ramosi, stipitis basi in fructu -3 mm. diam., terminales vel axillares, ex integro compressi, semper breviter pallide brunneo-pubescentes; ramulis -6 cm. longis, -9 flores distichos gerentibus; bracteolis -3.5×2.5 mm., ellipticis, obtusis, externe breviter flavido-brunneo-tomentosis, intus glabris, caducis. Alabastrum -9×4 mm., anguste ellipsoideum, obtusum. Calyx externe breviter conferte pallide flavido-alutaceo-tomentosus, intus glaber; lobis subaequalibus, ovatis, subacutis. Corolla in vivo fusco-rubra, partibus in alabastro expositis pallide brunneo-tomentosis; petalis linearibus, subacutis. Stamina 15, verticillis inaequalibus 3, interna 5 longissima ovarium paullum superantia; filamentis ad antheras gradatim attenuatis, aristis brevibus, dein reflexis. Ovarium stylopodiumque quam stylum c. 3-plo longiore anguste conicum vel ovoideum, apicem versus asperum tomentosum, basim versus breviter tomentosum; stylo filiformi, glabro. Pedicellus in fructu -1 mm. longus, -2.5 mm. diam., fructu subsessili. Calyx in fructu basim versus breviter pubescens, aliter glabrescens; lobis longioribus 3, -15×2.8 cm., spatulatis, obtusis, basim versus -1.5 cm. latis attenuatis; partibus basalibus -1.8 cm. lato, ad pedicellum abrupte terminatis, discis centralibus -8×7 mm. ovatis saccatis incrassatis, auriculis duobus lateralibus; lobis brevioribus 2, -8×0.7 cm., linearibus, inaequalibus, partibus basalibus ut in lobis longioribus. Nux -3×2 cm., ovoidea, conferte pallide badio vel pallide alutaceo-tomentosa, ad stylopodium brevem acutum attenuata.

Collections. *Sarawak*: S 1922, S. Bakong, Baram; *Brunei*: Kep 30505, Brun 500, Bt. Biang; Kep 47042, 'Brunei'; Kep 35545, Pengkalan Ran; S 1924 (Holotypus in Herb. Kew), S. Liang; Kep 30579, Ukong; S 1906, 2171, Kep 80088, 30596, 30607, 30628, 80096, S 4950, Brun 3291, 3076, 3164, San 17474, Andulau F.R.; s.n., Bt. Teraja.

SHOREA AGAMI Ashton s.n.

S. virescentis Parijs affinis, sed floribus minoribus, basi fructus impressa, laminis maioribus coriaceoribus differt.

Ramuli, perulae, stipulae, petioli, costaque media subtus primo pallide brunnescentes, dein glabrescentes. Ramuli apicem versus $2-3$ mm. diam., leves, fusco-brunnescentes vel nigrescentes, teretes, saepe lenticellis minutis pallidis punctati; cicatricibus stipularum brevibus inconspicuis; internodis $1-3$ cm. longis. Gemma c. 4×2.5 mm., ovoidea vel falcata, obtusa, paullum pubescens vel glabrescens, stipulae c. 10×3 mm., oblongae, obtusae, externe breviter pubescentes, intus glabrae, caducae. Lamina $10-15 \times 6-10$ cm., late ovoidea vel oblonga, coriacea, basi obtusa vel cuneata, apice in acumen late deltoideum $0.5-1$ cm. longum subabrupte attenuato; costis lateralibus utrinsecus $9-13$, remotis,

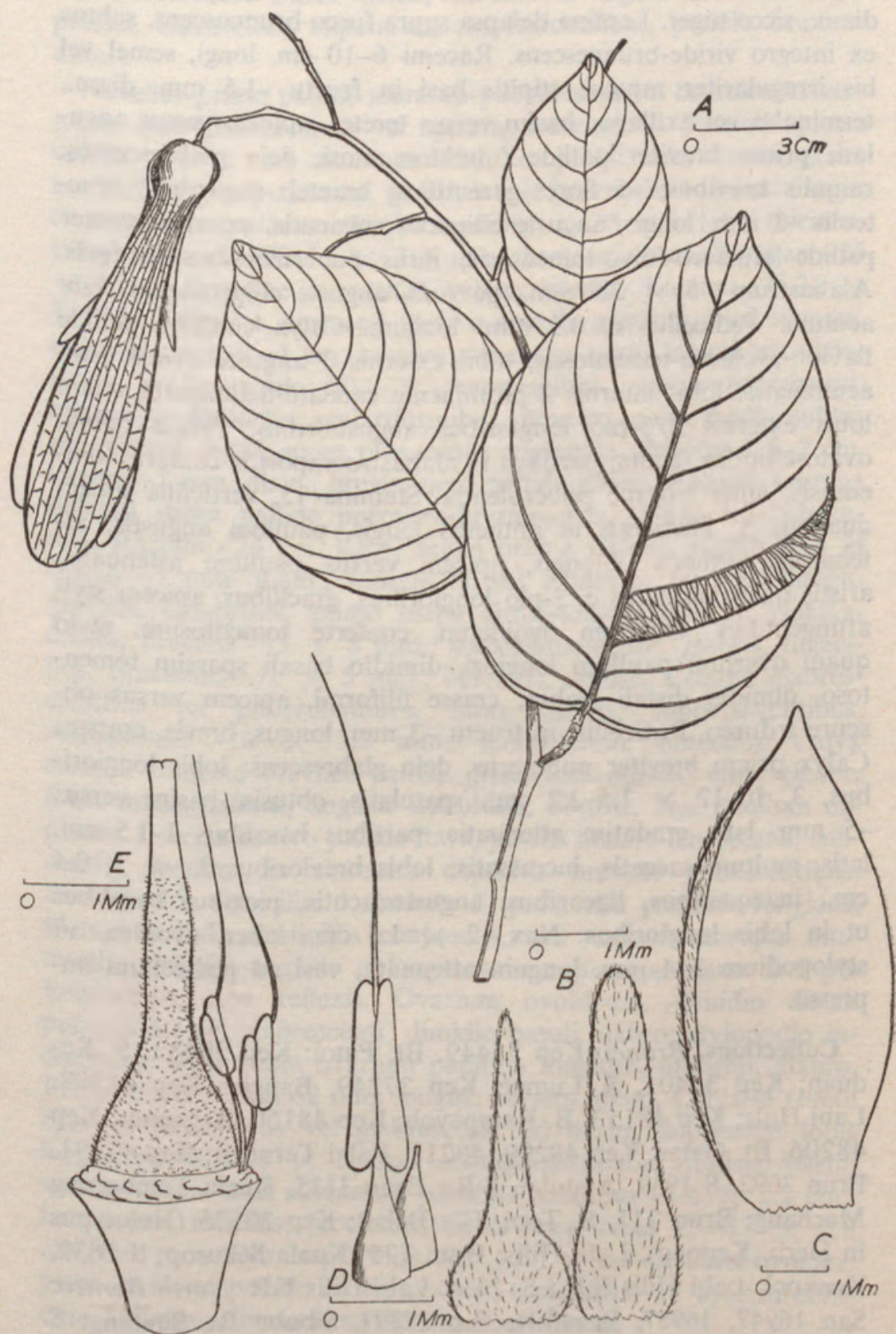


Plate 9. *S. agami*.

a, Fruiting twig. b, Sepals (left, inner; right, outer). c, Petal. d, Stamen (frontal view). e, Ovary.

(a from San 15402, b-e from Kep 30525).

curvatis, ad basim laminae angulo c. 90° , apicem versus eiusdem angulo 40° exorientibus. Petiolus 1–1.5 cm. longus, 1.5–2 mm. diam., sicco niger. Lamina delapsa supra fusco-brunnescens, subtus ex integro viride-brunnescens. Racemi 6–10 cm. longi, semel vel bis irregulariter ramosi, stipitis basi in fructu 1.5 mm. diam., terminales vel axillares, basim versus teretes, apicem versus angulati, primo breviter pallide fulvo-tomentosi, dein glabrescentes; ramulis brevibus, 5 flores gerentibus; bracteis fugacibus; bracteolis 3 mm. longis, anguste ellipticis, subacutis, externe breviter pallide alutaceo-fulvo-tomentosis, intus puberulentibus, caducis. Alabastrum 5×2.5 mm., parvum, anguste ellipsoideum, subacutum. Pedicellus c. 0.5 mm. longum. Calyx conferte pallide flavido-alutaceo-tomentosus; lobis externis 3 anguste ovatis, subacuminatis; lobis internis 2 prominente caudato-acuminatis, quam lobis externis $2/3$ -plo longioribus angustioribus. Petala parva, ovato-elliptica, acuta, partibus in alabastro expositis conferte tomentosis, aliter externe puberulentia. Stamina 15, verticillis subaequalibus 3, filamentis ut antheras longis, paullum angustis, attenuatis, antheris oblongis, apicem versus paullum attenuatis; aristis quam antheras c. 3-plo longioribus, gracilibus, apicem styli attingentibus. Ovarium ovoideum, conferte tomentosum, stylo quam ovarium paullum longiori, dimidio basali sparsim tomentoso, dimidio distali glabro, crasse filiformi, apicem versus obscure trifurco. Pedicellus in fructu 3 mm. longus, brevis, crassus. Calyx primo breviter pubescens, dein glabrescens; lobis longioribus, 3, $10\text{--}12 \times 1.5\text{--}2.2$ cm., spatulatis, obtusis, basim versus 5 mm. latis gradatim attenuatis, partibus basalibus 1–1.5 cm. latis, multum saccatis, incrassatis; lobis brevioribus 2, 6×0.4 cm., inaequalibus, linearibus, anguste acutis, partibus basalibus ut in lobis longioribus. Nux 2×1.5 cm., laber, ovoidea, ad stylopodium 3–4 mm. longum attenuata, vasi ad pedicellum impresso.

Collections. *Brunei*: Kep 35449, Bt. Patoi; Kep 30483, S. Kedu; Kep 34401, S. Lumut; Kep 37249, Bangar; Kep 48108, Labi Hills; Kep 48153, B. Rampayoh; Kep 48160, S. Lumut; Kep 48206, Bt. Gatas; Kep 48209, 48211, Balai Tarunan; Kep 48491, Brun 3092, S 1939, Andulau F.R.; Brun 3135, Kuala Temburong Machang; Brun 211, S. Topi, Ulu Belait; Kep 30525 (Holotypus in Herb. Kepong), Labi Hills; Brun 739, Kuala Sekurop; S 1632, Kenapol, Labi Hills F.R.; S. 1636, Labi Hills F.R. *North Borneo*: San 16947, 16987, Beaufort; San 17797, Sibubu R., Sipitang; S A379, S. Rayoh, Sabah; San A 3129, A 3477, A 3131, 15385, 15402, Sandakan; San A 3160, Kudat. *Indonesian Borneo*: Meijer 2464, Tarakan; bb 13617, Karangan R., NW of Sangkulirang; bb 17963, 17870, 33002, Tidung. *Sarawak*: S 1537, Bt. Meringgit, Merapok, Lawas

SHOREA AMPLEXICAULIS Ashton s.n.

S. beccarianae Burck affinis, sed ramulis angustioribus vix compressis, cicatricibus stipularum amplexicaulibus, petiolo brevior differt.

Novellae primo pallide alutaceo-pubescentes vel brunneo-tomentosae, dein glabrescentes vel sparsim tomentosae. Ramuli apicem versus -2×3 mm. diam., paullum compressi, dein teretes, graciles, pallide griseo-alutacei, glabri, leves; internodis 1–3 cm. longis; cicatricibus stipularum amplexicaulibus, c. 0.5 mm. latis, horizontalibus. Gemma 10–15 $\times$ 3–5 mm., hastata, acuta. Stipulae -25×8 mm., hastatae, subacutae, subpersistentes. Lamina 11–21 $\times$ 5–8 cm., elliptica, coriacea, in vivo novella magenta, basi cuneata, apice in acumen -1 cm. longum attenuato; costis lateralibus utrinsecus 9–12, angulo 50° – 70° exorientibus, subtus prominenti; intercostis distinctis, scalariformibus, remotis; costa media subtus prominenti, tereti, supra plus minus applanata. Petiolus 1.5–2 cm. longus, -2 mm. diam., brevis, sicco pallide griseo-brunnea. Lamina delapsa supra pallide purpureo-brunnescentis, subtus rubro-brunnea. Racemi -24 cm. longi, semel ordine ramosi, stipitis basi in fructu -3 mm. diam., terminales vel axillares, laxi, ex integro graciles, compressi, primo saepe aureo-tomentosi, dein glabrescentes; bracteis -13×8 mm., lanceolatis, acutis, glabris, fugacibus; bracteolis -11×5 mm., oblongis, obtusis, externe glabrescentibus vel puberulentibus, intus glabris, subpersistentibus. Alabastrum -10×3.5 mm., lanceolatum, obtusum. Calyx externe conferte breviter pallide griseo-tomentosus, intus glaber; lobis subaequalibus, anguste deltoideis, obtusis, basi paullum expansis. Corolla in vivo pallide flava, petalis lineare-lanceolatis, subacutis, partibus in alabastro expositis breviter pubescentibus. Stamina 15, verticillis 3, interna 5 quam alia paullum longiora; filamentis latis, verticillis conjunctis, sub antheris abrupte attenuatis; antheris anguste oblongis; aristis quam antheras 2–3-plo longioribus, non reflexis. Ovarium ovoideum, dimidio distali puberulenti vel glabrescenti, dimidio basali glabro; stylopodio indistincto; stylo quam ovarium paullum longiore, filiformi, glabro. Pedicellus in fructu -2 mm. longus, -4 mm. diam. Calyx in fructu breviter puberulens vel glabrescens, ad basim impressus; lobis longioribus 3, -18×3 cm., oblongo-spatulatis, obtusis, basim versus -2 cm. latis attenuatis, partibus basalibus -1.6×2.2 cm., late ovatis, saccatis, incrassatis; lobis brevioribus 2, -13×0.8 cm., basi ut in lobis longioribus. Nux -3.7×2.5 cm., late ovoidea, plane conferte pallide aureo-alutaceo-tomentosa, ad apicem conicum abrupte attenuata, stylopodio brevi acuto.

Collections. North Borneo: San 15071, 15122, 15072. Beaufort: San 15106, Pangl. Indonesian Borneo: bb 29636, 29666, 29663, 29702, 31420, 31419, Muara Tewe: bb 32780, 32781, 32774, 32779, Tarakan; Meijer 2218, Kostermans 8711, Nunukan, Tarakan; bb 29306, 29309, Bulungan; bb 31260, 31200, 31201,

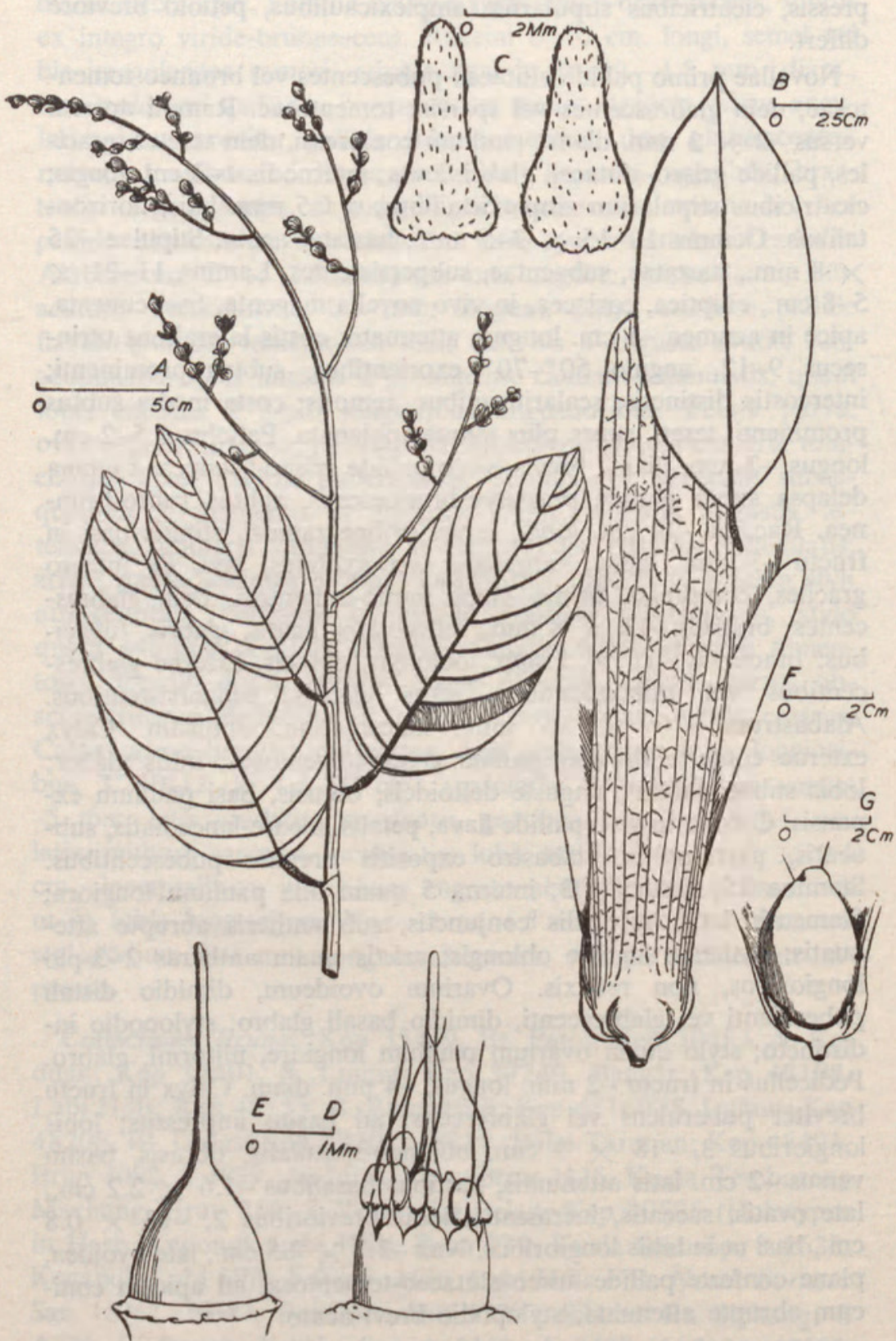


Plate 10. *S. amplexicaulis*.

a, Flowering twig. b, Leaf. c, Sepals (left, inner; right, outer). d, Ovary and androecium. e, Ovary. f, Fruit. g, Nut.

(a-e from Jacobs 5323; f, g, from Brun 3261).

31202, 31203, 29636, 27023, 28121, 27006, 27024, 30208, 30209, 30207, 26429, Melawi. *Brunei*: Kep 30374, Temburong; Brun 751, Base of Bt. Tanggoi, Temburong; Brun 3151, 3006, Bangar; S 5719, Kuala Belalong; Kep 30572, 30574, 35550, 35551, Tutong R.; Kep 28653, Bt. Kerita, Ladan Hills; S 1675, Mile 3, Ladan Hills; Kep 30633, Bt. Ladan; Kep 37086, 37087, Bt. Arong F.R.; Kep 32590, Balai Rotan; Kep 34559, Kuala Seladan, Tepiku; Kep 34566, Pak Andaki; Kep 34584, Pak Gabal; Kep 34596, Bt. Menggelang; Kep 48201, Balai Halim; Kep 80094, S 1860, 1927, 1937, 5580, Brun 555, 3261 (Holotypus in Herb. Kew), Andulau F.R.; Kep 30386, Kep 30387, S 1633, 1937, Kep 30389, 30460, 39638, Labi Hills F.R.; Kep 48184, Bt. Kenapol, Labi; S 2131, Bt. Teraja. *Sarawak*: S 247, Semengoh F.R.; S 6502, Simanggang; Clemens 21965, Sarawak; S 1683, Lawas; Jacobs 5323 Belaga.

SHOREA ANDULENSIS Ashton s.n.

S. pauciflorae King affinis, sed corolla ianthina, ovario glabro, lamina minore subtus glauca differt.

Ramuli, perulae, costa media supra, stipulae, petiolique, breviter conferte pallide flavido-alutaceo-tomentosi, costaeque subtus sparsius eodem tomentosi. Ramuli apicem versus 1.5–2 mm. diam., primo compressi, dein teretes, sicco nigrescentes, lenticellis minutis orbicularibus pallidioribus punctati, leves, glabri, angusti; internodis c. 1–1.5 cm. longis, brevibus; cicatricibus stipularum inconspicuis. Gemma 3–6 × 1.5–3 mm., ovoidea, compressa, subacuta. Stipulae 14 × 5 mm., hastatae, subacutae. Lamina 6–9 × 3–5 cm., elliptico-ovata, basi obtusa, apice in acumen 8 mm. longum attenuato; in arboribus maturis subtus glauca; costis lateralibus utrinsecus 10–13, rectis, marginem versus abrupte curvatis, subtus angustate prominentibus, angulo 40°–50° exorientibus basi excepta; intercostis angustis, scalariformibus, sinuatis, a costis lateralibus diagonale exorientibus. Petiolus 1–1.2 cm. longus, 1–1.5 cm. latus, sicco cremeo-glaucotomentosus, rugosus. Lamina delapsa supra pallide purpureo-brunnescentis, subtus plus minus glauca, dein saepe cere glauca attrita fusco-rufobrunneam; margine saepe paullum revoluta. Racemi 12 cm. longi, semel vel bis ramosi, stipitis basi in fructu 2, 5 mm. diam., terminales vel axillares, ex integro teretes vel paullum compressi, semper breviter conferte griseo vel pallide ferrugineo-tomentosi; ramuli 10 flores distichos gerentibus; bracteis bracteolisque 3 × 1.25 mm., ovatis, subacutis, externe breviter griseo-pubescentibus, intus glabrescentibus. Alabastrum 8 × 2.5 mm., anguste ovoideum, subacutum, calyce expanso. Calyx externe conferte breviter tomentosus, intus puberulens; lobis subaequalibus, ovatis, acutis vel paullum acuminatis, internis 2 quam externis 3 paullum acuminatioribus. Corolla in vivo pallide ianthina, ad marginem pallidior;

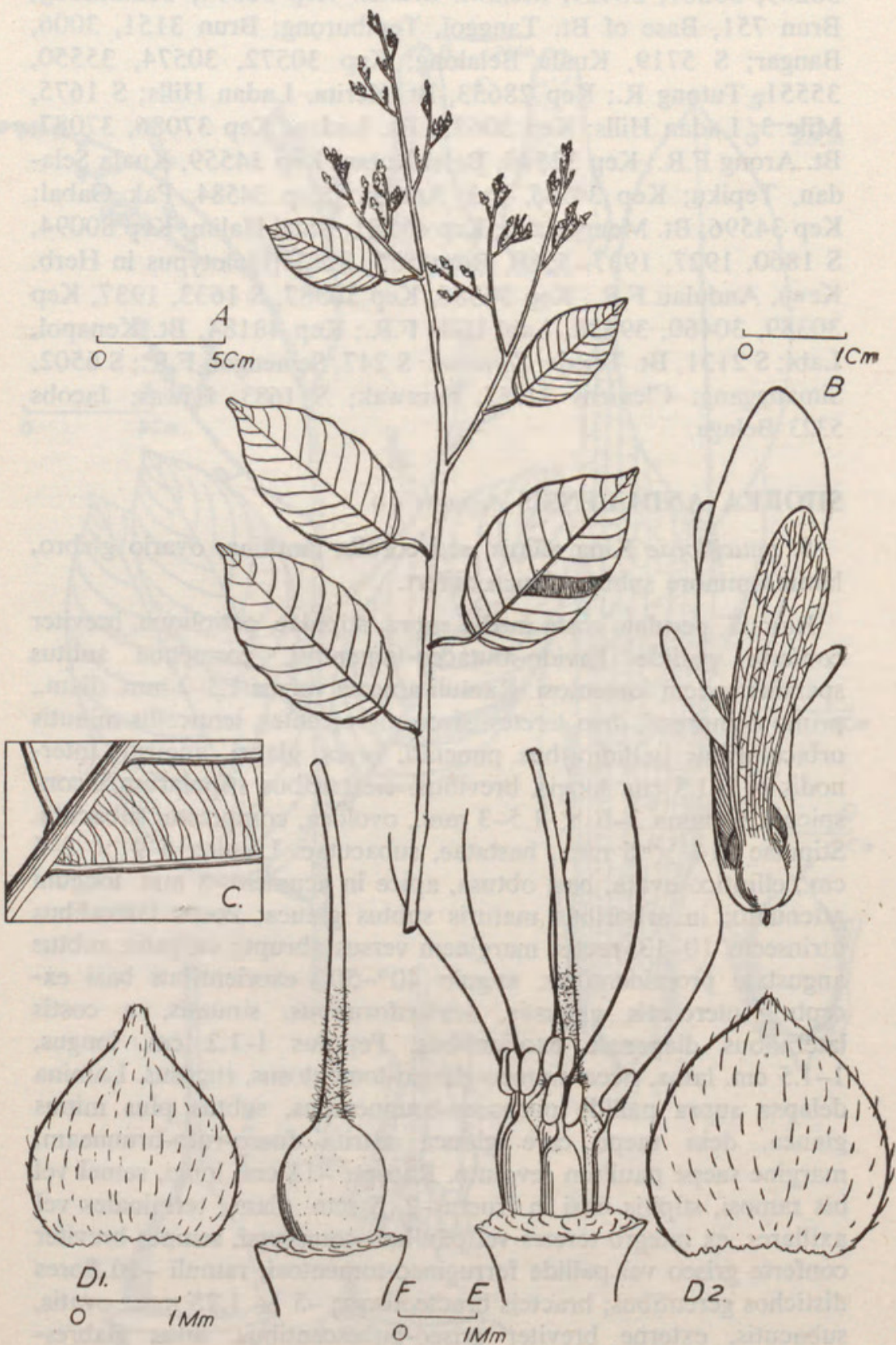


Plate 11. *S. andulensis*.

a, Flowering twig. b, Fruit. c, Part of lamina undersurface. d, Sepals (1, outer; 2, inner). e, Ovary and androecium. f, Ovary. (a-f, from Brun 3263).

petalis lineari-lanceolatis, anguste acutis, nectis, partibus in alabastro expositis breviter tomentosis, basim versus saccatis. Stamina 15, verticillis 3, bina cum solis alternata; interna 5 quam alia vix longiora; filamentis basim versus applanato-dilatatis, ad medium abrupte attenuatis, antheris late oblongis; aristis quam antheras 3-plo longiori, rectis, non reflexis, internis 5 prope apicem styli attingentibus. Ovarium parvum, globosum, glabrum, stylopodio indistincto; stylo quam ovarium 2-plo longiori, filiformi, dimidio basali sparsim tomentoso, aliter glabro. Pedicellus in fructu c. 3 mm. longus, c. 1 mm. diam., gracilis. Calyx in fructu breviter pubescens, basim versus confertius pubescens, in aetate maturandi sicco aureo-luteus; lobis longioribus 3, -5×1.2 cm., late spatulatis, obtusa, basim versus -2.5 mm. latis attenuatis, partibus basalibus c. 6×4 mm., anguste ovatis, incrassatis, saccatis; lobis brevioribus 2, -2.5×0.2 cm., linearibus, subaequalibus, basim versus ut in lobis longioribus. Nux -1.4×0.7 cm., ovoidea, breviter pallide griseo-alutaceo-pubescens, ad stylopodium -1 mm. acutum abrupte attenuata.

Collections. *Brunei*: Brun 5435, 3263 (Holotypus in Herb. Kew), 3030, 3275, San 17523, Andulu F.R.; Brun 3332, Bt. Patoi; Brun 878, Bt. Bedawan; S 2122, Bt. Teraja; Brun 173, R. Ingei. *Sarawak*: S 5637. Bt. Bubong Rumah, Lawas; Brun 809, Sourabaya-Merapok track, Kayangeran East F.R., Lawas.

SHOREA ANGUSTIFOLIA Ashton s.n.

S. xanthophylla Sym. affinis, sed petiolo pubescenti, lamina minore, coriaceore, sine costis lateralibus differt.

Perulae petiolique semper pilis brevissimis pallide brunneis punctati; ramuli stipulaeque pilis minutis pallidis brunneis primo sparsim punctati, dein glabrescentes. Ramuli apicem versus $1.5-2$ mm. diam., recti, teretes, pallide flavido-brunnescentes, rugosi, fissi, facie floccis parvulis chartaceis exfolia. Gemma $0.5-1.5 \times 1$ mm., parva, ovoidea, obtusa. Stipulae -3 mm. longae, lineares, fugaces. Lamina novella in vivo fusco-violescens; lamina $8-14 \times 2.5-4$ cm., ovato-lanceolata, coreacea, basi cuneata, apice in acumen $1-1.5$ cm. longum gradatim attenuato; costis lateralibus utrinsecus $8-9$ (10), vix prominentibus, curvatis, remotis, angulo $50^\circ-60^\circ$ exorientibus; costa media subtus vix elevata, intercostis conferte scalariformibus. Petiolus $6-8$ mm. longus, c. 1.5 mm. latus, brevis fissis minutis, sicco distincte pallide brunneus vel pallide cremeo-griseus. Lamina delapsa griseo-viridis, non crispata sed margine saepe undulato. Racemi -10 cm. longi, ordine semel vel bis ramosi, stipitis basi in fructu -1.5 mm. diam., terminales vel axillares, graciles, laxi, ex integro teretes, breviter pallide griseo-alutaceo-pubescentes; ramulis -2 cm. longis, -8 flores distichos gerentibus; bracteolis parvis, fugacibus. Gemma -2.5×1.5 mm., lanceolata, acuta. Calyx externe breviter tomentosus, intus

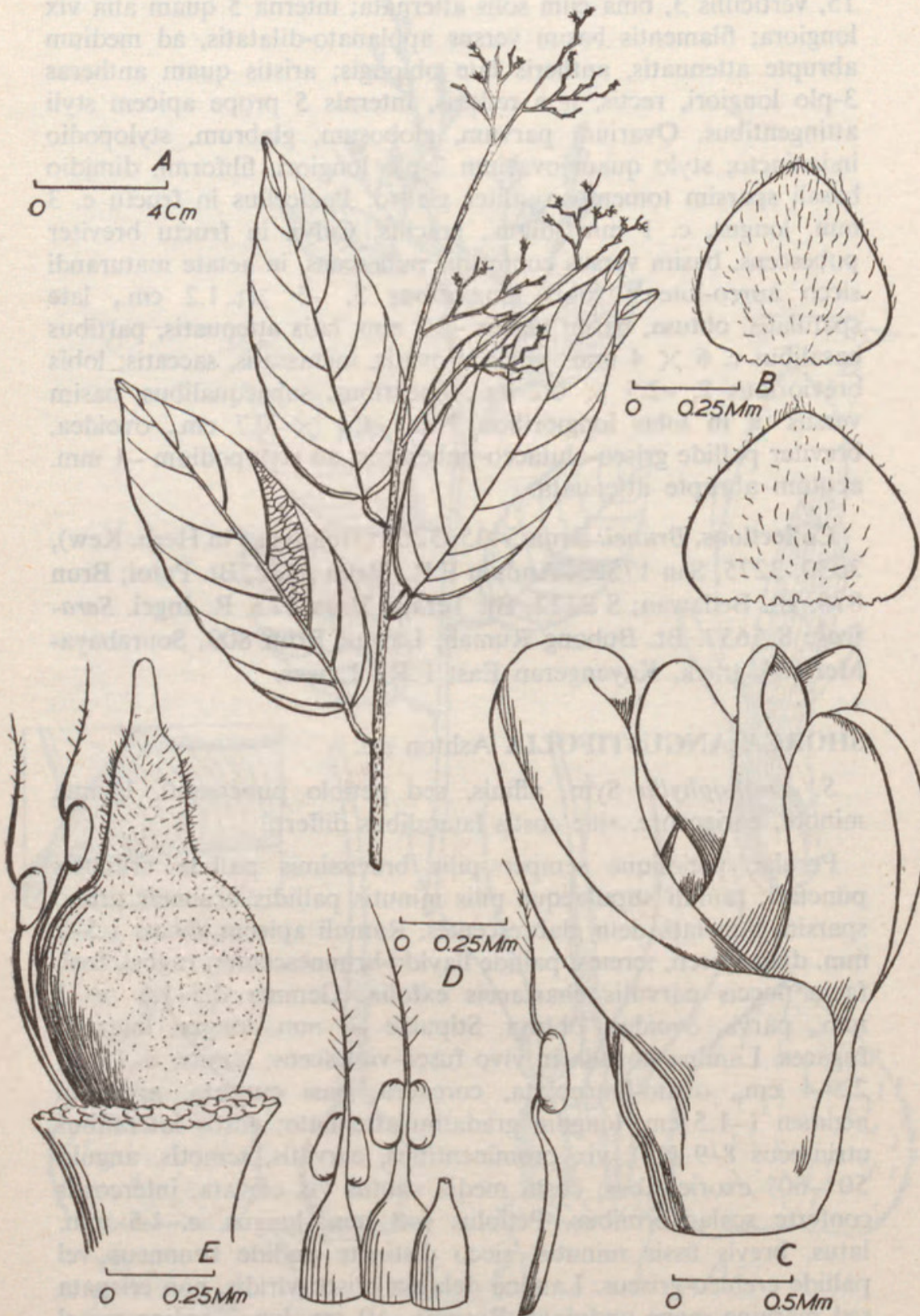


Plate 12. *S. angustifolia*.

a, Flowering twig. b, Sepals (above, outer; below, inner). c, Corolla. d, Stamens frontal view; right, lateral view). e, Ovary.

(a-e from Brun 778).

glaber, lobis ovatis, acutis, lobis internis 2 quam externis 3 tenuioribus, ad basim costrictioribus. Corolla in vivo pallide flava, aetate expandi basim versus imbricata, scyphiformis, apicem versus expansa; petalis linearibus, partibus in alabastro expositis breviter tomentosis, apicem versus nectis. Stamina 15, in verticillis 3 inaequalibus, bina cum solis alternata; filamentis basim versus dilatatis, apicem versus filiformibus; antheris oblongis; aristis quam antheras 1-2-plo longioribus, apicem styli attingentibus, apicem versus ciliatis. Ovarium ovoideum, basi glabra, aliter breviter tomentosum, stylopodio conico, tomentoso, stylo brevi glabro; stylo styloporioque ovarium aequanti. Fructus ignotis.

Collections. *North Borneo:* Kep 80302, Gaya F.R. *Indonesian Borneo:* bb 17915, 17919, 17760, Tidung; bb 12583, E. Kutai; bb 31774, Melawi; bb 11050, 21201, 21199, 21184, 21158, 21187, 21155, 22754, Puruktjau; bb 18988, 19555, Berau; bb 11200, Bulungan; bb 20143, Sampit; bb 20627, 20629, Boven Mahakam; bb 19987, Boven Dayak. *Brunei:* Brun 3393, 5682, Kuala Belalong; Brun 520, Bt. Patoi; Brun 748, Kuala Sekurop, Temburong; Brun 778, Kuala Temburong Machang, Temburong (Holotypus in Herb. Kew).

SHOREA ASAHI Ashton s.n.

S. maxwellianae King, *S. biawak* Ashton affinis, sed lamina coriacea, costa subtus supraque applanata differt.

Novellae primo brevissime pubescentes, dein glabrescentes, stipulae persistenter. Ramuli apicem versus c. 0.75 mm. diam., graciles, teretes, fusco brunnei vel nigri, lenticellis minutis pallidioribus conferte punctati; cicatricibus stipularum parvis, horizontalibus, inconspicuis. Gemma c. 1.5×1 mm., parva, falcata, sicco nigrescens. Stipulae -5 mm. longae, anguste deltoideae, fugacae. Lamina 6-10 $\times$ 3-5 cm., ovata, coriacea, non glauca, basi late cuneata, subaequali, apice in acumen c. 1 cm. longum anguste attenuato; costis lateralibus utrinsecus 6-7, angustis, curvatis, applanatis, angula c. 60° exorientibus; costa media indistincta, subtus supraque applanata; intercostis scalariformibus, confertis, angustissimis, indistinctis, a costa media angulo 90° exorientibus vel sursum directis, marginem versus a costis lateralibus angulo c. 90° exorientibus. Petiolus c. 1 cm. longus, c. 1 mm. diam., sicco nigrescens. Lamina delapsa supra obscure purpureo-brunnescens, subtus pallide flavido-brunnescens, ex integro nitens. Racemi -12 cm. longi, semel ramosi, stipitis basi in fructu -1 mm. diam., terminales vel axillares, ex integro graciles, teretes, recti, conferte cremeo-tomentosi; ramulis -7 mm. longis, brevibus, 'zigzag', -4 flores secundos conferte gerentibus; bracteolis -2 mm. longis, ellipticis, acutis, puberulentibus, fugacis. Alabastrum -2 mm. longum, globosum. Calyx externe breviter pubescens, intus glaber; lobis externis 3 ovato-delloideis, subacutis; lobis internis

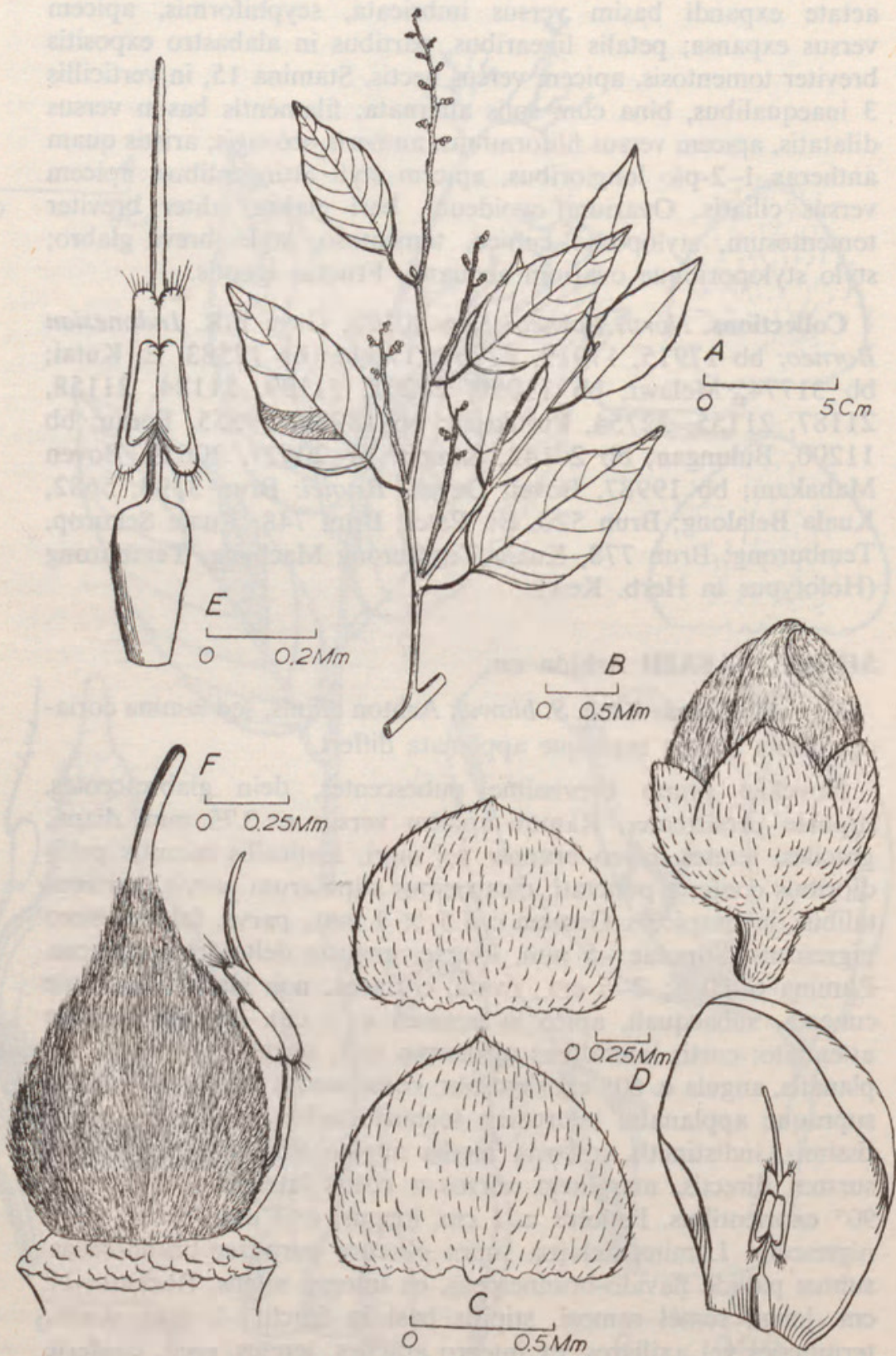


Plate 13. *S. asahi*.

a, Flowering twig. b, Flower bud. c, Sepals (inner above; outer below). d, e, Stamen (from inner side). f, Ovary.

(a-f from Kep 37183).

2 quam illis minoribus, latius ovatis, minoribus acutis. Corolla in vivo alba; petalis elliptico-oblongis, acutis, externe breviter pubescentibus, intus puberulentibus. Stamina c. 30, subaequalibus; filamentis basim versus applanato-dilatatis ad medium abrupta attenuatis, apicem versus filiformibus, breviter barbatis; antheris anguste oblongis, loculis interioribus quam exterioribus majoribus, apice breviter barbato; aristis quam antheras 2-plo longioribus, crassis, apicem versus barbatis. Ovarium stylopodiumque ovoideum, conferte tomentosum, in stylum breve gracile glabrum attenuatum. Pedicellus in fructu -2 mm. longus. Calyx sparsim alutaceo-pubescentis; lobis -4×4 mm. brevibus subaequalibus nucem adpressis. Nux -11×6 mm. oblongo-ovoidea acuta conferte alutaceo-pubescentis.

Collections. *Brunei*: Kep 37183, Bt. Bedawan (Holotypus in Herb. Kepong); Brun 772, Kuala Temburong Machang, Ulu Temburong; Brun 5632, Bt. Ulu Tutong; S 1183, Bt. Teraja. *North Borneo*: San 24279, M. 5, Telupid road, Beluran.

SHOREA BIAWAK Ashton s.n.

S. maxwellianae King affinis, sed lobis calycis in fructu quam nucem brevioribus differt.

Ramuli petiolique primo breviter pallide alutaceo-pubescentes, dein glaber, perulae semper iidem pubescentes, laminae glabrae. Ramuli apicem versus -1 mm. diam., graciles, teretes, multum ramosi, dein pallide vel fusco-brunnescentes, leves vel lineare striati; internodis $1.2-3$ cm. longis; cicatricibus stipularum minutis, brevibus, inconspicuis. Gemma -1 mm. longa, parva. Stipulae ignotae. Lamina $6-10 \times 2.5-4.5$ cm., tenuis, ovata, basi obtusa vel late cuneata, saepe subaequali, apice in acumen -1.5 cm. longum angustum vel caudatum attenuato; costis lateralibus utrinsecus $5-6$, angustis, subtus paullum prominentibus, supra paullum depressis, curvatis, angulo $50^{\circ}-60^{\circ}$ exorientibus; domatiis parvis puberulentibus axillaribus; intercostis indistinctis, scalariformibus, a costa media c. 90° exorientibus; costa media subtus paullum prominenti, supra paullum prominenti vel applanata. Petiolus $7-10$ mm. longus, -1 mm. diam., gracilis, sicco nigrescens. Lamina delapsa sicco ex integro pallide virido-brunnea. Racemi -14 cm. longi, semel ramosi, stipitis basi in fructu -1 mm. diam., terminales vel 1-axillares, ex integro teretes, semper breviter sparsim pallide cremeo-brunneo-pubescentes; ramulis -6 mm. longis, brevioribus, paullum secundis, -6 flores secundis conferte gerentibus; bracteolis -2 mm. longis, ovatis, acutis, breviter puberulentibus, fugacis. Alabastrum -1.5 mm. longum, globosum. Calyx externe breviter tomentosus, intus glaber; lobis late ovatis, acutis, subaequalibus, internis 2 quam externis 3 paulum brevioribus, tenuioribus, latioribus. Corolla in vivo cremea, petalis ellipticis, obtusis, externe breviter puberulentibus, intus

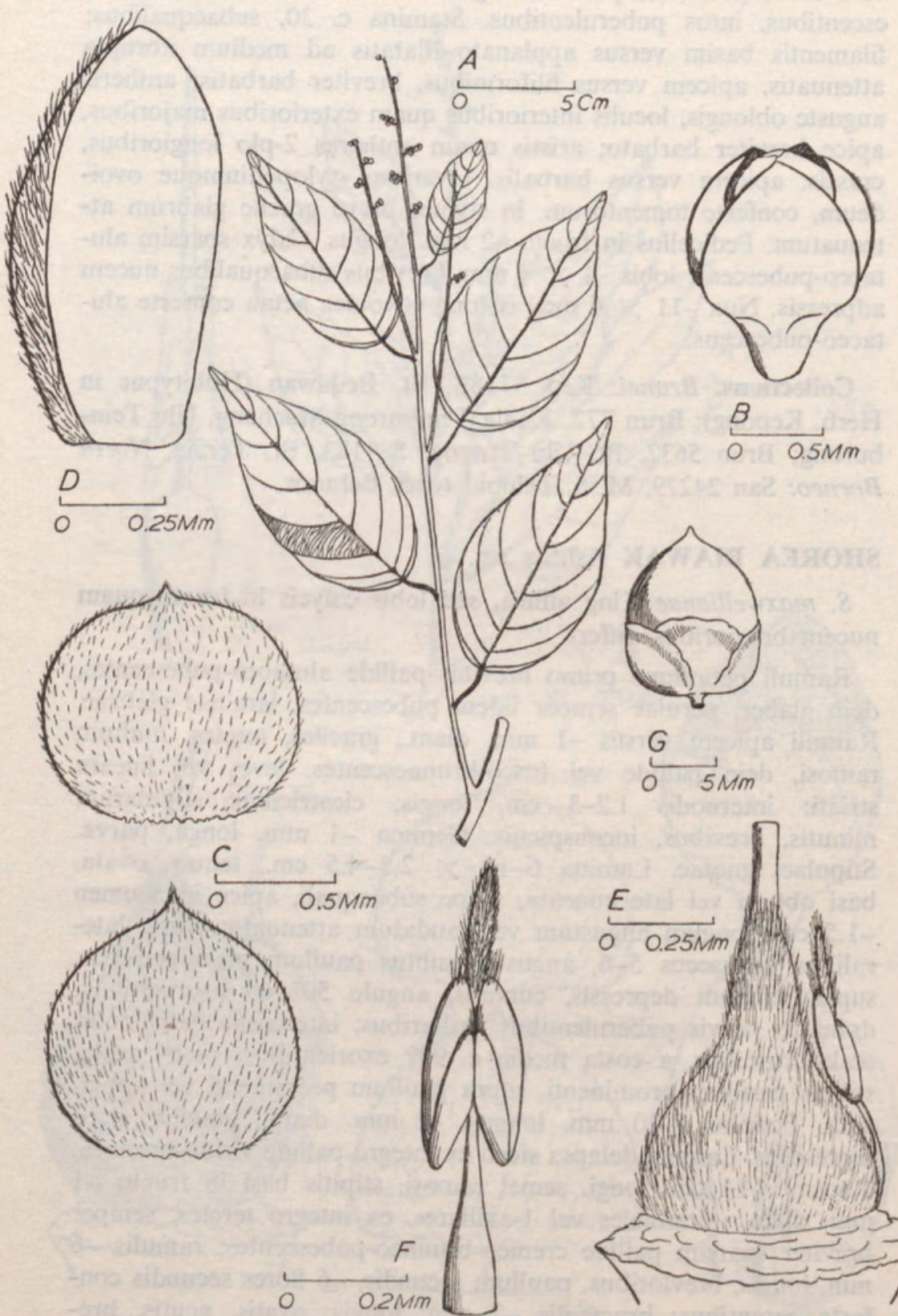


Plate 14. *S. biawak*.

- a, Flowering twig. b, Flower bud. c, Sepals (inner above, outer below). d, Petal. e, f, Stamen (inner side). g, Fruit.
(a-f from Brun 3005, g from Brun 3369).

glabris. Stamina c. 35; filamentis gracilibus, glabris, attenuatis; antheris anguste oblongis, apicem versus attenuatis; loculis interioribus quam exterioribus paullum maioribus, apice breviter barbato; aristis quam antheras paullum brevioribus, conferte barbatis. Ovarium stylopodiumque ovoideum vel pyriforme, conferte tomentosum, stylo brevi glabro. Pedicellus in fructu -2 mm. longus, brevis. Calyx quam nucem brevior; lobis subaequalibus, -7×9 mm., suborbicularibus, obtusis, tenuibus, ad nucem conferte adpressis, semper breviter pallide alutaceo-puberulentibus. Nux -13 $\times$ 10 mm., subglobosa, conferte pallide alutaceo-pubescentis, apice in stylopodio -1.5 mm. lineari abrupte attenuato.

Collections. *Brunei*: Brun 3356, 3351, Ulu Senuko, Labu; Brun 3385, Kuala Belalong; Brun 3005, 3369 (Holotypus in Herb. Kew) Bangar.

SHOREA BULLATA Ashton s.n.

S. flemmichii Sym. affinis, sed lamina maiore, sparsius tomentosa, paullum bullata, staminum aristis longissimis undulatis, stylo longiore differt.

Stipulae externe, ramuli, petioli, costae subtusque semper aspere scabrido-fulvo-cristato-tomentosi, stipulae intus breviter pubescentes. Ramuli apicem versus c. 2 mm. diam., primo cristato-tomentosi, dein glabri, tenue chartaceo exfoliati, pallide brunnei, teretes, multum ramosi; internodis 1-2 cm. longis, brevibus; cicatricibus stipularum brevibus, transversis, tomento obscuris. Gemma 3-4 $\times$ 2-3 mm., late ovoidea, subacuta. Stipulae -7 $\times$ 2 mm., anguste hastatae, acutae. Lamina 6.5-10 $\times$ 3-4.5 cm., elliptico-vel oblongo-obovata, bullata; saepe tenue concava, basi anguste obtusa vel late cuneata attenuata, apice obtuso vel in acumen -6 mm. longum breviter attenuato; margine revoluta; costis lateralibus utrinsecus 10-12, angulo variabile exorientibus; intercostis laxe scalariformibus, costatis, a costis lateralibus 90° exorientibus; costis supra depressis. Petiolus 0.8-1 cm. longus, c. 1.5 mm. diam., brevis, sicco fulvo-tomentosus. Lamina delapsa supra pallide griseo purpurescens, subtus fusco-rubro-purpurescens; tomento cristato distincte aureo-fulvo. Racemi -11 cm. longi, semel vel bis (terminales) ordine ramosi; stipitis basi in fructu -1.5 mm. diam., terminales vel axillares, ex integro teretes, laxi, ad basim conferte rubro-brunneo-tomentosi, ad apicem brevius pallidius tomentosi; ramulis -3.5 cm. longis, -8 flores plus minus secundis gerentibus; bracteis ignotis; bracteolis -6 $\times$ 3.5 mm., late ellipticis, obtusis, breviter pallide griseo-puberulentibus. Alabastrum -15 $\times$ 3 mm., lineare obtusum. Calyx parvus, externe conferte pallide griseo-tomentosus, intus glaber; lobis subaequalibus, late ovatis vel suborbicularibus. Corolla in vivo pallide crenea, basim versus rosea; petalis linearibus, obtusis, partibus in alabastro expositis conferte tomentosis, corolla delapsa paullum connata. Stamina 15,

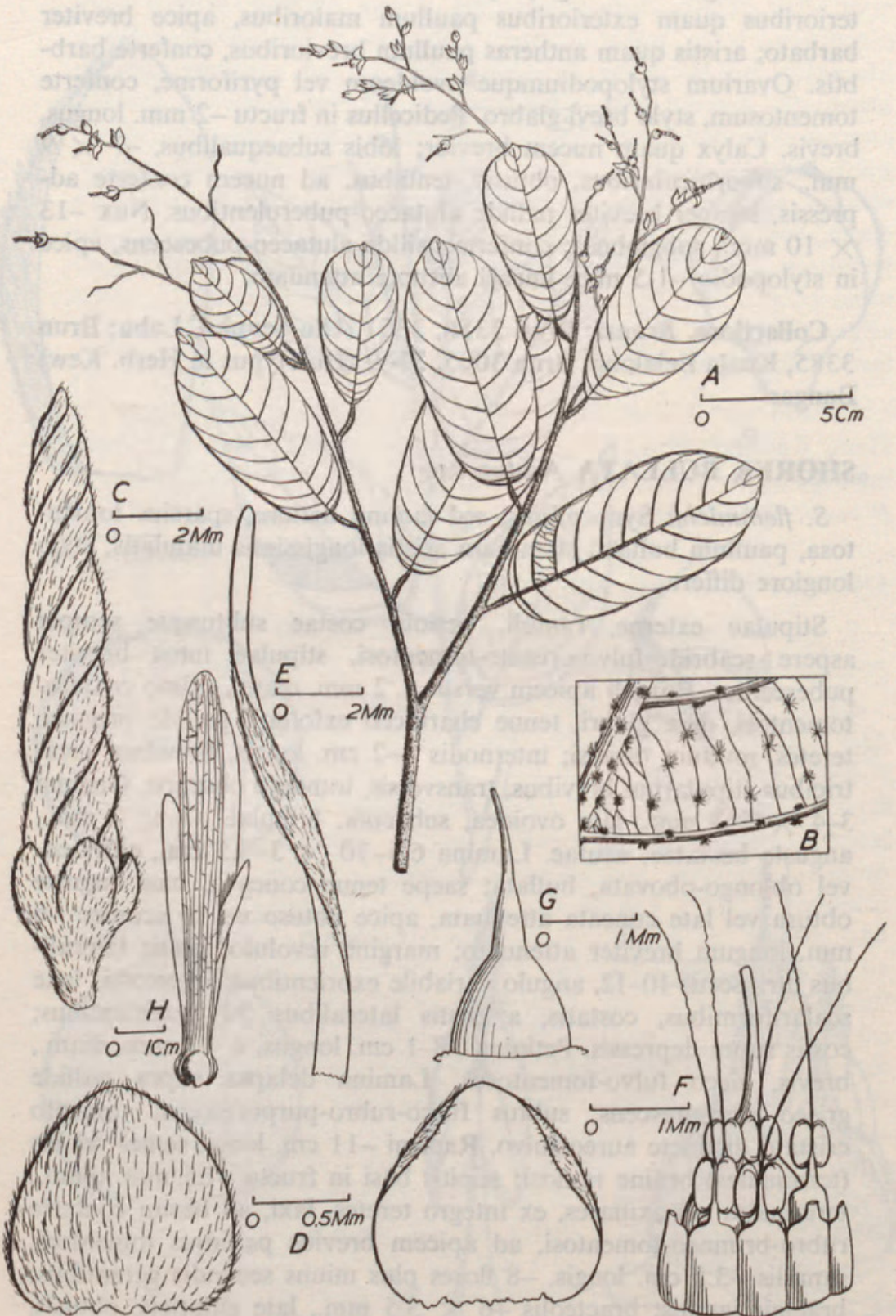


Plate 15. *S. bullata*.

a, Flowering twig. b, Part of lamina undersurface. c, Flower bud. d, Outer sepal (from outside, left; from inside, right). e, Petal. f, Androecium and gynoecium. g, Gynoecium. h, Fruit.

(a–g from Brun 2003a; h from Brun 2003c).

verticillis confertissimis 3, bina cum solis alternata, antheris internis 5 supra aliis extrusis, externis 10 subaequalibus; filamentis basi connatis, applanato-dilatatis, ad medium abrupte attenuatis, apicem versus filiformibus; antheris oblongis; aristis quam antheras -4-plo longioribus, apicem styli superantibus, gracillimis, sinuato-crispulatis. Ovarium stylopodiumque ovoideum, conferte breviter tomentosum; stylo quam illis prope 2-plo longiori, dimidio basali incrassato, setoso. Pedicellus in fructu -1 mm. longus. Calyx basim versus sparsim pallide alutaceo-pubescent, apicem versus glabrescent; lobis longioribus 3, -9×1.3 cm., spatulatis, obtusis, basim versus angustatis -5 mm. latis; partibus basalibus -6×6 mm., prominente saccatis incrassatis; lobis brevioribus 2, $2-5 \times 0.3$ cm., linearibus, obtusis, partibus basalibus ut in lobis longioribus. Nux -10×7 mm., ovoidea, breviter conferte cremeo-tomentosa, acuta.

Collections. *Brunei*: Brun 924, Andulau F.R.; S 5773, Bt. Biang; Brun 2003 (Holotypus in Herb. Kew), S. 5798, Bangar.

SHOREA DOMATIOSA Ashton s.n.

S. atrinervosae Sym. affinis, sed fructu maiore, lamina tenuiore, petiolo angustiore, longiore, costis lateralibus angustioribus, domatiis prominentibus differt.

Domatiae stipulae externeque pubescentes, aliter novelli glabri. Ramuli apicem versus c. 1.5 mm. diam., graciles, multum ramosi, sicco saepe compressi vel rugosi, fusco-brunnei vel nigrescentes, leves, lenticellis minutis pallidis rotundatis punctati; internodis 1-2 cm. longis; cicatricibus stipularum brevibus, pallidis, horizontalibus, inconspicuis. Gemma c. 4×2 mm., ovoidea, acuta. Stipulae c. 6×2.5 mm., ovatae, anguste obtusae, basi paullum constricta, caducae. Lamina 6.5-10 $\times$ 3-7 cm., late ovata vel obovata, tenuis, subtus in arboribus maturis glaucescens, basi obtusa vel subcordata, apice in acumen c. 8 mm. longum subabrupte attenuato; costis lateralibus utrinsecus (8)9-10(12), angustis, curvatis, subtus paullum prominentibus, angulo $45^\circ-65^\circ$ exorientibus, domatiis axillaribus prominentibus; intercostis angustis, confertis, scalariformibus, sinuatis. Petiolus 1.5-2.5 cm. longus, c. 1 mm. diam., gracilis, geniculatus, dimidio apicali incrassato, sicco nigrescens. Lamina delapsa supra purpureo-grisea, subtus in arboribus novellis ex integro griseo-brunnea, in arboribus maturis glauca costis nigris. Racemi, bractei, bracteolique ignoti. Alabastrum -1.3×4 mm., fuseforme. Calyx externe breviter pubescent, intus glaber; lobis externis 3 late ovatis subacutis, internis 2 anguste ovatis, acutis. Petala linearia, in alabastro vix contorta, obtusa, partibus in alabastro expositis sparsim pubescentibus, aliter glabra. Stamina c. 25-30; filamentis basim versus applanatis, ad antheris attenuatis; antheris late oblongis, loculis internis 2 quam externis 2 brevioribus; ad apicem sparsim setosis; aristis quam

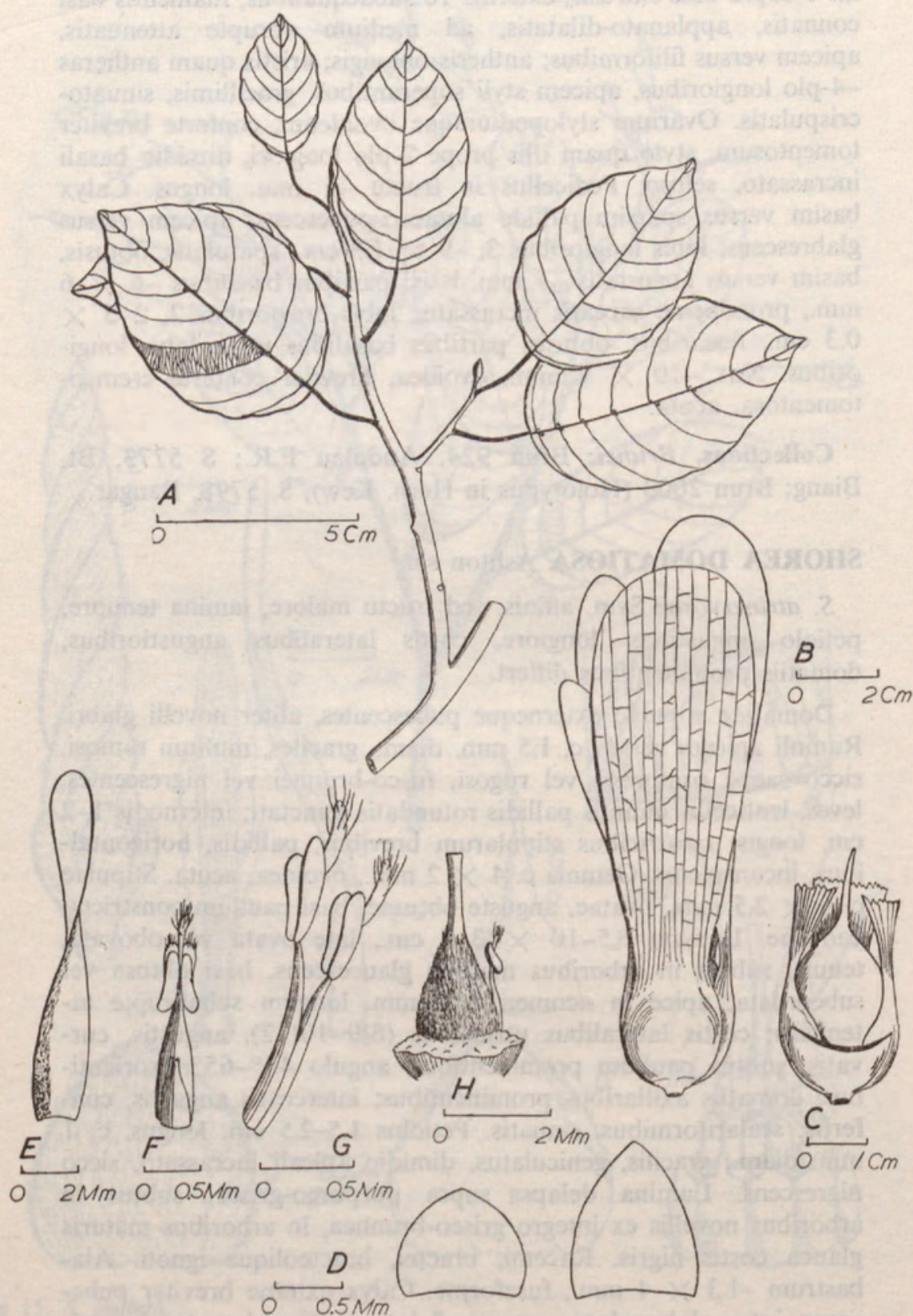


Plate 16. *S. domatiosa*.

a, Leafy twig. b, Fruit. c, Nut. d, Sepals (left, inner; right, outer). e, Petal. f, Stamen (frontal view). g, Stamens (lateral view). h, Ovary.

(a from S 1782; b, c, from San 16601; d-h from San 21492).

antheris $\frac{1}{2}$ -plo longioribus, crassis, $\pm$ conferte setosis. Ovarium ovoideum, conferte tomentosum basi excepta; stylopodio quam ovarium. $1\frac{1}{2}$ -plo longiori, longissimo, basim versus pubescenti, aliter glabro. Pedicellis in fructu -1 mm. longus, crassus. Calyx glaber; lobis longioribus 3, -13×3 cm., late spatulatis, obtusis, basim versus angustatis -8 mm. latis; partibus basalibus -1.8×1.6 cm., ellipticis saccatis incrassatis; lobis minoribus 2, -7×1.2 cm., anguste spatulatis, partibus basalibus ut in lobis longioribus. Nux -3.5×2.5 cm., ovoidea, conferte breviter cremeo-pubescentis, ad apicem acutum attenuata, stylopodio -1 cm. longo filiformi.

Collections. *North Borneo*: San A 308, Saliwagon M. 64, Beaufort; San 15164, A 306, A 302, 16604, 16601 (Holotypus in Herb. Kepong), Ulu Sipitang; San 21492, Tawau; *Sarawak*: S 1782, Bt. Berayong, Lawas. *Brunei*: S 5726, Brun 3395, 5665, 5210, Kuala Belalong; Brun 305, S. Batu Apoi-Sebatu watershed; Brun 888, Base of Bt. Bedawan; Kep 39645, Labi F.R.

SHOREA FAGUETIODES Ashton s.n.

Shoreae faguetianae Heim affinis, sed lamina tenuiore, latiore, basi saepe subcordata, petiolo longiore, differt.

Ramuli novell interdum pallide alutaceo-tomentosi, interdum glabri, perulae, stipulae laminaeque glabri. Ramuli apicem versus -3 mm. diam., primo subcompressi, sicco nigri, dein teretes, pallide brunnescentes, minute striati vel rugulosi. Gemma $3-4 \times 2.5$ mm., obtuso-ovoidea, glabra, sicco nigra. Stipulae -1.7×0.6 cm., anguste deltoideae, saccatae, ad apicem obtusae, tarde caducae. Lamina $12-18 \times 5-7$ cm., anguste ovata, tenuis, basi late cuneata vel subcordata, subaequali, apice in acumen -2 cm. longum gradatim attenuato; costis lateralibus utrinsecus $10-15$, angustis sed conspicuis, $60^\circ-70^\circ$ exorientibus, intercostis scalariformibus, a costis lateralibus diagonale exorientibus. Petiolus $2.2-3$ cm. longus, -2 mm. diam., sicco, niger. Lamina delapsa fusco-virido-brunnescentis, costis subtus prominente nigris, sicca involuta. Racemi -15 cm. longi, ordine $2-3$ ramosi, stipitis basi in fructu -1.2 mm. diam., terminales vel axillares, ex integro teretes, laxi, semel breviter pallide griseo-brunneo-pubescentes, sicco rugosi; ramulis -2 cm. longis, -7 flores gerentibus; bracteolis parvis, fugacibus. Alabastrum -2.5×1.5 mm., parvum, ellipticum, obtusum. Calyx externe conferte breviter pubescens, intus glaber; lobis ovatis, acutis, internis 2 quam externis 3 paullum minoribus, tenuioribus, ad basim constrictioribus. Corolla aetate florendi pallide crenea, ad basim imbricata et gracile scyphiformis, apicem versus expansa; petalis linearibus, apices versus spiraliter contortis, partibus in alabastro expositis pubescentibus. Stamina 15, verticillis 3 inaequalibus, bina cum solis alternata; filamentis angustis, attenuatis, basi dilatata, paullum gibbosa, apice filiformi; antheris subglobosis; aristis angustis, quam antheras 3 -plo longioribus,

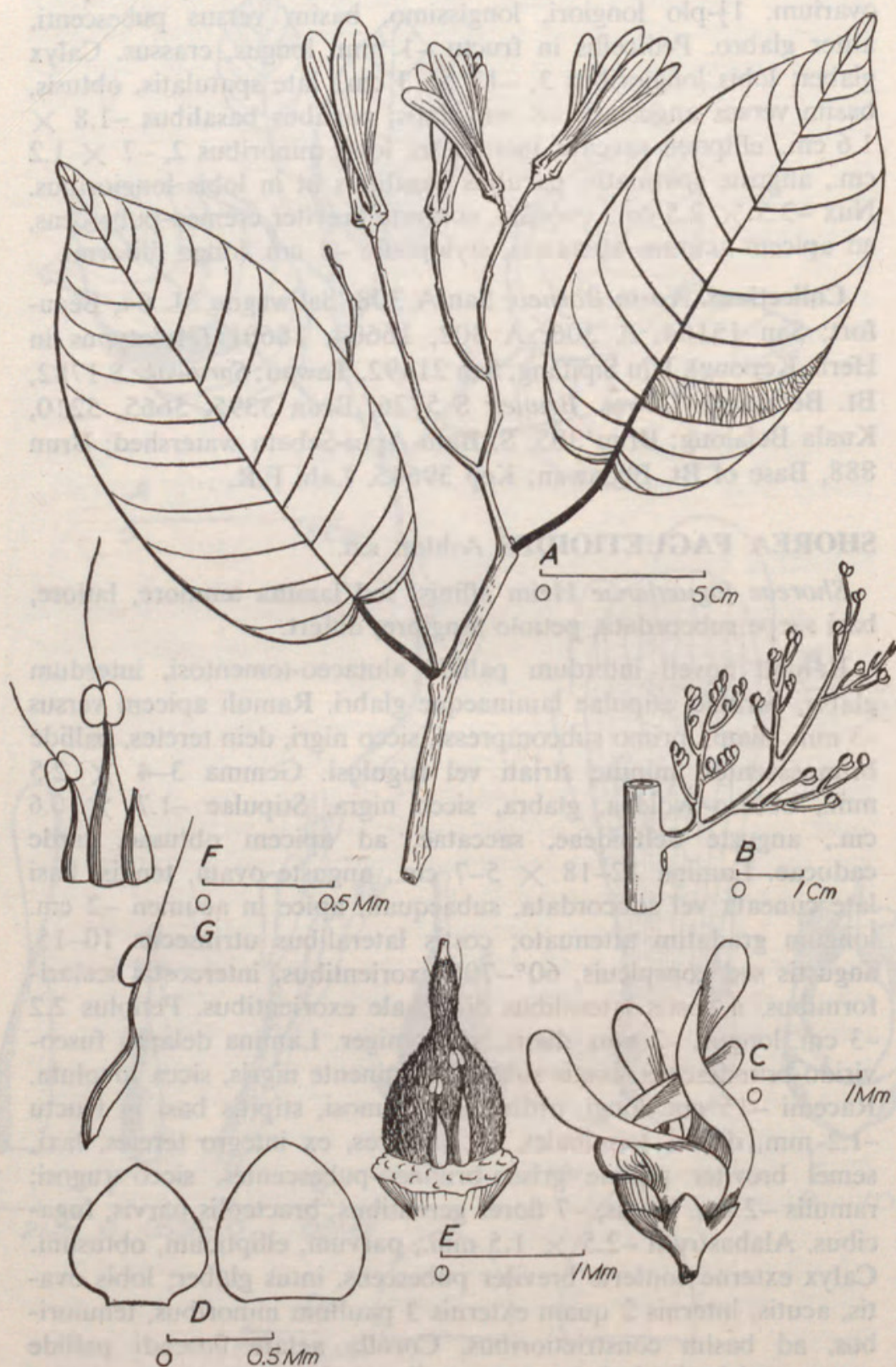


Plate 17. *S. faguetioides*.

- a, Fruiting twig. b, Inflorescence. c, Flower. d, Sepals (left, inner; right, outer). e, c, f, Stamens (frontal view). g, Stamen (lateral view).
(a from S 1771; b-g from S 1804).

apicem versus paullum ciliatis, internis 5 apice stylo superantibus. Ovarium ovoideum, sparsim tomentosum, stylopodio cylindrico, quam ovarium brevius confertius tomentoso, stylo glabro. Fructus subsessilis. Calyx in fructu ad pedicellum attenuatus, basim versus puberulens, apicem versus glabrescens; lobis longioribus 3, -7×-1.5 cm., late spatulatis, tenuibus, obtusis, basim versus -4 mm. latis angustatis; partibus basalibus -5 mm. lata, prominente tuberculatis, incrassatis; lobis brevioribus 2, -5×0.7 cm., aliter ut in lobis longioribus. Nux -20×6 mm., oblongo-obovoidea, pallide alutaceo-tomentosa, ad stylopodium -3 mm. longum angustum attenuata.

Collections. *Indonesian Borneo*: bb 22875, G. Pering, Sanggau; bb 29609, Long Bleh, W. Kutei; bb 18294, Tidung. *Sarawak*: S A 0301, Bt. Ngili, Sadong; S A 069, Nanga Mujan, Batang Ai; S 1804, Ulu Berawan, Limbang; S 1771, Bt. Pengalih, Lawas (Holotypus in Herb. Kew). *Brunei*: Kep 35674, Labi Hills F.R.; Kep 35466, Bt. Patoi; Kep 80137, Peradayan F.R.; S 1664, Biang; S 5805, Bangar; Brun 3340, 5645, S 5810, Bt. Patoi; S 5733, 5702, Kuala Belalong.

SHOREA FLAVIFLORA Wood ex Ashton:—*S. flaviflora* Wood msc.

S. kunstleri King affinis, sed floribus maioribus, calyce glabro fimbriato incrassato, antheris magnis reniformibus, lamina attenuatior undulata differt.

Ramuli, petioli, laminaeque primo pallide griseo-pubescentes, cristis minutis adpressis stellatis, dein glabrescentes, perulae stipulae externeque semper pubescentes, stipulae intus semper puberulentes. Ramuli apicem versus $2-3$ mm. diam., ex integro teretes, leves, dein glabri, pallide brunnei; internodis $1.5-4$ cm. longis; cicatricibus stipularum c. $1.5-2$ mm. longis, angustis, sursum directis, ramulos semicircumdatis. Gemma $6-12 \times 1.5-3$ mm., falcata, acuta. Stipulae -24×7 mm., anguste hastatae, fugacae. Lamina $12-18 \times 5.5-7$ cm., tenuis, anguste ovata, basi obtusa vel anguste cuneata, apice in acumen -1.5 cm. longum angustum attenuato; costis lateralibus utrinsecus $6-7$, curvatis, remotis, angustis, subtus prominentibus, domatiis parvis axillaribus, angulo $40^\circ-50^\circ$ exorientibus; costa media supra applanata; intercostis angustissimis, a costis lateralibus diagonale exorientibus, conferte scalariformibus. Petiolus $2-3$ cm. longus, c. 1.5 mm. diam., sicco rugoso-nigrescens. Lamina delapsa supra griseo-brunnescent, subtus ferrugineo-vel rubro-nigrescens, margine undulato. Racemi -15 cm. longi, bis ramosi, stipitis basi in fructu -2 mm. diam., terminales vel axillares, pendentes, ex integro teretes, sicco rugosi, breviter sparsim pallide griseo-pubescentes vel glabrescentes; ramuli -12 flores distichos gerentibus; bracteolis -5×2.5 mm.,

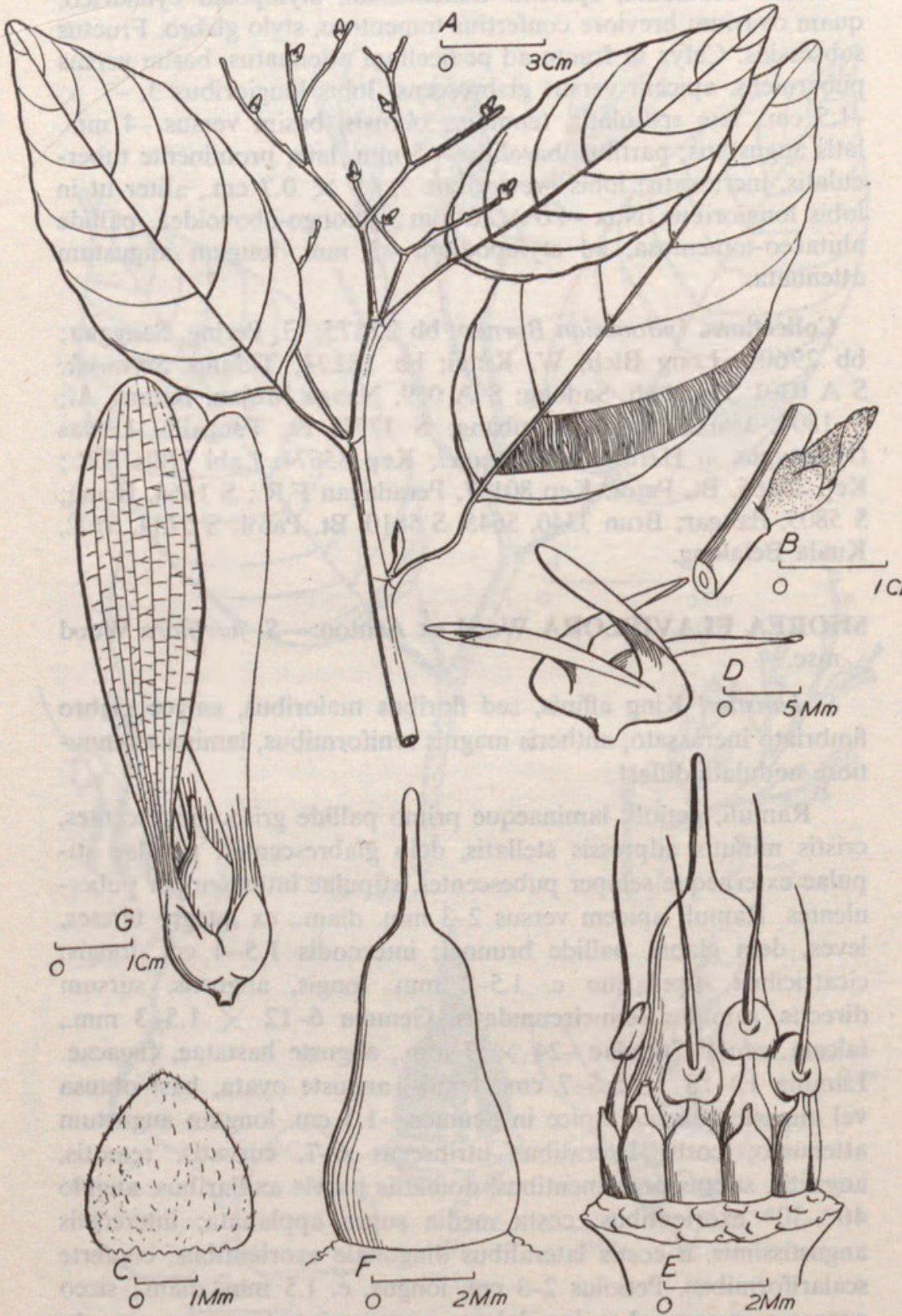


Plate 18. *S. flaviflora*.

a, Flowering twig. b, Flower bud. c, Outer sepal. d, Corolla. e, Ovary and androecium. f, Ovary. g, Fruit.

(a-f from Brun 5664; g from Brun 5211).

ellipticis, obtusis, externe conferte breviter pallide griseo-tomentosis, intus sparsim pubescentibus. Alabastrum -14×4.5 mm., fuseiforme, obtusum. Calyx glaber, margine fimbriato excepto; lobis aequalibus, late ovatis, incrassatis, ad corollam conferte adpressis. Corolla in vivo fusco-flava, petalis lineare-lanceolatis, acutis, basi firmiter connatis, multum contortis nectisque, partibus in alabastro expositis breviter tomentosis, aetate florendi dimidio basali imbricato late scyphiformi. Stamina 15, verticillis inaequalibus 3; filamentis basim versus dilatato-applanatis, apicem versus abrupte attenuatis, filiformibus; antheris magnis, reniformibus, loculis interioribus quam exterioribus paullum minoribus; aristis quam antheris 3-plo longioribus. Ovarium pyriforme, breviter conferte tomentosum; stylo ovarii stylopodiiue aequali, dimidio supra antheris longissimis superanti, filiformi, glabro. Pedicellus in fructu c. 3 mm. longus, c. 2.5 mm. latus. Calyx glaber; lobis longioribus 3, -13×3 cm., late spatulatis, obtuso, basim versus -11 mm. latis gradatim attenuatis, partibus basalibus -1×1.2 cm., abrupte prominente saccatis, incrassatis; lobis brevioribus $2-9 \times 1.3$ cm., subaequalibus, basim versus ut in lobis longioribus. Nux -2.5×1.3 cm. (stylopodio incluso), ovoideum, ad stylopodium -10×2 mm. gradatim attenuatum, breviter conferte pallide alutaceo-tomentosum.

Collections. *North Borneo:* San 15098, 15109 (Holotype in Herb. Kepong), Pangi, Beaufort; San 16389, Ranau; San 16475, Balong. *Sarawak:* S 3529, Upper Plieran. *Brunei:* Brun 5664, 5211, Bt. Belalong; Brun 5276, Ulu Ropan-Belalong watershed; S 5739, Kuala Belalong; Brun 781, Kuala Temburong Machang; Brun 736, Kuala Sekurop, Temburong.

SHOREA GENICULATA Sym. ex Ashton:—*S. geniculata* Sym. nomen nudum.

S. inappendiculatae Burck affinis, sed nuce maxima globosa, lobis calycis in fructu brevibus subaequalibus, lamina late ovata, petiolo longissimo differt.

Novellae ex integro glabrae. Ramuli apicem versus c. 3 mm. diam., crassi, multum ramosi, teretes, pallide brunnei vel nigrescentes, leves; internodis 2.5–4 cm. longis, nodis prominentibus, cicatricibus petiolarum orbicularibus, elevatis, cicatricibus stipularum 2–3 mm. longis, rectis, pallidis, sursum directis, vix distinctis. Gemma $4-7 \times 1-1.5$ mm., linearis vel falcata, acuta, sicco nigrescens. Stipulae -10×3 mm., anguste oblongae, acutae, fugacae. Lamina $11-17 \times 7-13$ cm., late ovata vel suborbicularis, coriacea, subtus glauca, basi obtusa vel subcordata, apice in acumen -8 mm. longum abrupte attenuato vel obtuso; costis lateralibus utrinsecus 9–11, angulo $40^{\circ}-50^{\circ}$ exorientibus; intercostis sinuatis, conferte scalariformibus angustis. Petiolus 4–6.5 cm. longus, c. 2

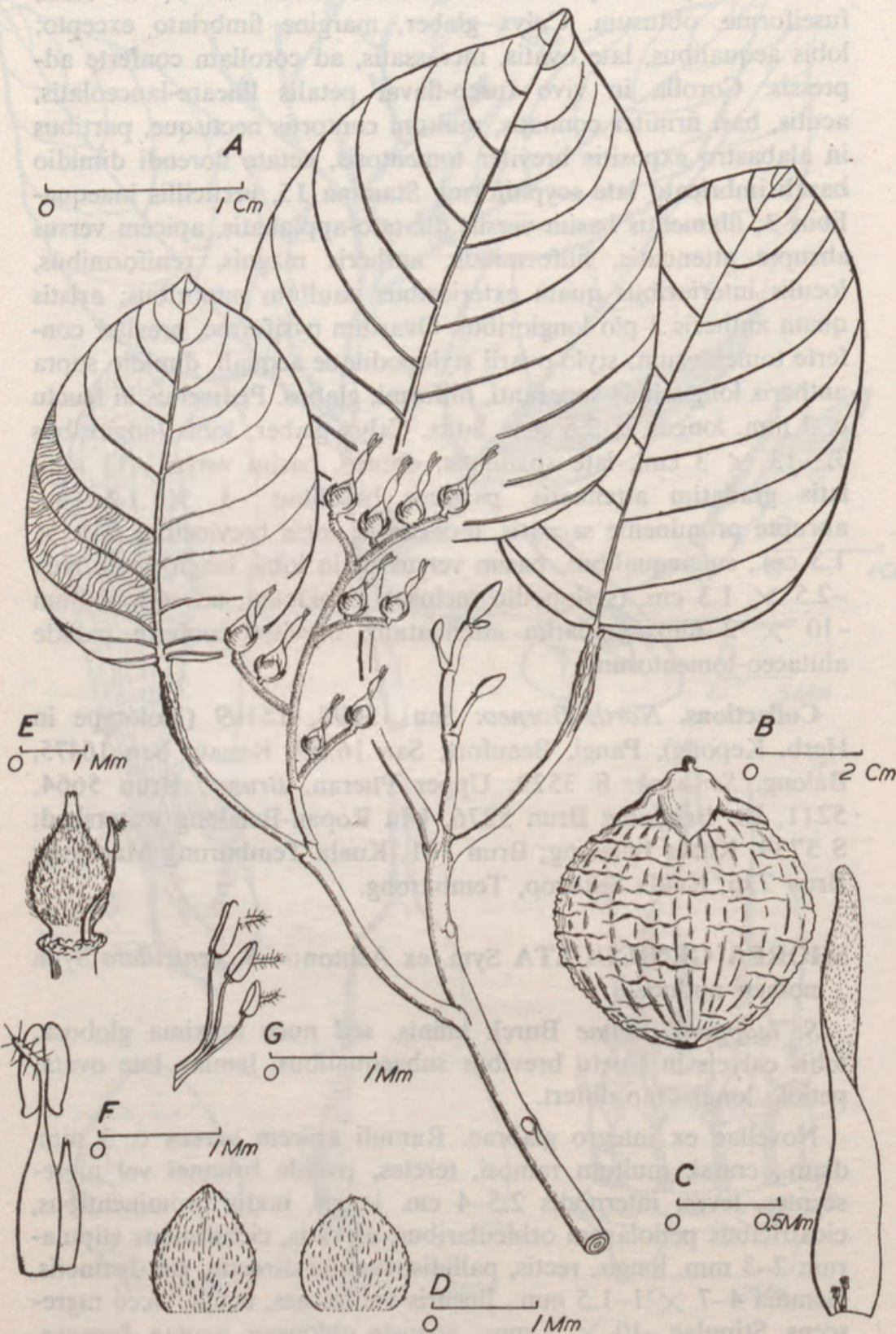


Plate 19. *S. geniculata*.

a, Flowering twig. b, Fruit. c, Petal. d, Sepals (left, outer; right, inner). e, Ovary. f, mens (frontal view). g, Stamens (lateral view).

(a, c-g from Brun 3264, b from Brun 1037).

mm. diam., sicco nigrescens. Lamina delapsa supra pallide viride-brunnescentis, subtus glauca, costis nigrescentibus. Racemi -12 cm. longi, semel ordine ramosi, stipitis basin in fructu -2 mm. diam.; terminales vel axillares, ex integro plus minus teretes, primo conferte breviter pallide alutaceo-pubescentes, dein glabrescentes; ramulis -1.5 cm. longis, -4 flores secundos gerentibus; bracteolis -4 mm. longis, oblongis, puberulentibus, fugacis. Alabastrum -20 $\times$ 4 mm., magnum, lineare-lanceolatum. Calyx externe breviter pubescens, intus glaber; lobis ovatis, acutis, externis 3 quam internis 2 paullum longioribus, brevioribus. Corolla in vivo crenea, petalis -2.5 cm. longis, linearibus, ex integro pubescentibus. Stamina c. 55, subaequalia; filamentis basi applanato-dilatatis, apicem versus filiformis, attenuatis; antheris oblongis, glabris, loculis interioribus quam exterioribus paullum minoribus; aristis quam antheras paullum brevioribus, sed prominentibus, crassis, setosis. Ovarium styopodiumque late ovoideum, conferte tomentosum, basi glabro, apice in stylum breve latum trifurcatum glabrum abrupte attenuato; stigmatibus minuto. Pedicellus in fructu -3 mm. longus, -4 mm. diam., brevis. Calyx quam nucem brevior, sparsim pallide griseo-alutaceo-pubescentis; lobis c. 1.5 cm. longis latisque, aequalibus, incrassatis, deltoideis, subacutis, apicibus ad basim nucis adpressis. Nux -5 cm. longa lataque, globosa, conferte breviter pallide griseo-alutaceo-tomentosa, sicco longitudine striata, transverse rugosa, apice obtusa, stylopodio c. 1.5 mm. longo brevi.

Collections. *Brunei*: S 1852, Tapangan Sapi; Kep 37074, Bt. Ligi; S 1902, 1929, Kep 80092, 48486, 48452, 47041, Brun 3264 (Holotypus in Herb. Kew), 1037, 919, 3060, 3188, 618, San 17470, Andulau F.R.; Kep 35553, 35549, Pengkalan Ran; Kep 12988, Tutong R., hills west of Ukong.

SHOREA ISOPTERA Ashton:—*Neohopea isoptera* Wood msc.

Shoreis aliis facile potest distinguere; alabastro globoso, staminibus 15 glabris, filamentis latis brevibus, aristis latis brevibus, stylo brevissimo, receptaculo lato tenui, lobis calycis expansis subaequalibus distinguitur.

Novellae glabrae, racemis exceptis. Ramuli apicem versus -1.5 mm. diam., ex integro graciles, fusco-rubro-brunnei vel nigrescentes, leves, teretes; internodiis 2-4 cm. longis; cicatricibus stipularum brevibus, inconspicuis. Gemma -1 mm. longa, parva, globosa, sicco nigrescens. Stipulae caducae, ignotae. Lamina 9-16 $\times$ 5-8 cm., ovata, basi late cuneata vel obtusa in petiolum -2 mm. decurrenti; apice in acumen -1.5 cm. longum angustum subabrupte attenuato; margine undulato; costis lateralibus utrinsecus 9-11, curvatis, subtus paullum elevatis, supra depressis, angulo 45°-65° exorientibus; intercostis scalariformibus, sinuatis, angustis; costa media subtus tereti, paullum prominenti, supra plus minus applanata. Petiolus 1.3-2 cm. longus, -1.5 mm. latus, sicco nigrescens. Lamina delapsa ex integro hebet virido-brunnea, supra

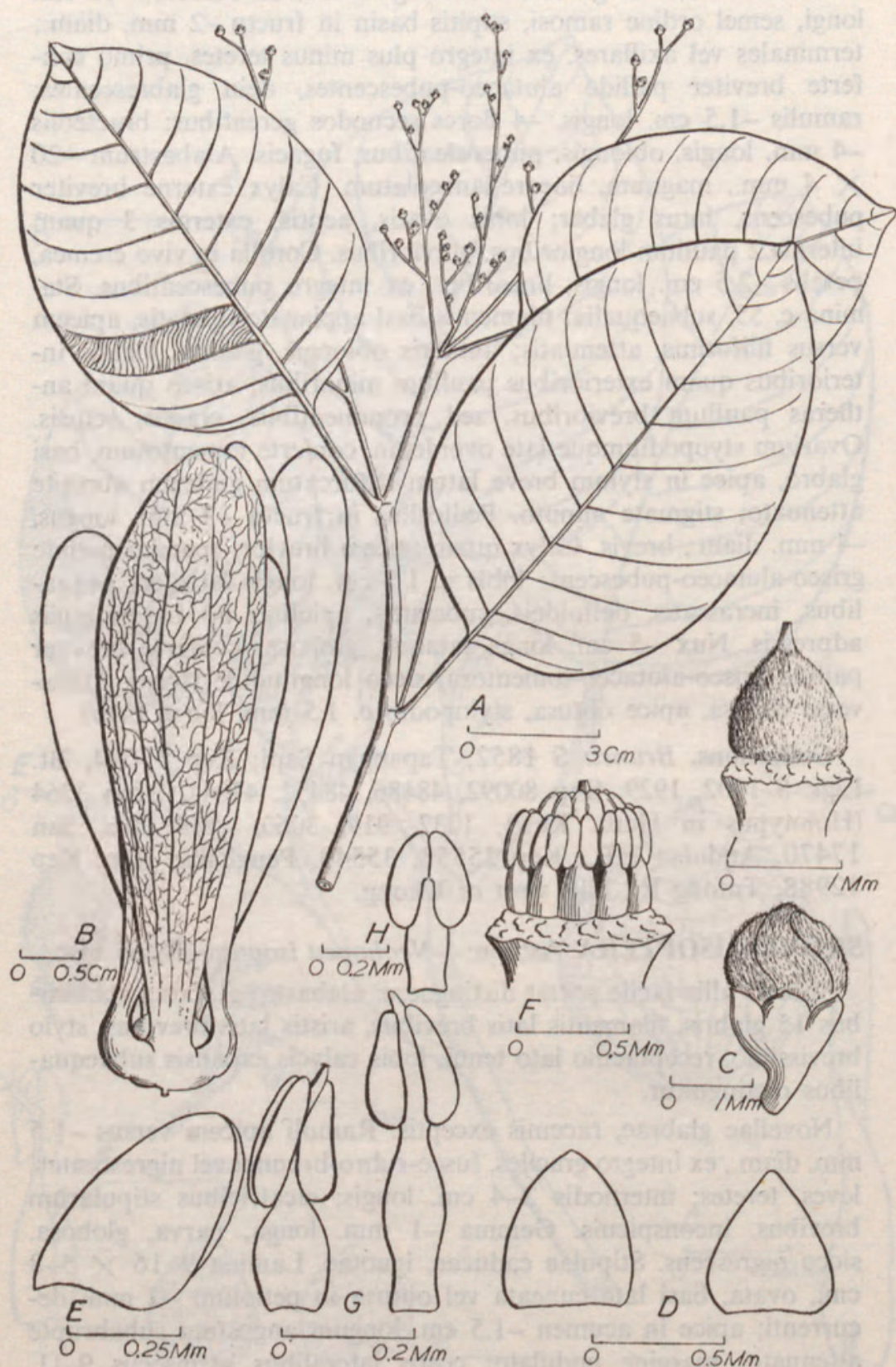


Plate 20. *S. isoptera*.

a, Flowering twig. b, Fruit. c, Flower bud. d, Sepals (left, outer; right, inner). e, Petal. f, Androecium. g, Stamens (from within). h, Outer stamen (frontal view). i, Ovary. (a, c-i from Brun 3018; b from Brun 3343).

paullum rubrior. Racemi -11 cm. longi, bis ordine ramosi, stipitis basi in fructu -1.5 mm. diam., terminales vel 1-plures axillares, ex integro teretes vel paullum commpresses, laxi, super breviter griseo-puberulentes; ramosis -5 cm. longis; ramulis -1 cm. longis, brevibus, -6 flores secundos conferte gerentibus; bracteis ignotis; bracteolis -1 mm. longis, linearibus, pubescentibus, fugacis. Alabastrum -1.5 mm. longum, globosum. Calyx externe breviter pubescens, intus glaber; lobis subaequalibus, imbricatis, acutis; externis 3 ovatis, internis 2 deltoideis. Corolla in vivo crenea, petalis externe conferte tomentosis, intus breviter pubescentibus, oblongis, obtusis, multum contortis. Stamina 15, verticillis 3, bina cum solis alternata; filamentis crassis compressis, ad antheras vix attenuatis; antheris oblongis glabris, 4-loculis, loculis subaequalibus vel exterioribus quam interioribus paullum maioribus; aristis brevibus, crassis, glabris, apices antherorum non superantibus. Ovarium stylopodiumque ovoideo-conicum, basi glabro; apicem versus breviter pubescenti, in stylo brevi glabro abrupte terminatum; stigma minuta. Pedicellus in fructu -1.5 mm. longus, brevis. Calyx ad basim puberulens, apicem versus glabrescens; lobis 5 subaequalibus, -5.5×1.5 cm., spatulatis, obtusis, in aetate maturo rotatis, basim versus -5 mm. latis attenuatis; partibus basalibus paullum expansis, imbricatis; receptaculo -9 mm. diam., tenui. Nux -9×10 mm., ovoidea, latior quam longa, breviter pallide-griseo-brunneo-pubescent, apice in stylopodium -4 mm. longum acutum subabrupte attenuato.

Collections. *Sarawak*: S 7978, Lundu. *North Borneo*: San 4394, 3955, Bettotan; San 15111, Beaufort; San A 4318, Tenom San A 307, Saliwagon, M. 64, Beaufort; San 16603, Sipitang; San 15202 (fr. excl.), 15222, Pangi. San A 4336: Kóta Belud. *Brunei*: Brun 5676, Kuala Belalong; S 5563, Bt. Peradayan; Kep 80132, 80133, Peradayan F.R.; Brun 3343, 3018 (Holotypus in Herb. Kew), Bt. Patoi.

N.B. The fruit of San 15202 represents *Dryobalanops* sp.

SHOREA LADIANA Ashton s.n.

S. maxwellianae King, *S. biawak* Ashton affinis, sed lobis calycis in fructu quam nucem brevioribus, subaequalibus, lamina maiore coriacea, costis differt.

Ramuli petioli novellaeque breviter pubescentes, perulae semper griseo-tomentosae, lamina glabra. Ramuli apicem versus 1.5-2 mm. diam., graciles, teretes, pallide brunnei, multum ramosi, leves vel rugulosi, internodis 2-4 cm. longis; cicatricibus stipularum parvis, paullum deorsum curvatis, inconspicuis. Gemma c. 1×0.5 mm., parva, conica. Stipulae ignotae. Lamina $10-14 \times 4.5-7.5$ cm., ovata, utrinsecus aequalis vel subaequalis, coriacea, basi

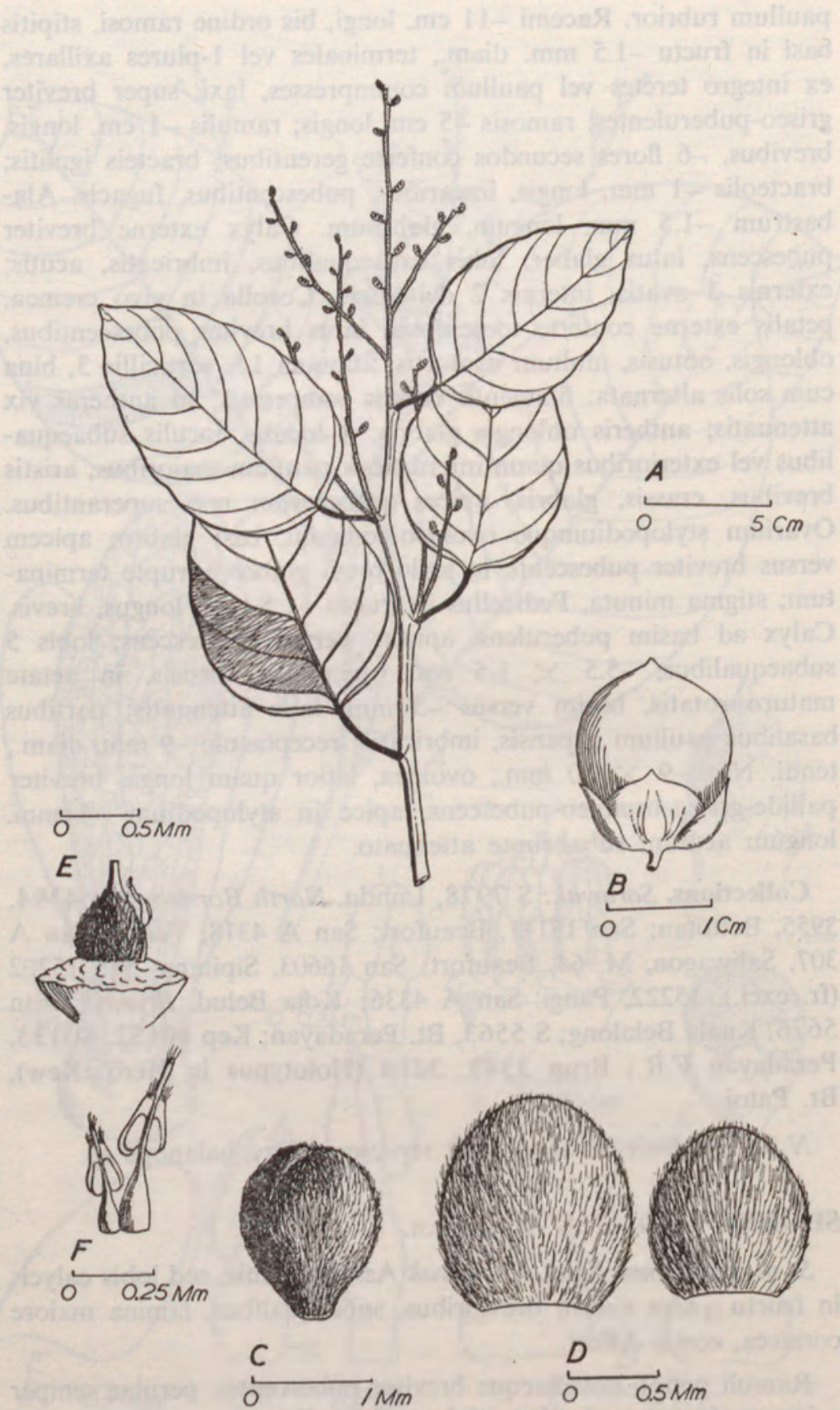


Plate 21. *S. ladiana*.

a, Flowering twig. b, Fruit. c, Flower bud. d, Sepals (left, outer; right, inner). e, f, Stamens (inner side).

(a, c-f, from S 11076; b from Brun 2622).

obtusa vel late cuneata, apice in acumen 1–1.5 cm. longum gradatim attenuato; costis lateralibus utrinsecus 5–6, subtus prominentibus, remotis, curvatis, angulo 40°–50° exorientibus; intercostis angustis, indistinctis, conferte scalariformibus, a costa media 90° exorientibus; margine saepe paullum revoluta. Petiolus 1–2.2 cm. longus, c. 1.25 mm. diam., sicco nigrescens. Lamina delapsa supra fusco-rubro-brunnescens, subtus pallidius melleo-brunnescens, ex integro nitens. Racemi –15 cm. longi, semel vel bis ramosi, stipitis basi –2 mm. diam., terminales vel –2 axillares, recti, ex integro paullum compressi, laxi, semper breviter pallide cremeo-griseo-pubescentes; ramulis –8 mm. longis, brevibus, 'zigzag', –9 flores secundos conferte gerentibus; bracteolis –1.5 mm. longis, ovato-deltaideis, acutis, breviter pubescentibus, fugacis. Alabastrum –1.5 mm. longum, globosum (Alabastrum maturum ignotum). Calyx externe conferte tomentosus, intus glaber; lobis suborbicularibus, subaequalibus. Petala late elliptica. Stamina 30–35; filamentis brevibus, attenuatis; antheris oblongis, loculis interioribus quam exterioribus maioribus, apice breviter barbato; aristis brevibus, barbatis. Ovarium ovoideum, conferte tomentosum, stylo brevi glabro. Pedicellus in fructu –3 mm. longus, gracilis, tomentosis. Calyx quam nucem brevior, lobis 5 subaequalibus, c. 8 × 8 mm., late ovatis, breviter puberulentibus, subacutis, incrassatis, tenue saccatis, conferte ad nucem adpressis. Nux –1.7 × 1.4 cm., obovoideo-globosa, conferte breviter pallide alutaceo-tomentosa, apice in stylopodium c. 1 mm. longum angustum acutum abrupte attenuato.

Collections. *Sarawak*: S 11076 (Holotypus in Herb. Kew) 0188, 1625, Semengoh F.R. *Brunei*: Brun 5543, 2629, 2622, Andulau F.R.

SHOREA MONTICOLA Ashton s.n.

S. pauciflorae King affinis, sed lamina maiore, incrassatissima, subtus aureo-lepidota, costis lateralibus utrinsecus 13–16 differt.

Ramuli, petioli, et costae subtus primo breviter pallide flavido-alutaceo-tomentosi, dein glabrescentes, perulae semper similiter tomentosae. Ramuli apicem versus –3 mm. diam., teretes, crassi, lenticellis minutis pallidis ellipticis verruculosi punctatis, pallide brunnei; internodis 1.5–5 cm. longis; cicatricibus stipularum subamplexicaulibus vel amplexicaulibus, 0.5 mm. latis, pallidis, prominentibus. Gemma 5–10 × 2–4 mm., anguste ovata, acuta, falcata. Stipulae ignotae. Lamina 8–13 × 5–8 cm., multum coriacea, elliptica, primo aureo-lepidota; basi obtusa vel late cuneata, apice in acumen –5 mm. longum, brevem, late deltaideum, abrupte attenuato; costis lateralibus utrinsecus 13–16, ad marginem curvatis, angulo 45°–55° exorientibus; intercostis angustis, conferte scalariformibus, a costis lateralibus diagonale exorientibus; costa media subtus prominenti, acuta, supra glabra depressa.

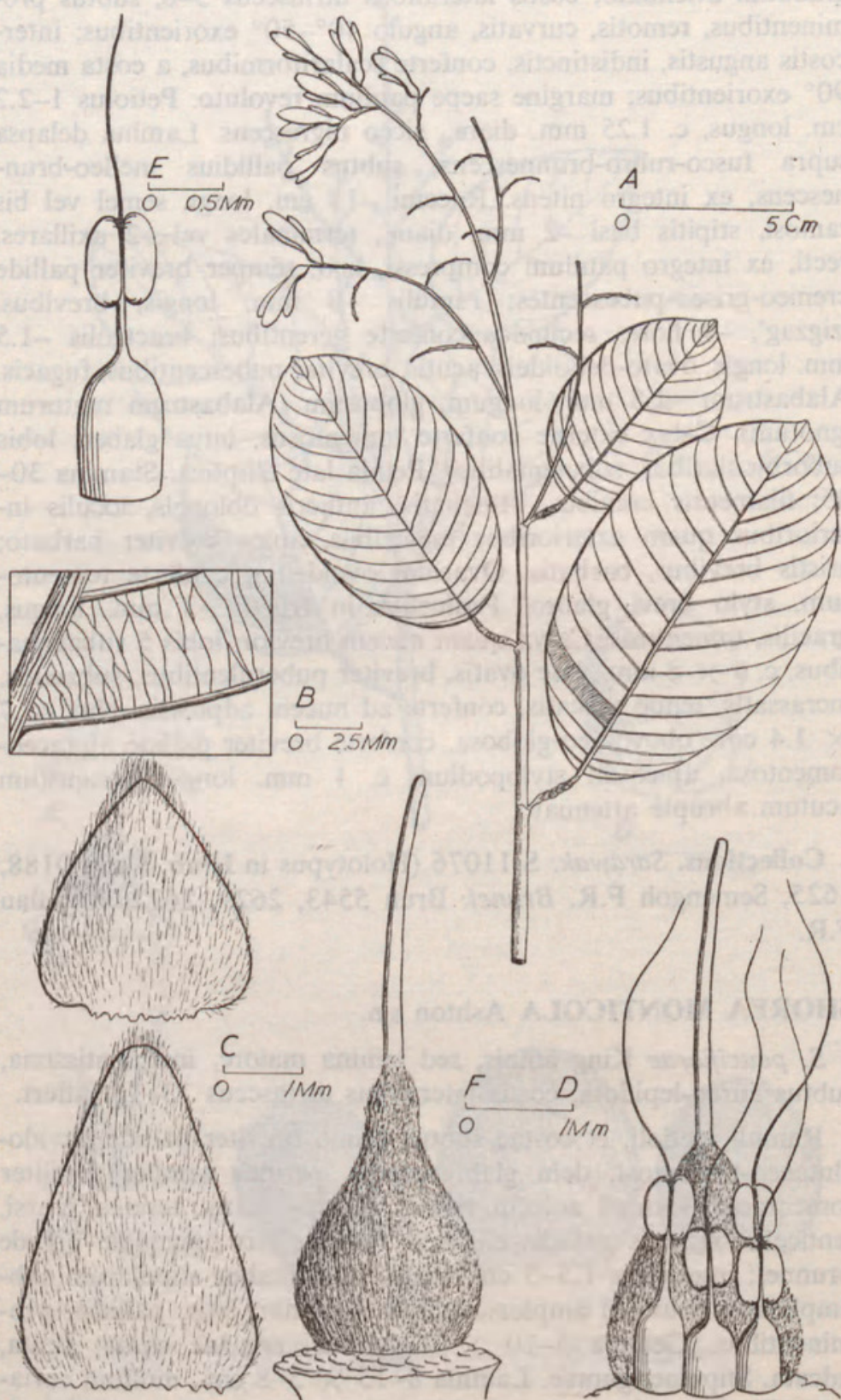


Plate 22. *S. monticola*.

a, Twig with young fruit. b, Part of lamina undersurface. c, Sepals (below, outer; at inner). d, Ovary and androecium. e, Stamen (frontal view). f, Ovary.

(a and b from Clemens 31885, c-f from Hallier 678).

Petiolus 2–2.5 cm. longus, c. 2 mm. diam., sicco niger. Lamina delapsa supra nitens, pallide griseo- vel luteo-brunnea; subtus griseo- vel aureo-lepidota, costis subtus griseis vel nigrescentibus. Racemi –12 cm. longi, semel ramosi, stipitis basi in fructu –2 mm. diam.; terminales vel axillares, teretes, conferte pallide flavido-brunneo-pubescentes; ramulis –12 flores gerentibus; bracteis bracteolisque ignotis. Alabastrum –7 × 3 mm., lanceolatum, sub-acutum. Calyx externe breviter pubescens, intus glaber; lobis externis 3 anguste ovatis, obtusis, quam internis 3 1½-plo longioribus; lobis internis 2 latius ovatis, acutis, basibus constrictis. Petala oblonga, obtusa, partibus in alabastro expositis breviter tomentosis. Stamina 15, verticillis 3, interna 5 quam alia paullum longiora; filamentis basim versus applanato-dilatatis, ad medium abrupte attenuatis, apicem versus filiformibus; antheris late oblongis; aristis quam antheras 2–3-plo longioribus, gracilibus. Ovarium stylopodiumque pyriformibus, breviter tomentosum; stylo ovarium aequanti, filiformi, glabro. Fructus maturus ignotus. Pedicellus in fructu –1 mm. longus, –3 mm. diam., brevissimus. Calyx basim versus puberulus, aliter glabrescens; lobis maioribus 3, c. 7 × 1.5 cm., spatulatis, obtusis, supra basi vix attenuatis; partibus basilibus –1.5 × 1.5 cm., incrassatis, tenue saccatis; lobis minoribus 2, –3.5 × 0.6 cm., lineare oblongis, partibus basalibus ut in lobis longioribus. Nux –1.6 × 1.6 cm., ovoidea, acuta, conferte breviter tomentosa.

Collections. *Indonesian Borneo:* Hallier 678, Summit of G. Smedoen. *North Borneo:* San 16704, Gunong Lumaku, 1650 m; San 16914, Kundasan, 1200 m; Clemens 31885, Penibukan, Kinabalu, 1650 m (Holotypus in Herb. Kew), s.n. (J. Wyatt Smith), Kg. Kangeran, 800 m; San A 4353, Penibukan, Keningau, 1000 m; San A 4372, Penibukan, Keningau, Trus Madi, 1350 m; Kep 80446, Tambunan, 1000 m. *Sarawak:* S 9135, G. Penrissen, W Sarawak, 1000–14000 m. *Brunei:* Brun 2360, 2377, Gunong Pagon Periok, 1600 m.

SHOREA MYRIONERVA Sym. ex Ashton:—*S. myrionerva* Sym., nomen nudum.

S. macropterae Dyer, *S. slootenii* Ashton affinis, sed lamina longissima, tenui, costis lateralibus multis supra applanatis, subtus sparsim tomentis, racemis brevibus axillaribus saepe ramifloris, lobis calycis in fructu prominentius auriculatis distinguatur.

Ramuli petiolique semper aspere cristis pallide badiis punctati, costae subtus, perulae, stipulaeque brevius cristatae; lamina dein glabrescens. Ramuli apicem versus 2.5–3.5 mm. diam., crassi, recti, vix ramosi, teretes, sicco rufo-tomentosi; internodis 2–5 cm. longis; cicatricibus stipularum –2 × 1 mm., pallidis, connatis. Gemma

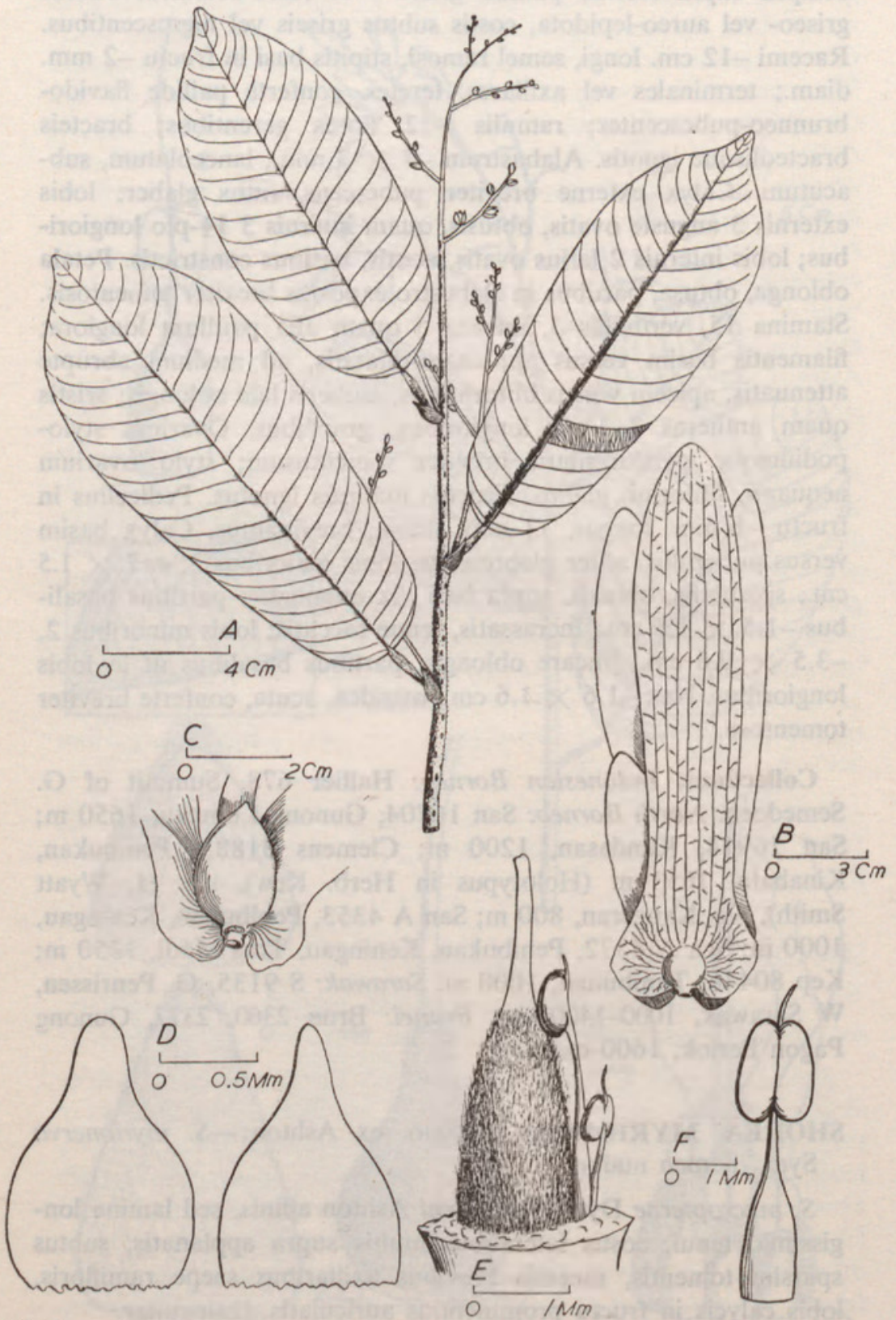


Plate 23. *S. myrionerva*.

a, Flowering twig. b, Fruit. c, Nut. d, Sepals (outer, left; inner right). e, Ovary. f, S
men (from inside).

(a, d-f, from Jacobs 5371; b and c from S 1519).

–10 × 7 mm., compressa, perulis foliaceis numerosis laxè composita. Stipulae –15 × 7 mm., subpersistentes, in arboribus novellis persistentioribus, late hastatae, basi subauriculata, apice subacuto; in vivo magentae. Lamina 12–22 × 4.5–9 cm., anguste oblonga, tenuis, in vivo primo magenta, basi obtusa, apice in acumen –8 mm. longum late deltoideum abrupte attenuato; costis lateralibus utrinsecus 24–28, angustis, confertis, subtus prominentibus, apicem versus curvatis; intercostis anguste scalariformibus; a costis lateralibus angulo 90° exorientibus; costa media supra depressa. Petiolus 1.25–2 cm. longus, 2–2.5 mm. diam., brevis, crassus, sicco nigrescens. Lamina delapsa subtus fusco-rufobrunnescens, supra fuscior-purpureo-brunnescens, semper plus minus applanata. Racemi –8 cm. longi, semel ramosi, stipitis basi in fructu –2 mm. diam., axillares, raro terminales, saepe ramiflori, ex integro teretes, sicco striati, laxi, basim versus cristis badiis sparsim punctati; ramulis brevibus –5 flores distichos gerentibus; bracteis –8 × 1.5 mm., lineare-lanceolatis, acutis; bracteolis –5 × 3 mm., ovatis, obtusis, externe puberulentibus, intus glabris. Alabastrum –5 × 3 mm., ellipticum, rotundatum. Calyx externe breviter conferte pubescens, intus glaber; lobis subaequalibus, ovatis, obtusis, externis 3 quam internis 2 paulum angustioribus. Corolla in vivo fusco-rubra, marginem versus alba (Jacobs), petalis anguste ovatis, partibus in alabastro expositis conferte flavido-aureo-tomentosis. Stamina 15, verticillis inaequalibus 3, interna 5 quam alia multum longiora, prope apicem styli extensa; filamentis crassis, ad antheras gradatim attenuatis; aristis brevibus, dein reflexis. Ovarium stylopodiumque anguste conicum vel pyriforme, breviter pubescens; stylo quam ovarium stylopodiumque paulum breviori, late filiformi, glabro. Pedicellus in fructu –4 mm. longus, c. 3 mm. diam., glaber, ad basim fructus dilatatus. Calyx glaber; lobis longioribus 3, –17 × 2.5 cm., oblongis, tenue chartaceis, obtusis, basibus ad centra saccatis, incrassatis, auriculis –1.5 cm. latis tenuibus lateralibus 2; lobis brevioribus 2, subaequalibus, –8 × 0.7 cm., linearibus saccatis nec auriculatis. Nux –2.5 × 1.2 cm., glabra, glaucescens, ellipsoidea, ad stylopodium c. 1.5 mm. longum acutum celeriter attenuata.

Collections. *North Borneo:* Kep 80268, 80269, S. Lukutan Beaufort. *Sarawak:* S 0920/1928, S. Segan, Bintulu; S A 0314, Long Bunau, Pata; S A 0421, Balleh; S 1519, Merapok, Lawas (Holotypus Herb. Kepong); S 1805, Ulu Berawan, Limbang; S 2901, R. Kenaban, Upper Plieran; Kep 79349, Lambir Hills; S 00279, Beseri F.R., S. Babong, Suai; Jacobs 5371, Belaga. *Brunei:* Kep 30480, Ulu Belait; Kep 48268, Andulau F.R.; Kep 39630, Batu Apoi; Brun 5218, S. Belalong above Kuala Empan, Ulu Temburong; Brun 5200, San 17378, Kuala Belalong.

SHOREA PATOIENSIS Ashton s.n.

S. gibbosae Brandis lamina similis, sed fructus glaber, calyx quam nucem brevior, lonis subaequalibus differt.

Stipulae perulaeque breviter fimbriatae, gemmae novellae ramulique in arboribus maturis saepe tenuissime pulverulento albo-cerati, foliae glabrae. Ramuli apicem versus c. 1 mm. diam., graciles, teretes, leves vel rugulosi, sicco fusco-rubro-nigrescentes vel nigri. Gemma c. 3×1 mm. (in arboribus novellis 4×2 mm.), anguste ovoidea, obtusa, perulis distincte expansis, non adpressis; sicco nigrescentibus. Stipulae c. 8×2 mm., oblongae, breve acutae. Lamina 5–8 $\times$ 2–3.5 cm., tenuis, ovata, utrinsecus subaequalis, saepe costa media oblique inflecta, basi plus minus late cuneata, juxta petiolum –1 mm. decurrenti, apice in acumen anguste c. 1 cm. longum gradatim attenuato; costis lateralibus utrinsecus 7–9, angustis quanquam prominentibus, curvatis, angulo 35° – 45° exorientibus; costa media supra paullum elevata, subtus prominente elevata; intercostis conferte scalariformibus. Petiolus 7–10 mm. longus, c. 1 mm. diam., gracilis, sicco nigrescens. Lamina delapsa griseo-brunnescent, sursum quam deorsum pallior, lutior, sicca involuta. Racemi –9 cm. longi, semel vel bis ramosi, stipitis basi in fructu –2 mm. diam., terminales vel axillares, paullum breves confertique, graciles, ex integro teretes, semper breviter pallide griseo-brunneo-pubescentes; ramulis –1 cm. longis, –6 flores gerentibus; bracteolis minutis, fugacis. Alabastrum 3.5×1.5 mm., lanceolatum, acutum. Calyx conferte rubro-brunneo-tomentosus; lobis minimis, suborbicularibus, obtusis; lobis internis 2 quam lobis externis 3 paullum tenuioribus, basi costrictis. Corolla in vivo fusco-flava, aetate florendi basim versus imbricata scyphiformis, apicem versus revoluta expansa necta; petalis linearibus, partibus in alabastro expositis breviter pubescentibus. Stamina 15, verticillis 3, bina cum solis alternata, inaequalibus; filamentis paullum brevibus, basim versus dilatatis, ad medium abrupte attenuatis, apicem versus filiformibus; antheris subglobosis; aristis antheras aequantibus, apicem versus breviter ciliatis, apicem styli vix attingentibus. Ovarium ovoideum, breviter pubescente; stylopodio cylindrico pubescenti, stylo brevi glabro. Pedicellus in fructu c. 1 mm. longus, brevis. Calyx breviter caduce pallide flavido-alutaceus, margine semper fimbriato; lobis 3–5 mm. longis latisque, late ovatis, ad basim nucis adpressis, basim versus conjunctis scyphum –5 mm. diam. factis. Nux –15 $\times$ 8 mm., parva, oblongo-ellipsoidea, striata, aetate maturandi prope glabra, apice obtuso.

Collections. *Brunei*: Brun 3324 (Holotypus in Herb. Kew), 3017, Kep 85465, S 5811, Bt. Patoi; Kep 80127, 80113, 80139, S 5562, Peradayan F.R.; S 5757, 5710, 5746, Kuala Belalong. *Sarawak*: S 1807, Bt. Tegaria, Ulu Berawan, Limbang.

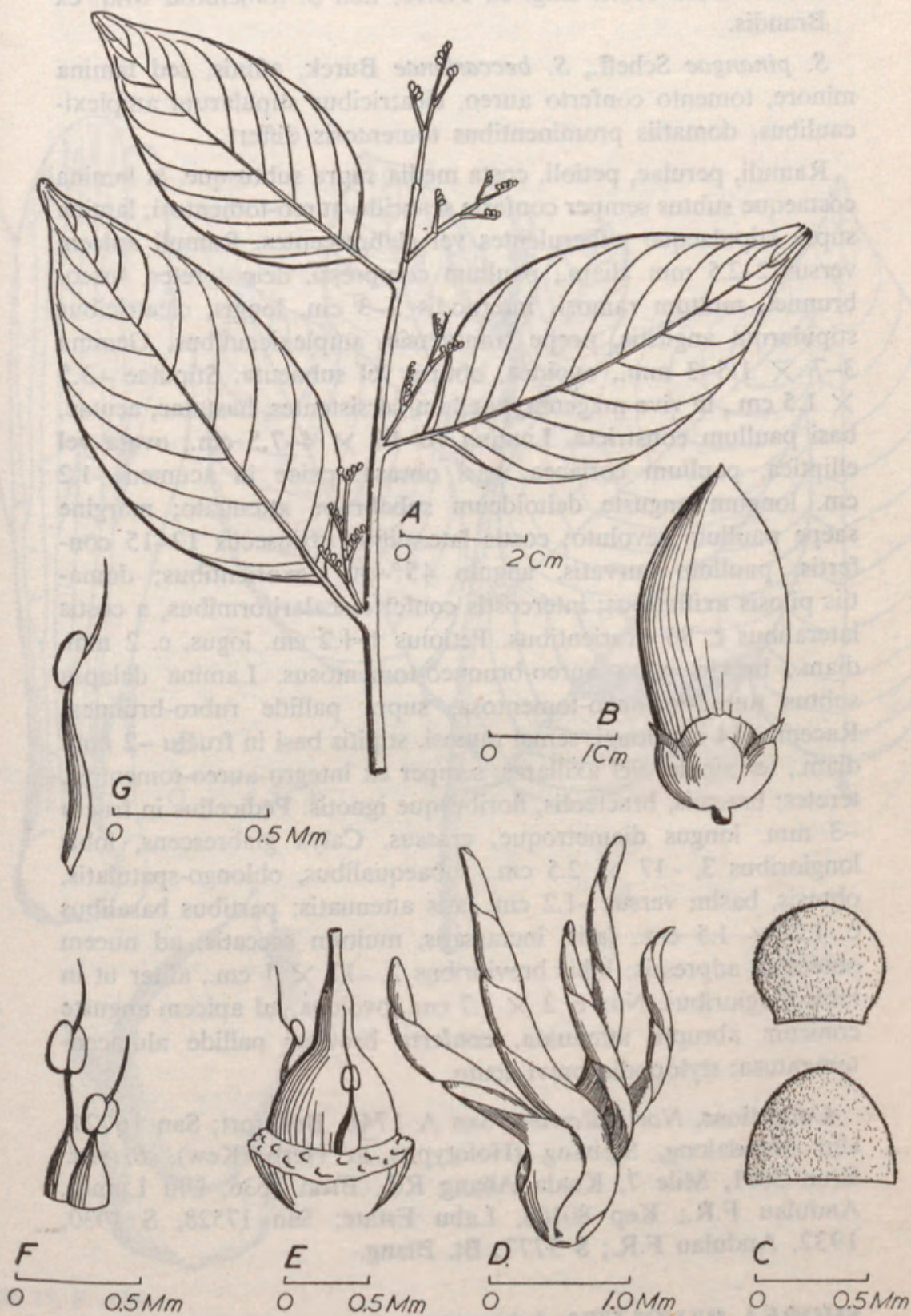


Plate 24. *S. patoisensis*.

a, Flowering twig. b, Fruit. c, Sepals (inner, above; outer below). d, Corolla. e, Ovary. f, Stamens (frontal view). g, Stamens (lateral view).

(a, c-g, from Brun 3324; b from Brun 3324).

SHOREA PILOSA Ashton s.n.:—*S. tomentosa* Wood msc; non *S. tomentosa* Hort. Bog. ex Pierre; non *S. tomentosa* Miq. ex Brandis.

S. pinangae Scheff., *S. beccariana* Burck, affinis, sed lamina minore, tomento conferto aureo, cicatricibus stipularum amplexicaulibus, domatiis prominentibus tomentosis differt.

Ramuli, perulae, petioli, costa media supra subtusque, et lamina costaeque subtus semper conferte scabrido-aureo-tomentosi; lamina supra stipulaeque puberulentes vel glabrescentes. Ramuli apicem versus 2–2.5 mm. diam., paullum compressi, dein teretes, fusco-brunnei, multum ramosi; internodis 2–3 cm. longis; cicatricibus stipularum angustis, prope transversis, amplexicaulibus. Gemma 3–7 × 1.5–3 mm., ovoidea, obtusa vel subacuta. Stipulae 3.5 × 1.5 cm., in vivo magenta, paullum persistentes, hastatae, acutae, basi paullum constricta. Lamina 10–17 × 4–7.5 cm., ovata vel elliptica, paullum coriacea, basi obtusa, paice in acumen 1.2 cm. longum anguste deltoideum subabrupte attenuato; margine saepe paullum revoluta; costis lateralibus utrinsecus 12–15 confertis, paullum curvatis, angulo 45°–50° exorientibus; domatiis pilosis axillaribus; intercostis conferte scalariformibus, a costis lateralibus c. 90 exorientibus. Petiolus 1–1.2 cm. longus, c. 2 mm. diam., brevis, sicco aureo-brunneo-tomentosus. Lamina delapsa subtus aureo-brunneo-tomentosa, supra pallide rubro-brunnea. Racemi 14 cm. longi, semel ramosi, stipitis basi in fructu 2 mm. diam., terminales vel axillares, semper ex integro aureo-tomentosi, teretes; bracteis, bracteolis, floribusque ignotis. Pedicellus in fructu 3 mm. longus diametroque, crassus. Calyx glabrescens, lobis longioribus 3, 17 × 2.5 cm., subaequalibus, oblongo-spatulatis, obtusis, basim versus 1.2 cm. latis attenuatis; partibus basalibus c. 1.2 × 1.5 cm., latis, incrassatis, multum saccatis, ad nucem obtectum adpressis; lobis brevioribus 2, 12 × 1 cm., aliter ut in lobis longioribus. Nux c. 2 × 1.7 cm., ovoidea, ad apicem anguste conicum abrupte attenuata, conferta breviter pallide alutaceo-tomentosa; stylopodio brevi acuto.

Collections. *North Borneo*: San A 1748, Beaufort; San 16721, Ulu Mendalong, Sipitang (Holotypus in Herb. Kew). *Brunei*: Brun 5091, Mile 7, Kuala Abang Rd., Brun 2636, Ulu Lumut, Andulau F.R.; Kep 80108, Labu Estate; San 17528, S 1930, 1932, Andulau F.R.; S 5777, Bt. Bian.

SHOREA REVOLUTA Ashton s.n.

S. parvifoliae Dyer affinis, sed racemis longioribus rigidioribus rectoribus, lamina maiore coriaceiore subtus nitenti, costis lateralibus prominentioribus laxioribus, margine prominenti revoluta differt.

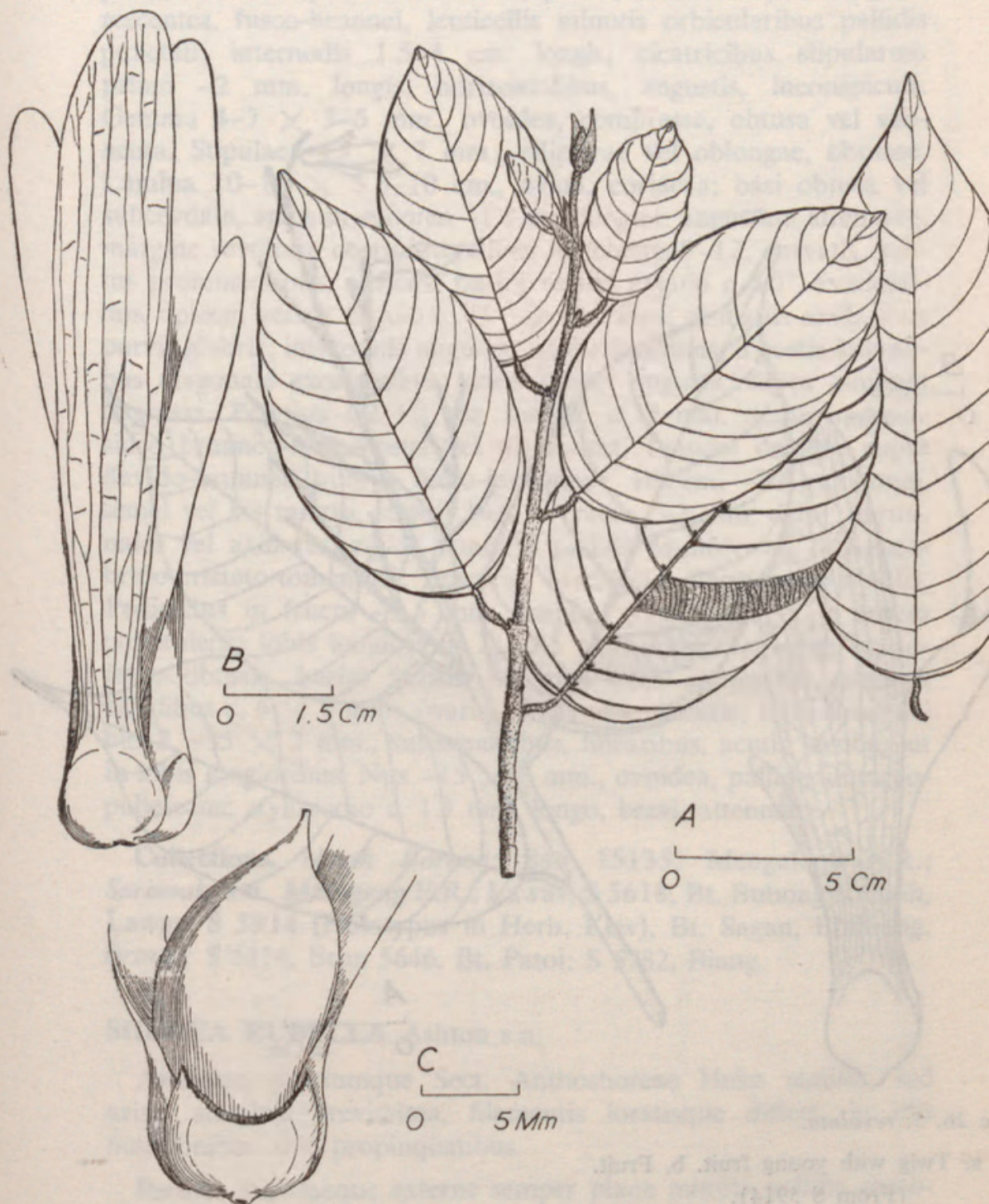


Plate 25. *S. pilosa*.

a, Leafy branch. b, Fruit. c, Nut.

(a from Brun 5091; b and c from San 16721).

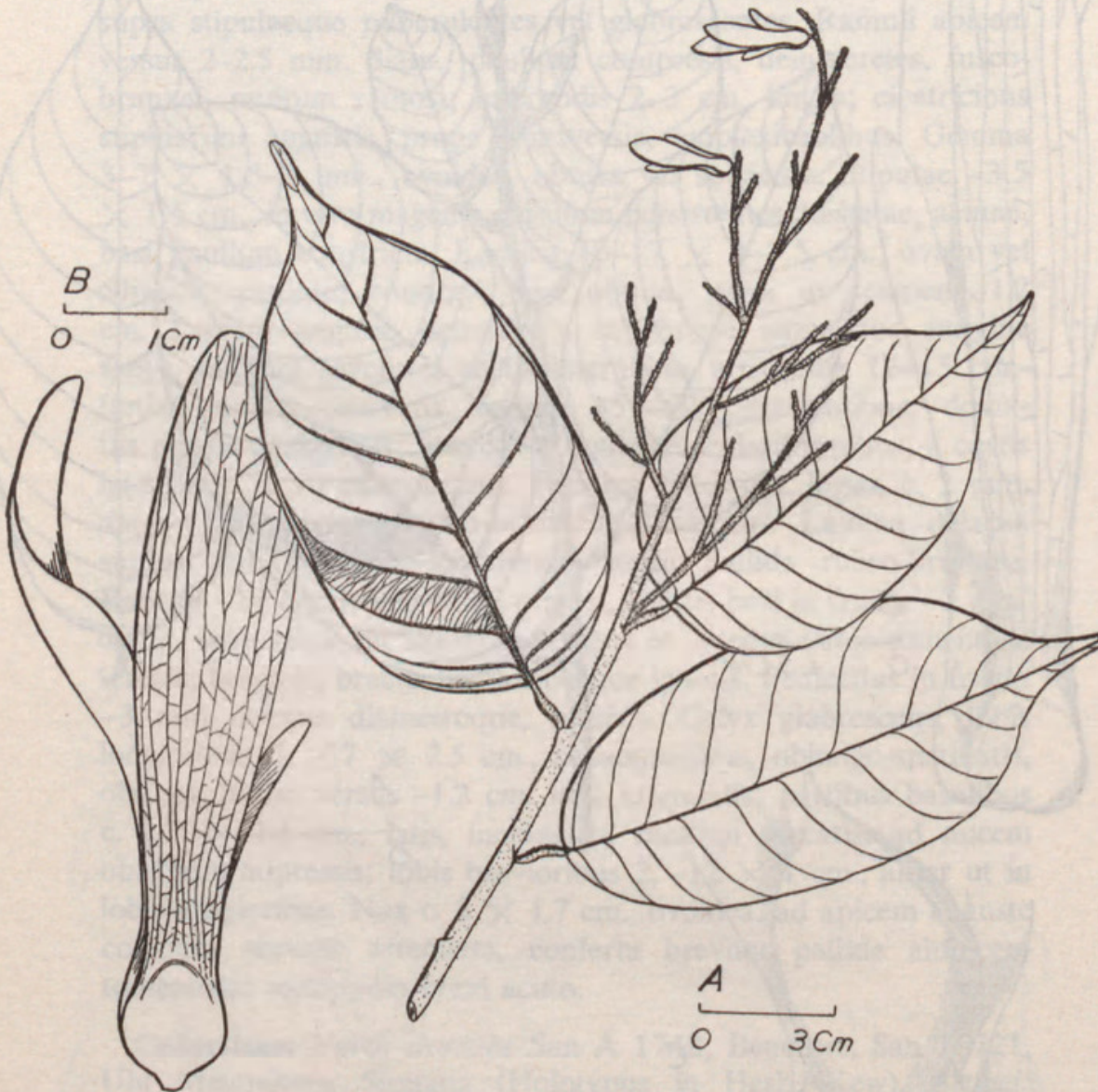


Plate 26. *S. revoluta*.

a, Twig with young fruit. b, Fruit.
(From S 5914).

Ramuli, perulae, stipulae externae, petiolique semper sparsim pallide brunneo- vel fulvo-scabrido-cristato-tomentosi, stipulae intus plane pubescentes, costae subtus, costa media supra brevius tomentosi vel glabrescentes. Ramuli apicem versus 2–3 mm. diam., primo teretes vel paullum striati compressi, dein teretes, crassi, glabrescentes, fusco-brunnei, lenticellis minutis orbicularibus pallidis punctati; internodis 1.5–4 cm. longis; cicatricibus stipularum primo –2 mm. longis, horizontalibus, angustis, inconspicuis. Gemma 4–7 $\times$ 3–5 mm., ovoidea, compressa, obtusa vel sub-acuta. Stipulae –15 $\times$ 7 mm., ellipticae vel oblongae, obtusae. Lamina 10–15 $\times$ 5.5–10 cm., ovata, coriacea; basi obtusa vel subcordata, apice in acumen –1.5 cm. longum angustum attenuato, margine revoluto; costis lateralibus utrinsecus 9–12, curvatis, subtus prominentibus, remotis, basim versus angulo c. 90° exorientibus, apicem versus angulo c. 45° exorientibus; domatiis axillaribus parvis glabris; intercostis angustis, scalariformibus, a costis lateralibus diagonale exorientibus; costa media angusta, supra paullum depressa. Petiolus 1.2–1.5 cm. longus, c. 2 mm. diam., crassus, sicco brunneo-tomentosus vel nigrescens. Lamina delapsa supra flavido-brunnea, subtus fusco-ferruginea. Racemi –22 cm. longi, semel vel bis ramosi, stipitis basi in fructu 2–3 mm. diam., terminales vel axillares, rigidi, conferte pallide brunneo-vel fulvo-scabrido-cristato-tomentosi; bracteis, bracteolis, floribusque ignotis. Pedicellus in fructu –1.5 mm. longus, gracilis. Calyx in fructu puberulens; lobis longioribus 3, –7.5 $\times$ 1.3 cm., tenuibus, spatulatis, obtusis, basim versus –3 mm. latis attenuatis, partibus basalibus c. 6 $\times$ 5 mm., ovatis, incrassatis, saccatis; lobis brevioribus 2, –3.5 $\times$ 2 mm., subaequalibus, linearibus, acutis basibus ut in lobis longioribus. Nux –15 $\times$ 8 mm., ovoidea, pallide alutaceo-pubescentis; stylopodio c. 1.5 mm. longo, brevi, attenuato.

Collections. *North Borneo:* San 15135, Mengalong F.R.; *Sarawak:* s.n., Meragang F.R., Lawas; S 5618, Bt. Bubong Rumah, Lawas; S 5914 (Holotypus in Herb. Kew), Bt. Sagan, Limbang. *Brunei:* S 5814, Brun 5646, Bt. Patoi; S 5782, Biang.

SHOREA RUBELLA Ashton s.n.

Antherae ovariumque Sect. Anthoshoreae Heim similes, sed arista staminis brevissima, filamentis loratisque differt; in illis notationibus sine propinquantibus.

Perulae stipulaeque externe semper plane minute pallide roseo-alutaceo-pubescentes, stipulae intus puberulentes; ramuli, petioli, laminaeque primo similiter tomentosi, dein glabrescentes. Ramuli apicem versus 2–3 mm. diam., apicem versus sicco striati compressi, dein leves, teretes, crassi, pallide brunnei; internodis 2–4 cm. longis, multum ramosis; cicatricibus stipularum primo c. 1.5 mm. longis, plus minus transversis, anguste cuneatis. Gemma 6–9 $\times$ 2–3 mm., anguste ovoidea vel paullum falcata. Stipulae

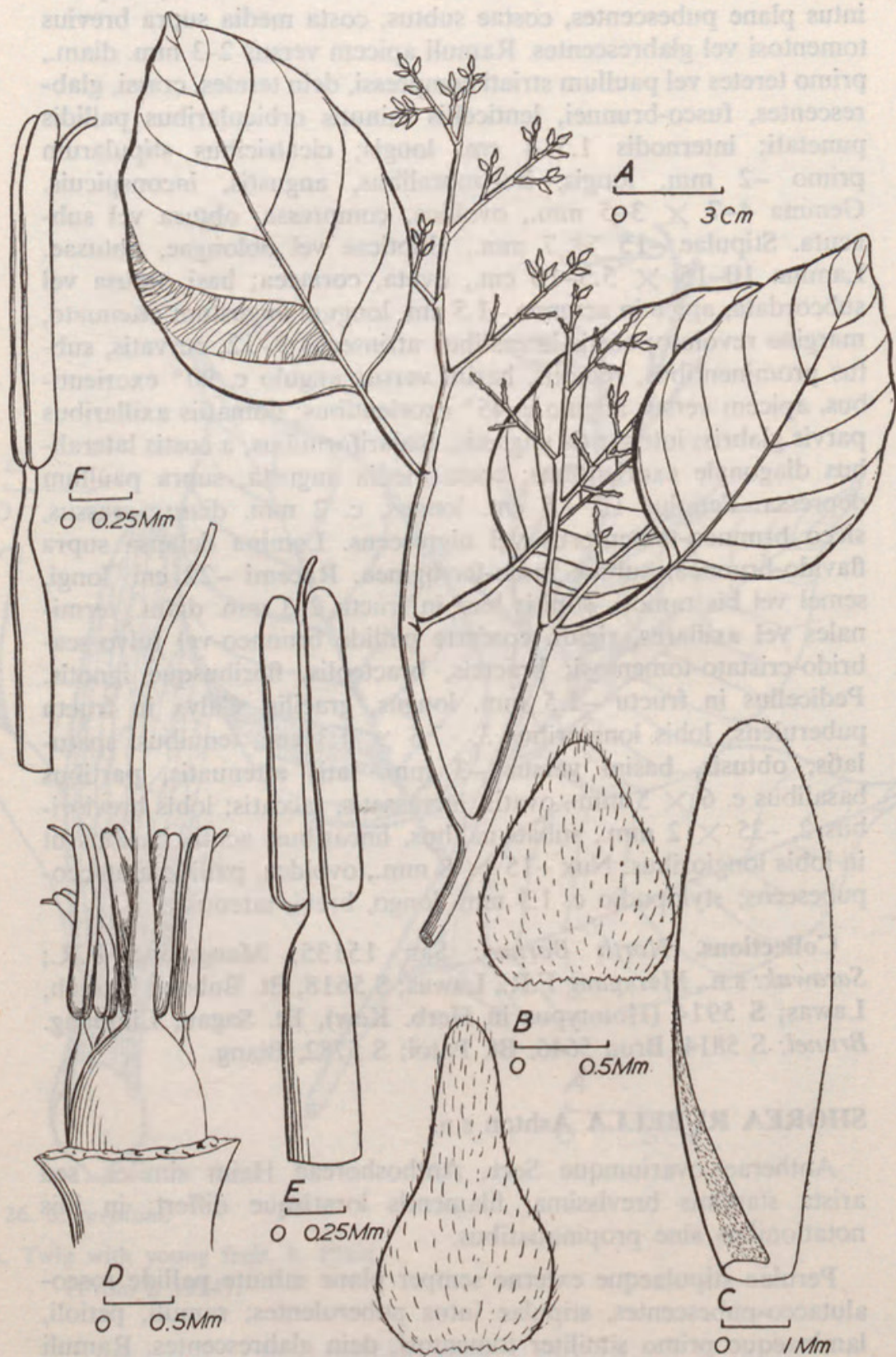


Plate 27. *S. rubella*.

a, Flowering branch. b, Sepals (outer, below; inner, above). c, Petal. d, Ovary. e, Stamen (frontal view). f, Stamen (lateral view).

(a-f from Brun 3078).

—18 × 6 mm., hastatae vel falcatae, acutae. Lamina 9.5–14 × 6–8 cm., late ovata, crasse coriacea, subtus cremeo-glaucula, basi obtusa, apice in acumen c. 1 cm. longum plus minus abrupte attenuato; margine saepe paullum revoluta; costis lateralibus utrinsecus 5–7, prominentibus, curvatis, angulo c. 40°–50° exorientibus, saepe domatiis axillaribus minutis; intercostis a costis lateralibus c. 90° exorientibus, conferte scalariformibus; costa media supra applanata vel paullum depressa. Petiolus 2.2–3.5 cm. longus, c. 2.5 mm. latus, sicco glaucus vel nigrescens. Lamina delapsa supra roseo-brunnea, nitens, subtus cremeo-glaucula (in arboribus novellis rubro-brunneus). Racemi —15 cm. longi, semel vel bis ramosi, stipitis basi in fructu —2 mm. diam., terminales vel axillares, sicco striati, semper ex integro breviter conferte roseo-brunnescente-pubescentes; ramulis —5 cm. longis, —5 flores distichos gerentibus; bracteis bracteolisque ignotis. Alabastrum —7 × 3 mm., anguste ovoideum, acutum. Calyx externe breviter conferte pallide roseo-griseo-pubescentis, intus glaber; lobis ovatis subaequalibus, internis 2 quam externis 3 paullum latioribus, paullum brevioribus. Corolla in vivo pallide rosea, basim versus fuscior; petalis oblongis, obtusis, vix contortis, delapsis vix connatis, partibus in alabastro expositis breviter tomentosis. Stamina 15, subaequalia, verticillis 3, bina cum solis alternata, circum ovarium conferta, filamentis loratis, sub antheris abrupte attenuatis, apicem ovarii attingentibus; antheris filamentos aequalibus, lineare-oblongis, angustis; aristis brevibus crassis, paullum reflexis. Ovarium parvum, globosum, glabrum; stylopodio indistincto, stylo quam ovarium 3-plo longiore, glabro, filiformi. Fructus maturus ignotus. Calyx in fructu novello pubescenti; lobis maioribus 3 quam minoribus 2 multum longioribus. Nux ovoidea, conferte pubescens.

Collections. *North Borneo:* San A 1750, Beaufort. *Sarawak:* S 9474, S. Iran, Pelagus. *Brunei:* S 1909, Belait; S 1907, Arboretum, Kampong Gana; S 1925, Kep 36027, 80084, 81925, 48487, 48460, San 17564, Brun 3078 (Holotypus in Herb. Kew), 616, Andulau F.R.; Kep 30574, S. Tutong; Kep 30585, Tutong; Kep 48162, S. Lumut; Kep 34529, S. Tepiku; Kep 34578, Pak Gabal; Kep 35569, Pengkalan Ran; Kep 35667, Labi Hills F.R.

SHOREA RUBRA Ashton s.n.

S. parvifoliae Dyer, *S. dasyphyllae* Foxw. affinis, sed lamina coriaceore, tomento conferte fusco-ferrugineo differt.

Ramuli, perulae, stipulae, petioli, costa media supra, lamina subtusque semper conferte fusco-rufobrunneo-tomentosi, stipulis intus quam externe brevius sparsius tomentosis. Ramuli apicem versus —1.5 mm. diam., teretes, multum ramosi, dein rufobrunnescentes, leves, lenticellis parvis pallidis orbicularibus punctati; internodis 1–1.5 cm. longis; cicatricibus stipularum primo c. 1 mm. longis, brevibus, tenuibus, deorsum curvatis. Gemma 4–7 × 3–4.5

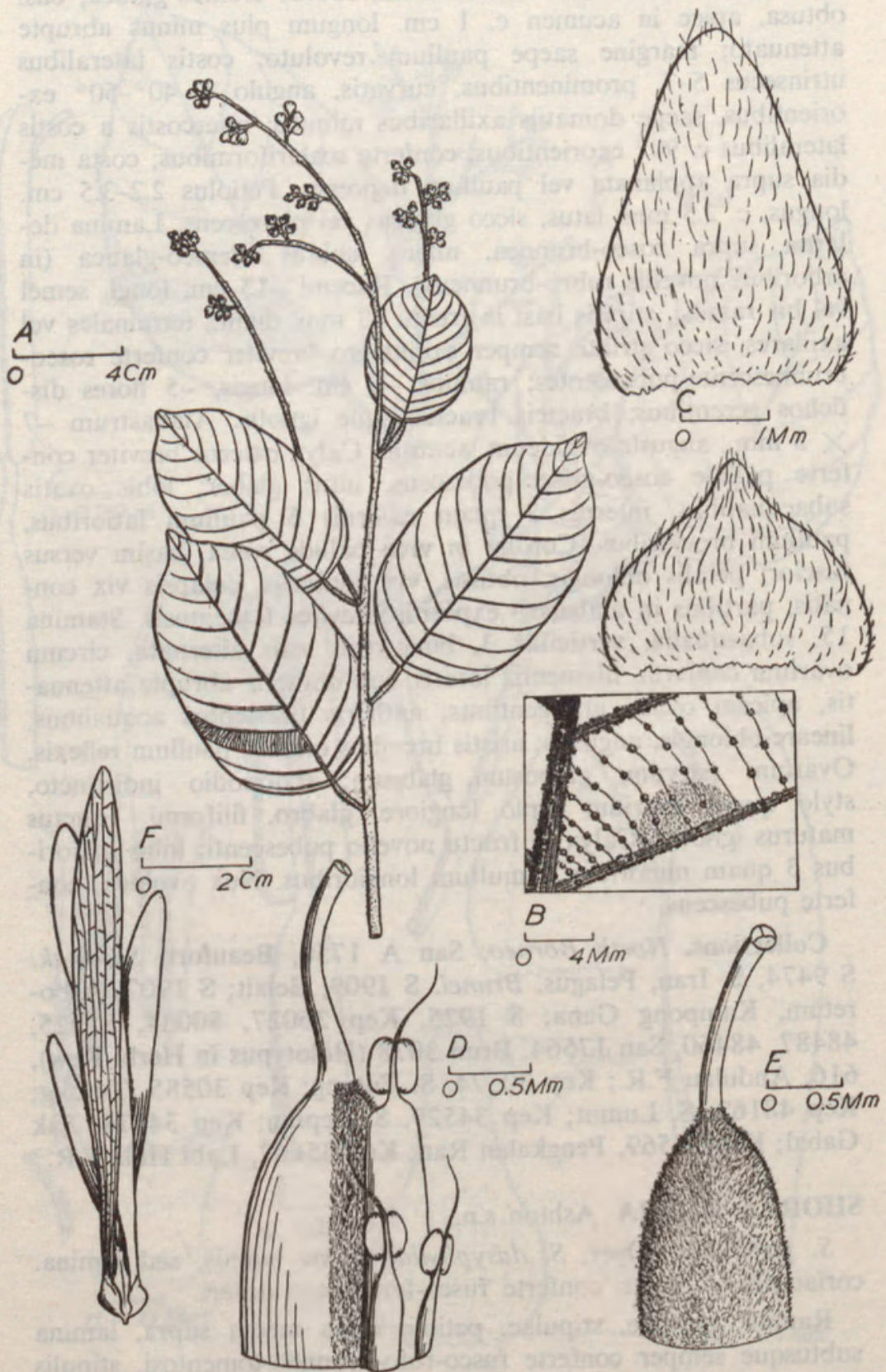


Plate 28. *S. rubra*.

- a, Flowering twig. b, Part of lamina (undersurface). c, Sepals (outer, above; below). d, Ovary and stamens. e, Ovary. f, Fruit.
(a-e from S 9475; f from S 2112).

mm., compressa, ovoidea, late acuta. Stipulae -16×5 mm., hastatae, basi attenuata, subacutae. Lamina $8-12 \times 4-7.5$ cm., late ovata; basi obtusa, apice in acumen -1.3 cm. longum (saepe brevem) abrupte attenuato, margine paullum revolutum; costis lateralibus utrinsecus $11-13$, subtus prominentibus, ad apices curvatis, angulo $40^\circ-50^\circ$ exorientibus; intercostis angustis, conferte scalariformibus, a costis lateralibus diagonale exorientibus; costa media subtus prominenti, tereti, supra angusta paullum depressa. Petiolus $1-1.4$ cm. longus, c. 1.5 mm. diam., sicco rufo vel purpureo-griseo-tomentosus. Lamina delapsa supra purpureo-pubescentibus, subtus rufescentibus, dein indistincte purpureo-pubescentibus vel grisea. Racemi -14 cm. longi, semel vel bis ordine ramosi, stipitis basi in fructu -2 mm. diam., terminales vel axillares, ex integro teretes, recti, striati, conferte fusco-rufo-brunneo-tomentosi; ramulis brevibus, confertis, -5 flores distichos gerentibus; bracteolis -4×3.5 mm., late ovatis, subacutis, circum alabastro imbricatis, externe breviter pallide alutaceo-pubescentibus, intus sparsim pubescentibus. Alabastrum -7×4 mm., ellipsoideum vel subglobosum, obtusum. Calyx externe conferte pallide griseo-tomentosus, intus glaber; lobis externis 3 deltoideo-ovatis obtusis, lobis internis 2 late ovatis acutis quam illis minoribus. Corolla in vivo pallide flavida, partibus in alabastro expositis breviter tomentosis; petalis lineariblongis, subacutis. Stamina 15, verticillis 3 inaequalibus, interna 5 quam alia prope 2-plo longiora; filamentis externis 10 ad antheras gradatim attenuatis, internis 5 late loratis, sub antheris abrupte attenuatis; antheris subglobosis; aristis quam antheras brevioribus, dein paullum reflexis. Ovarium stylopodiumque ovoideo-conicum, conferte tomentosum basi excepto; stylo quam ovarium brevius glabro. Pedicellus in fructu c. 1 mm. longus diametroque, brevis. Calyx in fructu breviter tenuiter puberulus vel glabrescens; lobis longioribus 3, -11×1.6 cm., anguste spatulatis, anguste obtusis, basim versus -4 mm. attenuatis; partibus basalibus -8×6 mm., multum saccatis, incrassatis; lobis brevioribus 2, -4.5×0.4 cm., subaequalibus, linearibus, acutis, partibus basalibus ut in lobis longioribus. Nux -10×9 mm., late ovoidea, alutaceo-velutinata, in stylopodium -2 mm. longum acutum abrupte attenuata.

Collections. *North Borneo:* San 15124, 15085, Beaufort; San 17008, 17013, 17010, 17023, Tambunan; San 16638, 16556, 15187, 15190, 15193, Sipitang; San 15124, Pangl; San 16355, Ranau; San 16577, Ulu Moyah. *Brunei:* S 1677, Kep 48492, Andulau F.R.; S 1691, S. Kiaput, Tutong; S 2112, Bt. Teraja; Brun 364, Ulu Katop-Ulu Senuko watershed, Ulu Batu Apoi; S 5754, Kuala Belalong; Brun 2615, Kuala Temburong Machang; Brun 784, Kuala Sekurop. *Sarawak:* S 9475, S. Iran, Pelagus (Holotypus in Herb. Kew); Jacobs 5464, Belaga; S 9413, Kuching; S 117, S. Miah, Rejang; S 166, S. Merirai, Ulu Balleh; S 6525, G. Menuku.

SHOREA SLOOTENI Ashton:—*S. vanslootenii* Wood msc.

S. macropterae Dyer affinis, sed lamina maiori, costis lateralibus multis supra depressis, ramulis crassis compressis, staminum aristis externis 10 vix reflexis, ovario angusto, stylo longiore differt.

Ramuli, perulae, stipulae externe, petiolo laminaeque subtus semper conferte pallide fulvo-scabrido-cristato-tomentosi, cristis brevibus, duris, verrucosis; stipulae intus pubescentes, costa media supra breviter pubescens. Ramuli apicem versus -5×3 mm., primo compressi, striati, dein teretes, crassi, basibus cristorum persistentibus verrucosis; internodis 1–3 cm. longis; cicatricibus stipularum primo -3 mm. longis, basi -0.5 mm. lata, cuneatis, paullum sursum directis. Gemma $6-10 \times 5-8$ mm., late ovoidea, paullum compressa, obtusa. Stipulae -25×8 mm., oblongae, obtusae. Lamina $11-22 \times 4-7$ cm., late oblonga, coriacea, basi obtusa, apice in acumen 1.5 cm. longum abrupte attenuato; costis lateralibus utrinsecus (25) 27–34, confertis, subtus prominentibus, supra depressis, ad marginem curvatis, angulo $50^\circ-60^\circ$ exorientibus; intercostis conferte scalariformibus, prominentibus, a costis lateralibus paullum diagonale vel ad 90° exorientibus; costa media subtus prominenti, tereti, supra multum depressa. Petiolus 1.7–2.5 cm. longus, c. 3 mm. diam., crassus, sicco rufo-brunneo-tomentosus. Lamina delapsa supra pallide ferruginea, subtus fusco-ferruginea, utrinsecus inflexa, scaphiformis, Racemi -18 cm. longi, semel vel bis ordine ramosi, stipitis basi in fructu -4 mm. diam., terminales vel axillares, ex integro crassi, fragiles, plus minus compressi, conferte pallide fulvo-scabrido-tomentosi, ramulis brevibus, -4 flores gerentibus; bracteolis -3×2 mm., ovatis vel deltoideis, obtusis, externe conferte flavido-brunneo-pubescentibus, intus glabris, caducis. Alabastrum -12×7 mm., ovoideum vel ellipsoideum, obtusum. Calyx externe breviter conferte virido-brunneo-tomentosus, intus glaber; lobis externis 3 ovatis, acuminatis, quam lobis internis 2 acutis longioribus. Corolla in vivo pallide flava, petalis lanceolatis, subacutis, partibus in alabastro expositis conferte breviter tomentosis. Stamina 15, verticillis 3, bina cum solis alternata; interna 5 basim styli attingentia, quam aliis 2-plo longioribus, his inaequalibus filamentis ad antheras gradatim attenuatis, in alabastrum paullum nectis; antheris globosis; aristis internis 5 quam antheras brevioribus dein reflexis, externis 10 quam antheras 2-plo longioribus, vix reflexis. Ovarium stylopodiumque anguste ovoideum vel lanceolatum, dimidio distali sparsim setoso, stylo ovarium prope aequali, late filiformi, glabro. Pedicellus in fructu -3 mm. longus diametroque, brevis, crassus. Calyx in fructu nitens, breviter puberulens, apicem versus sparsus; lobis longioribus 3, $-17 \times$ c. 1.75 (-4) cm., inaequalibus, lineare-oblongis, obtusis, basim versus vix attenuatis, partibus basalibus ad pedicellum abrupte attenuatis, discis centris -12×12 mm. saccatis incrassatis, nuce adpressis, auriculis lateralibus 2, -1 cm. latis; lobis brevioribus 2, $5.5-12.5 \times 0.7$ cm.,

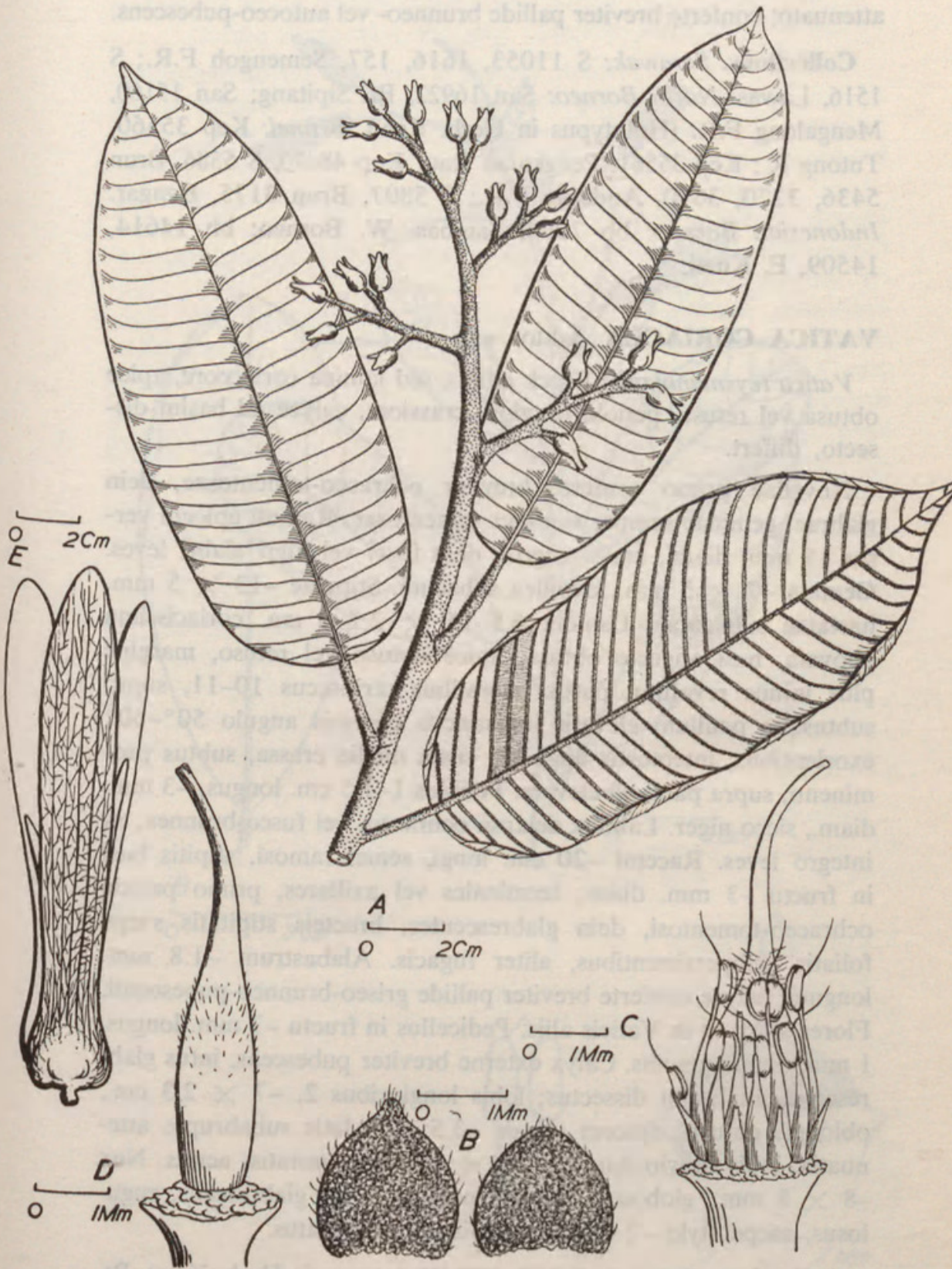


Plate 29. *S. slootenii*.

a, Twig with young fruit. b, Sepals (outer, left; inner, right). c, Stamens and Ovary
d, Ovary. e, Fruit.

(a from S 11053; b-d from Brun 3070; e from S 1516).

inaequalibus, linearibus, basibus ut in lobis longioribus. Nux -3.5×1.5 cm., ovoideum, stylopodio -4 mm. longo acuto gradatim attenuato; conferte breviter pallide brunneo- vel autoceo-pubescent.

Collections. *Sarawak*: S 11053, 1616, 157, Semengoh F.R.; S 1516, Lawas. *North Borneo*: San 16922, Bt. Sipitang; San 15160, Mengalong F.R. (Holotypus in Herb. Kew). *Brunei*: Kep 35560, Tutong R.; Kep 35561, Pengkalan Ran; Kep 48470, S 5586, Brun 5436, 3270, 3070, Andulau F.R.; S 5807, Brun 3175, Bangar. *Indonesian Borneo*: bb 7097, Sambas, W. Borneo; bb 14614, 14509, E. Kutei.

VATICA CORIACEA Ashton s.n.

Vatica teysmanniana Burck affinis, sed lamina coriaceore, apice obtusa vel retusa, petiolo brevior crassior, calyce ad basim dissecto, differt.

Novellae primo conferte breviter ochraceo-tomentosae, dein glabrae; gemmae semper similiter tomentosae. Ramuli apicem versus -5 mm. diam., crassi rugosi, dein fusci vel nigri glabri leves. Gemma -7×5 mm., ovoidea subacuta. Stipulae -13×5 mm. hastatae subacutae. Lamina $6.5-15 \times 2.2-6$ cm. coriacissima obovata, basi anguste obtusa, apice obtuso vel retuso, margine plus minus revoluta; costis lateralibus utrinsecus $10-11$, supra subtusque paullum elevatis indistinctis curvatis angulo $50^{\circ}-60^{\circ}$ exorientibus; intercostis angustis; costa media crassa, subtus prominenti, supra paullum elevata. Petiolus $1-1.5$ cm. longus, -3 mm. diam., sicco niger. Lamina delapsa ochraceo- vel fusco-brunnea, ex integro leves. Racemi -20 cm. longi, semel ramosi, stipitis basi in fructu -3 mm. diam., terminales vel axillares, primo pallide ochraceo-tomentosi, dein glabrescentes, bracteis stipitatis saepe foliatis, subpersistentibus, aliter fugacis. Alabastrum -1.8 mm. longum; calyce conferte breviter pallide griseo-brunneo-pubescenti. Flores aliter ut in *Vaticis* aliis. Pedicellus in fructu -7 mm. longus, 1 mm. diam., gracilis. Calyx externe breviter pubescens, intus glabrescens, ad basim dissectus; lobis longioribus 2 , -7×2.3 cm., oblongis obtusis, apicem versus -3.5 mm. latis subabrupte attenuatis; lobis brevioribus 3 , -20×-6 mm., hastatis, acutis. Nux -8×8 mm., globosus, breviter puberulus vel glabrescens, rugulosus, saepe stylo -2 mm. longo lineari terminatus.

Collections. *Sarawak*: S 362, 372 (Holotypus in Herb. Kew), Bt. Sebandar, Lundu; S 10296, 10296A, Bako N.P.; S 10390, 10391, Bt. Serepah, Kuching; S 7295, Selang F.R.; S 6344, G. Pueh F.R.; 18/58, Bt. Kayangeran, Merapok, Lawas. *Brunei*: S 4134, Brun 5155, Berakas F.R.; Brun 5652, Bt. Patoi.

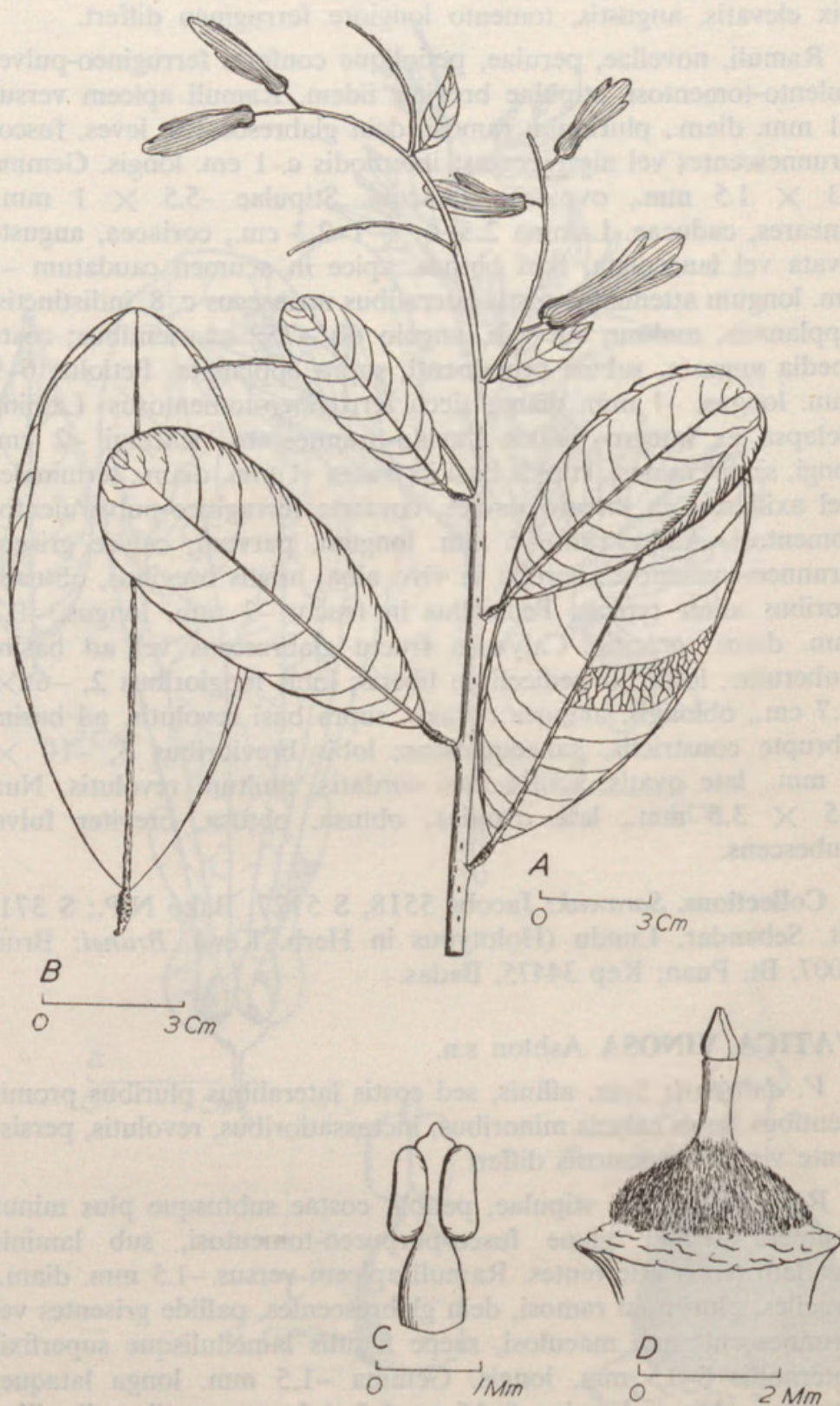


Plate 30. *Vatica coriacea*.

a, Fruiting twig. b, Leaf. c, Stamen. d, Ovary.

(a and b from S 10296a; c and d from S 10296).

VATICA PARVIFOLIA Ashton s.n.

V. micranthae V.Sl. affinis, sed lamina minore, costis lateralibus vix elevatis, angustis, tomento longiore ferrugineo differt.

Ramuli, novellae, perulae, petiolique conferte ferrugineo-pulverulento-tomentosi, stipulae breviter iidem. Ramuli apicem versus -1 mm. diam., plurimum ramosi, dein glabrescentes, leves, fusco-brunnescentes vel nigrescentes; internodis c. 1 cm. longis. Gemma -3 × 1.5 mm., ovoidea, subacuta. Stipulae -5.5 × 1 mm., lineares, caducae. Lamina 2.8-6 × 1-2.3 cm., coriacea, anguste ovata vel lanceolata, basi obtusa, apice in acumen caudatum -1 cm. longum attenuato; costis lateralibus utrinsecus c. 8, indistinctis, applanatis, multum curvatis, angulo 60°-75° exorientibus; costa media angusta, subtus prominenti, supra applanata. Petiolus 6-9 mm. longus, -1 mm. diam., sicco ferrugineo-tomentosus. Lamina delapsa ex integro pallide flavido-brunnescent. Racemi -2 cm. longi, semel ramosi, stipitis basi in fructu -1 mm. diam., terminales vel axillares, ex integro teretes, conferte ferrugineo-pulverulento-tomentosi. Alabastrum -6 mm. longum, parvum; calyce griseo-brunneo-tomentoso; corolla in vivo alba; aristis brevibus, obtusis, floribus aliter typicis. Pedicellus in fructu -3 mm. longus, -0.7 mm. diam., gracilis. Calyx in fructu glabrescens vel ad basim puberulus; lobis ad pedicellum liberis; lobis longioribus 2, -6 × 1.7 cm., oblongis, anguste obtusis, supra basi revolutis, ad basim abrupte constrictis, subaequalibus; lobis brevioribus 3, -10 × 7 mm., late ovatis, acutis, basi cordatis, multum revolutis. Nux -5 × 3.5 mm., late ovoidea, obtusa, obtusa, breviter fulvo pubescens.

Collections. *Sarawak*: Jacobs 5518, S 5127, Bako N.P.; S 371, Bt. Sebandar, Lundu (Holotypus in Herb. Kew). *Brunei*: Brun 2007, Bt. Puan; Kep 34475, Badas.

VATICA VINOSA Ashton s.n.

V. dulitensis Sym. affinis, sed costis lateralibus pluribus prominentibus, lobis calycis minoribus, incrassatioribus, revolutis, persistente vinoso-tomentosis differt.

Ramuli, perulae, stipulae, petioli, costae subtusque plus minus semper breviter plane fusco-purpureo-tomentosi, sub laminis quadam tenus atterrentes. Ramuli apicem versus -1.5 mm. diam., graciles, plurimum ramosi, dein glabrescentes, pallide grisentes vel brunnescentesque maculosi, saepe fissulis lamellulisque superfixi; internodis 8-15 mm. longis. Gemma -1.5 mm. longa lataque, ovoidea, obtusa. Lamina 6-15 × 1.5-4.5 cm., spatii varii, elliptica vel lanceolata, basi anguste obtusa vel cuneata, apice in acumen angustum -1.2 cm. longum attenuato; costis lateralibus primariis utrinsecus 12-20, angustis, subtus plus minus prominente elevatis, curvatis, confertis angulo 50°-70° exorientibus, secundariis brevibus angustis; costa media angusta, subtus prominenti,

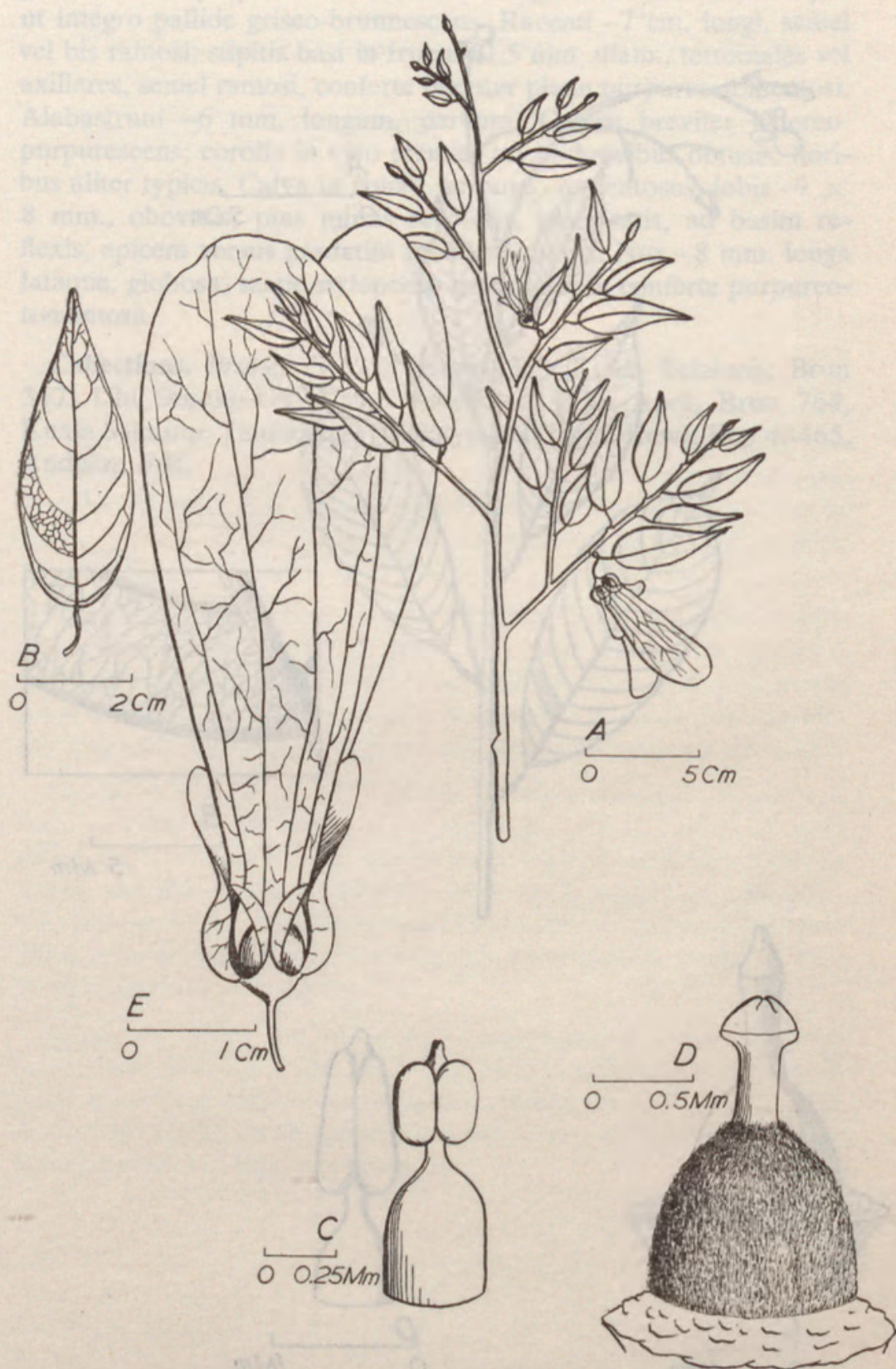
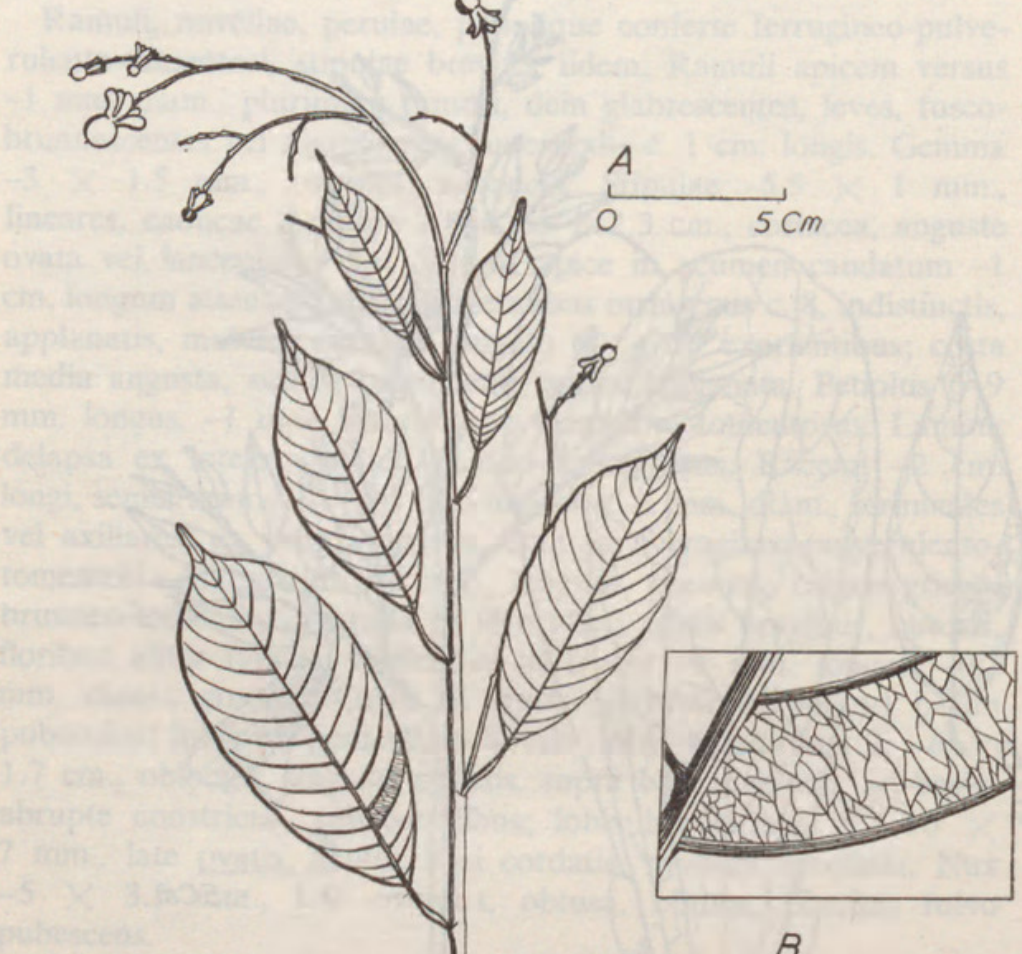


Plate 31. *Vatica parvifolia*.

a, Fruiting twig. b, Leaf. c, Stamen (frontal view). d, Ovary. e, Fruit.
(a and e from S 371; b-d from Jacobs 5518).

Vatica parvifolia Ashby s.n.

V. parvifolia V. S. affinis, sed lamina minor, costis interlibax
vix elevatis, squamis junioribus longiore ferruginea distincti.



Collectors. Sarawak: Deco 5573, 5574, 5575, 5576, 5577, 5578, 5579, 5580, 5581, 5582, 5583, 5584, 5585, 5586, 5587, 5588, 5589, 5590, 5591, 5592, 5593, 5594, 5595, 5596, 5597, 5598, 5599, 5600, 5601, 5602, 5603, 5604, 5605, 5606, 5607, 5608, 5609, 5610, 5611, 5612, 5613, 5614, 5615, 5616, 5617, 5618, 5619, 5620, 5621, 5622, 5623, 5624, 5625, 5626, 5627, 5628, 5629, 5630, 5631, 5632, 5633, 5634, 5635, 5636, 5637, 5638, 5639, 5640, 5641, 5642, 5643, 5644, 5645, 5646, 5647, 5648, 5649, 5650, 5651, 5652, 5653, 5654, 5655, 5656, 5657, 5658, 5659, 5660, 5661, 5662, 5663, 5664, 5665, 5666, 5667, 5668, 5669, 5670, 5671, 5672, 5673, 5674, 5675, 5676, 5677, 5678, 5679, 5680, 5681, 5682, 5683, 5684, 5685, 5686, 5687, 5688, 5689, 5690, 5691, 5692, 5693, 5694, 5695, 5696, 5697, 5698, 5699, 5700, 5701, 5702, 5703, 5704, 5705, 5706, 5707, 5708, 5709, 5710, 5711, 5712, 5713, 5714, 5715, 5716, 5717, 5718, 5719, 5720, 5721, 5722, 5723, 5724, 5725, 5726, 5727, 5728, 5729, 5730, 5731, 5732, 5733, 5734, 5735, 5736, 5737, 5738, 5739, 5740, 5741, 5742, 5743, 5744, 5745, 5746, 5747, 5748, 5749, 5750, 5751, 5752, 5753, 5754, 5755, 5756, 5757, 5758, 5759, 5760, 5761, 5762, 5763, 5764, 5765, 5766, 5767, 5768, 5769, 5770, 5771, 5772, 5773, 5774, 5775, 5776, 5777, 5778, 5779, 5780, 5781, 5782, 5783, 5784, 5785, 5786, 5787, 5788, 5789, 5790, 5791, 5792, 5793, 5794, 5795, 5796, 5797, 5798, 5799, 5800, 5801, 5802, 5803, 5804, 5805, 5806, 5807, 5808, 5809, 5810, 5811, 5812, 5813, 5814, 5815, 5816, 5817, 5818, 5819, 5820, 5821, 5822, 5823, 5824, 5825, 5826, 5827, 5828, 5829, 5830, 5831, 5832, 5833, 5834, 5835, 5836, 5837, 5838, 5839, 5840, 5841, 5842, 5843, 5844, 5845, 5846, 5847, 5848, 5849, 5850, 5851, 5852, 5853, 5854, 5855, 5856, 5857, 5858, 5859, 5860, 5861, 5862, 5863, 5864, 5865, 5866, 5867, 5868, 5869, 5870, 5871, 5872, 5873, 5874, 5875, 5876, 5877, 5878, 5879, 5880, 5881, 5882, 5883, 5884, 5885, 5886, 5887, 5888, 5889, 5890, 5891, 5892, 5893, 5894, 5895, 5896, 5897, 5898, 5899, 5900, 5901, 5902, 5903, 5904, 5905, 5906, 5907, 5908, 5909, 5910, 5911, 5912, 5913, 5914, 5915, 5916, 5917, 5918, 5919, 5920, 5921, 5922, 5923, 5924, 5925, 5926, 5927, 5928, 5929, 5930, 5931, 5932, 5933, 5934, 5935, 5936, 5937, 5938, 5939, 5940, 5941, 5942, 5943, 5944, 5945, 5946, 5947, 5948, 5949, 5950, 5951, 5952, 5953, 5954, 5955, 5956, 5957, 5958, 5959, 5960, 5961, 5962, 5963, 5964, 5965, 5966, 5967, 5968, 5969, 5970, 5971, 5972, 5973, 5974, 5975, 5976, 5977, 5978, 5979, 5980, 5981, 5982, 5983, 5984, 5985, 5986, 5987, 5988, 5989, 5990, 5991, 5992, 5993, 5994, 5995, 5996, 5997, 5998, 5999, 6000.

Vatica vinosa Ashby s.n.

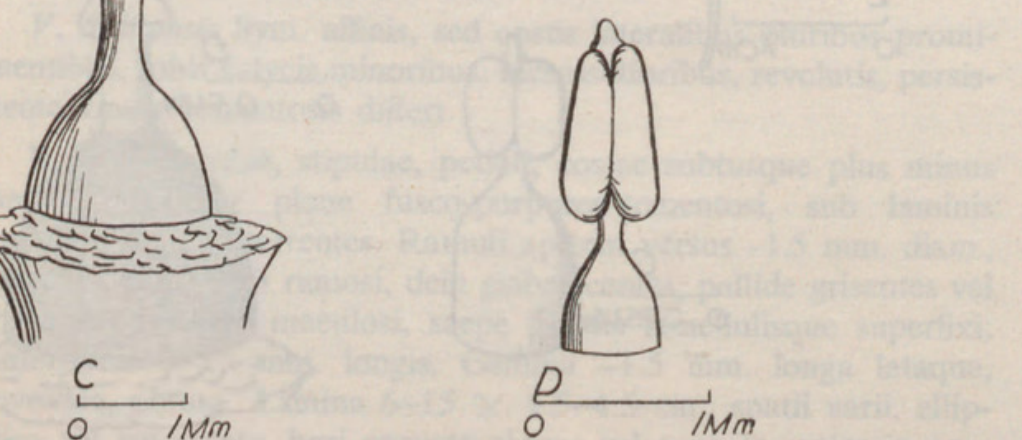


Plate 32. *Vatica vinosa*.

a, Fruiting twig. b, Part of lamina undersurface. c, Ovary. d, Stamen.
(a and b from Brun 764; c and d from Brun 3383).



Ashton, Peter S. 1962. "Some New Dipterocarpaceae from Borneo." *The Gardens' bulletin, Singapore* 19(1-3), 253–319.

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