

REVISION OF THE SAPOTACEAE OF THE MALAYSIAN AREA  
IN A WIDER SENSE

XIV<sup>1)</sup>. *Diploknema* Pierre

by

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(Rijksherbarium, Leiden)

(Issued 1. VII. 1958)

*Diploknema* Pierre, Arch. néerl. sc. exact. et nat. 19, 1884, 103; Burck, Med. Lands Pl. Bzg 3, 1886, 43; Boerlage, Handl. Fl. Ned.-Ind. 2, 1, 1891, 301; Baillon, Hist. Pl. 11, 1891, 302; Engler & Prantl, Nat. Pfl. Fam. 4, 1, 1897, 134; Heyne, Nutt. Pl. Ned.-Ind. 3, 1917, 292; Lam, Bull. Jard. Bot. Bzg, sér. 3, 7, 1925, 183; Lam, Bull. Jard. bot. Bzg, sér. 3, 8, 1927, 463; Heyne, Nutt. Pl. Ned.-Ind., ed. 2, 1927, 1231, and ed. 3, 1950, 1231 — *Mixandra* Pierre, Not. Bot. Sapot., 1890, 2; Dubard, Rev. Gén. Bot. 20, 1908, 316.

Trees. *Leaves* alternate, usually crowded at apex of branchlets, stipules extant, petioles often thickened in basal part. *Inflorescences* fascicled in axils of leaf-scars on older branches, those of the present year in most cases bearing leaves only. *Sepals* (4—)5(—6), spirally arranged, ovate, the two exterior ones valvate, the inner ones imbricate. *Corolla* 7—16-lobed. *Stamens* 16—80, in 2—4 rows inserted in the throat of the corolla, sometimes androecium reduced and consisting of as many petaloid staminodes. *Ovary* without or with a small disk, conoid, glabrous or pubescent, 5—14-celled; style stout, truncate, cells with one ovule which is centrally or apically attached. *Fruit* a 1—3(—5)-seeded berry, seeds large, scar broad, testa thin to thick, woody to crustaceous, albumen none to extant, cotyledons thick, curved towards margins, radicle short, inferior.

Type species: *D. sebifera* Pierre.

Distr.: 6 species; 2 in India, Tibet, Bhotan, Nepal, Burma, and the Andamans, 1 in Siam, 1 in Borneo, 1 in the Philippines, and 1 in Amboina. (*Fig. 1*).

Remarks: The number of secondary nerves is that at one side of the midrib. The scales added to the drawings are given in millimeters.

<sup>1)</sup> I—III in *Blumea* VI, 3, 1952, 547—595; IV—V in *Blumea* VII, 2, 1953, 364—412; IVa in *Blumea* VII, 3, 1954, 481—483; IIa, IVb, Va, VI—IX in *Blumea* VIII, 2, 1957, 201—513; X—XII in *Nova Guinea N. S.* 8, 1, 1957, 87—128; XIII—XVI in the present issue.

**Key to the taxa**

- 1.a. Base of leaves abruptly narrowed, rounded, or cuneate and shortly decurrent; corolla-lobes 5—10, stamens 10—20, flowers up to 1 cm large, pedicels 0.2—1.5 cm long . . . . . 2
- b. Base of leaves tapering, short or rather long decurrent, but if rounded then stamens 22—40, flowers larger than 1 cm and pedicels 2.5—3.5 cm long . . . . . 3
- 2.a. Corolla smaller than 5 mm, corolla-lobes spatulate, apex obtuse, stamens 16—20, pedicels 0.2—0.5 cm long; secondary nerves of leaves 8—14, ascending at an angle of 45°—55°. *Borneo* . . . . . 1. *D. sebifera* Pierre

**DISTRIBUTION OF THE SPECIES OF DIPLOKNEMA**

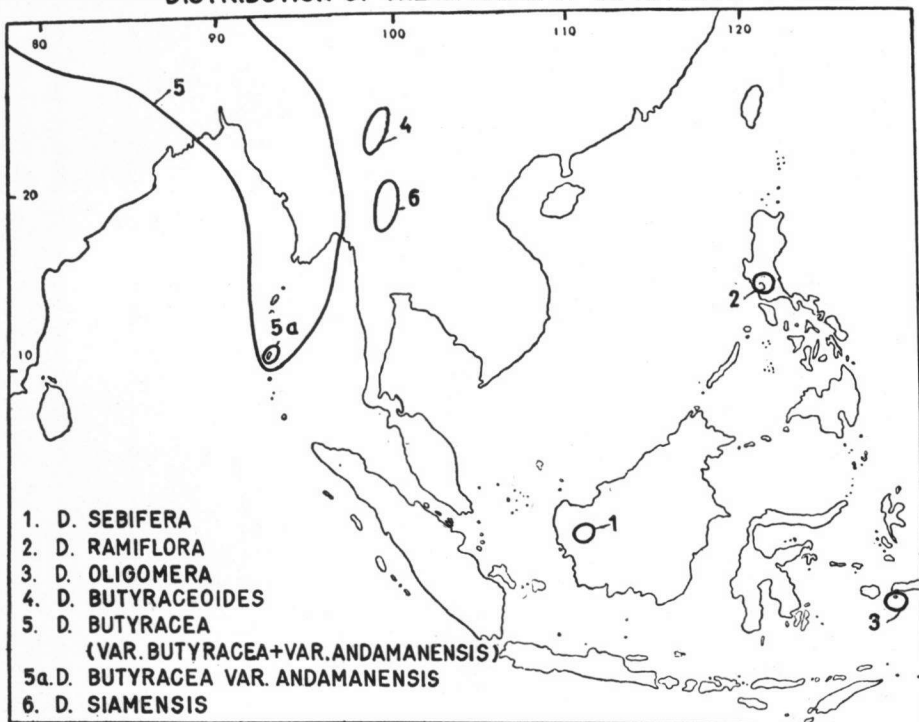


Fig. 1. Distribution of the species of *Diploknema*.

- b. Corolla 6—8 mm large, corolla-lobes lanceolate, apex acute, stamens c. 20, pedicels c. 1.5 cm long; secondary nerves of leaves 6—8, ascending at an angle of 35°—50°. *Philippines* . . . . . 2. *D. ramiflora* (Merrill) H. J. Lam
- 3.a. Corolla smaller than 4 mm, pedicels 0.7—1.2 cm; leaves 4—16 by 2—5.5 cm, longly acutely acuminate, secondary nerves 8—14, petioles 1.5—3 cm long. *Amboina* . . . . . 3. *D. oligomera* H. J. Lam
- b. Corolla larger than 1 cm, pedicels 1.5—3.5 cm long; leaves 15—45 by 6—18 cm, short obtusely acuminate or rounded, secondary nerves 15—20, petioles 2—12 cm long . . . . . 4
- 4.a. Stamens 70—80, pedicels 1.5—2.5 cm long, petioles 2—4 cm long, glabrous. *India and Burma* . . . . . 4. *D. butyraceoides* (Scott) H. J. Lam
- b. Stamens 18—40, petioles 4—12 cm long and glabrous or petioles 1.8—4.4 cm long and yellowish puberulous . . . . . 5

- 5.a. Corolla 7—10-lobed; petioles 1.8—4.4 cm long, flat or shallow and broadly grooved above . . . . . 6  
 b. Corolla 14-lobed; petioles 4—12 cm long, narrow and deeply grooved above. *Siam* 6. *D. siamensis* Fletcher
- 6.a. Corolla-lobes broadly spatulate, calyx glabrous within, except for a few scattered brown woolly hairs, lobes obtuse to subobtuse, stamens 20—40, filaments 5—7 mm long, glabrous, anthers glabrous. *India, Bhotan, Nepal and Tibet.*  
 5. *D. butyracea* (Roxb.) H. J. Lam  
 var. *butyracea*
- b. Corolla-lobes narrowly ovate, calyx ferruginously sericeous within, lobes acute, stamens c. 18, filaments c. 2 mm long, densely brownish woolly, anthers with long brown hairs on either side. *Andamans* 5. *D. butyracea* (Roxb.) H. J. Lam  
 var. *andamanensis* van Royen

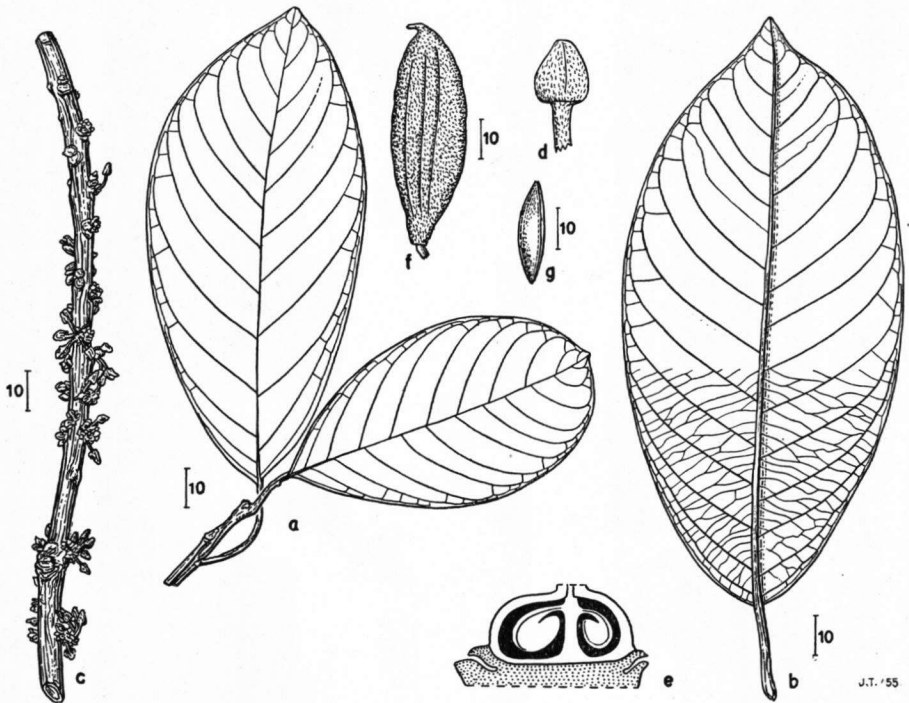


Fig. 2. *Diploknema sebifera*, a. top of branchlet with leaves, b. leaf, underside, c. flowering branchlet, d. flowerbud, e. longitudinal section of ovary, f. fruit, g. seed. (from Knappert s.n.).

1. *D. sebifera* Pierre, Arch. néerl. sc. exact. et nat. 19, 1884, 103, t. 4; Burek, Med. Lands. Pl.t. Bzg 3, 1886, 43; Heyne, Nutt. Pl. Ned.-Ind. 3, 1917, 292; Lam, l. c. 1925, 184; Lam, l. c. 1927, 463; Heyne, Nutt. Pl. Ned. Ind., ed. 2, 1927, 1231, and ed. 3, 1950, 1231 — Fig. 2.

Trees. Branchlets angular, c. 4 mm thick, glabrous, greyish. Leaves conferted at apex of branchlets, spatulate or obovate, 10—24 by 3—7.5 cm, apex obtuse or shortly acuminate, base rounded, shortly decurrent along upper surface of petiole; glabrous on either side, nitidous above, dull below,

coriaceous; midrib grooved above, prominent below, secondary nerves 8—14, ascending at an angle of 45°—55°, slightly curved, diminishing until inconspicuous, rarely archingly joined, subimpressed above, prominent below; tertiary nerves transverse, few, inconspicuous above, prominent below; petioles 2—4 cm long, with a very narrow shallow groove above, basal part thickened, glabrous. *Flowers* unisexual, in 3—7-flowered fascicles on distinctly prominent warts, in the axils of up to 2 mm large, lanceolate bracts, which are ferruginously puberulous without and glabrous within; pedicels 2—5 mm long, ferruginously tomentose. *Sepals* 5, ovate or elliptic, 2.5—4 by 1—3 mm, apex subacute or obtuse, ferruginously tomentose without, glabrous within, margin ciliate, the two innermost sepals carinate and pubescent except along margins, glabrous within. *Corolla* 10-lobed, 3—4.5 mm long, tube 0.5—1 mm long, lobes spatulate, 2.5—3.5 mm long, apex obtuse, margins denticulate, (according to Pierre apex pubescent). *Sterile stamens* 16—20, in two rows, 2—3.5 mm long, lanceolate, but narrowed at the base, apex obtuse, irregularly denticulate, sometimes sparsely pilose, glabrous, except in the basal part for some white hairs along margins and outside. *Ovary* (6—)7(—8)-celled, c. 1 by 1.5 mm, ferruginously sericeous, ovules apically and centrally attached, campylo-tropous, the ovules in a subhorizontal position with the micropyle slightly below the hilum; style angular, up to 4 mm long; disk cup-shaped, c. 1.5 mm in diam., irregularly 16—20-toothed, glabrous. *Fruits* obliquely fusiform or subobovate, 3.5—6 by 1.4—2 cm, apex obtusely acuminate (acumen up to 3 mm), 1—3-seeded, brownish floccose but glabrescent, pericarp subligneous, seeds obovoid, 2.5—3 by 0.8—1 by 0.6—0.8 cm, apex obtuse, base acute, scar covering almost half of the seed, embryo unknown.

Type specimen: *Knappert s. n.* in L.

Use: The seeds produce after pressing the so-called Tangkawang oil (Minjak Tangkawang).

Vern. names: merading, njato kalan, hankang, putat.

Distr.: Borneo.

BORNEO. Indonesian Borneo, distr. Amuntai: *Knappert s. n.* (K, L), fl. & fr.; E. Kutai, Sungei Menubar region, alt. 20 m, loam soil with limestone: *Kostermans 5023* (BO, L), tree 32 m, fr. June; Mt Sekrat, S. of Sangkulirang, alt. 100—200 m, coral limestone rocks: *Kostermans 5928* (BO, L), tree 40 m, fl. buds, July; Loa Haur, W. of Samarinda, alt. 40 m, sandstone, loam soil: *Kostermans 6794* (BO, L), tree 40 m, fr. May; ibidem: *Kostermans 6949* (BO, L), tree 48 m, fr. May; Tdg Bangko region near mouth of Mahakam river, low ridge, sandy soil: *Kostermans 7168* (BO, L), tree 45 m, fr.; Berau Domaring, alt. 300 m: *NIFS db 18901* (BO, L), May — Sandakan, Elopura: *Agama A 3135* (SING), Sept.; West Gajah: *Lakursing A 3354* (SING), Sept.

Remarks: In Pierre's description the number of secondary nerves of the leaf is stated as being 28—30, but this certainly is a typographic error as in the type specimen this number is 8—10 pairs only. By this error, Lam, 1927, who did not see the type specimen, unintentionally placed *D. sebifera* in the wrong part of his key.

2. *D. ramiflora* (Merrill) H. J. Lam, l. c. 1925, 184, f. 52; Lam, l. c. 1927, 463 — *Illipe ramiflora* Merrill, Bur. Gov. Lab. Bull. 17, 1904, 42 — *Bassia ramiflora* (Merrill) Merrill, Phil. Journ. Sc. Bot. 10, 1915,

56 — *Madhuca ramiflora* (Merrill) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 278 — Fig. 3.

Trees, up to 35 m. Branchlets terete, 3—9 mm in diam., striate, greyish-brown, brownish sericeous when young; stipules lanceolate, up to 5 mm long, apex acute, brownish sericeous, caducous. *Leaves* scattered or subconferted at apex of branchlets, oblong or subobovate, 8—13 by 2.5—5 cm, apex obtuse or subacuminate, acumen up to 5 mm long, obtuse, base

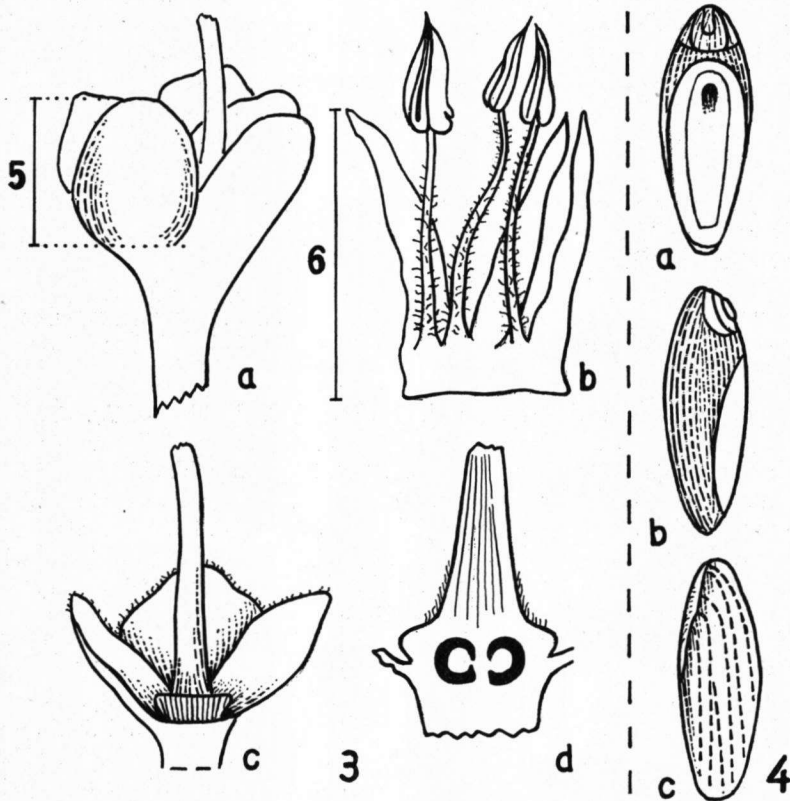


Fig. 3. *Diploknema ramiflora*, a. flower, outside, b. dissected flower, inside, c. ovary, with a few sepals, d. longitudinal section of gynaeceum. (from type specimen).

Fig. 4. *Diploknema oligomera*, a. seed, view of the scar, b. seed, seen from side, c. inside of testa. (from Buwalda 6100).

rounded or acute, abruptly narrowed; juvenile leaves sparsely whitish sericeous on either side, mature ones glabrous on either side or with a few white hairs below, nitidulous above, dull below, coriaceous; midrib grooved above and minutely crested, prominent below, secondary nerves 6—8, ascending at an angle of  $35^{\circ}$ — $50^{\circ}$ , slightly curved, diminishing until inconspicuous, impressed above, prominent below, tertiary nerves few, transverse, invisible above, inconspicuous below; petioles 1.5—4 cm long, grooved

above, rounded below, basal part thickened, rugose and flaking off with marcescent flakes. *Flowers* in 1—5-flowered fascicles on distinctly prominent warts, in the axils of up to 2 mm large, lanceolate, acute bracts which are ferruginously sericeous on either side; pedicels angular, c. 1.5 cm long, brownish sericeous, thickened at apex. *Sepals* 5, broadly ovate, 5—7.5 by 5—6 mm, apex obtuse, or short obtusely or acutely acuminate, ferruginously tomentose or sericeous on either side, but woolly along the margins. *Corolla* white, 10-lobed, 6—8 mm long, lobes lanceolate, 5—6.5 by c. 2 mm, apex acute. *Stamens* c. 20, 7—10 mm long, filaments subulate, 4.5—6.5 mm long, sparsely brownish woolly, anthers sagittate, 2.5—4 mm long, apex acuminate, dehiscing laterally. *Pistillum* long-conoid, up to 14 mm long, ovary 6—8-celled, brownish sericeous, ovules attached in the middle of the cells; style angular, glabrous, apex with 6—8 stigmas; disk cupuliform, c. 2 mm high, adnate to the ovary, glabrous. *Fruits* unknown.

Type specimen: *Barnes 189* in PNH.

Vernacular name: baniti (Luzon).

Distr.: Philippines.

PHILIPPINES. Luzon, Bataan prov., Lamao river: *Barnes 189* (K, PNH, SING), fl. Jan.; ibidem: *Barnes 583* (PNH), March; Bataan, *Williams 554* (SING), fl.; Zayabas prov.: *Curran 10394* (SING), May; Laguna prov.: Santa Maria, Maritae: *Curran 10086* (SING), Febr.

### 3. *D. oligomera* H. J. Lam, l. c. 1927, 463, f. 26 — *Fig. 4*.

Large trees. Branchlets angular or subterete, 2—3.5 mm in diam., ferruginous-brownish sericeous, the more mature ones blackish-greyish sericeous, glabrescent. *Leaves* subconferted at apex of branchlets, subovate, elliptic or subobovate, 4—16 by 2—5.5 cm, apex caudate-acuminate, acumen 5—35 mm long, acute and sometimes oblique, margin crenulate, with a distinct marginal nerve; glabrous on either side, except for the very young leaves, but sometimes with a few scattered white hairs on lower surface to leaf, blackish to black-greenish above and nitidous when dry, cinnamonous or blackish brown below and dull, coriaceous; midrib grooved above and minutely crested, prominent below, secondary nerves 8—14, straight or curved, ascending at an angle of 55°—70°, diminishing until inconspicuous, grooved and minutely crested above, prominulous below, tertiary nerves transverse, few, grooved above, prominent below; petioles 1.5—3 cm long, slender, shallowly grooved above and minutely crested, basal part slightly thickened, grey-blackish velutinous, glabrescent except for the thickened part. *Flowers* in 5—12-flowered fascicles, in the axil of up to 1 mm large, deltoid, acute bracts which are ferruginously blackish sericeous without, glabrous within; pedicels angular, 7—12 mm long, slightly thickened at apex, ferruginously velutinous. *Sepals* broadly ovate, 1—2 by 1.5—2.5 mm, apex obtuse or subacute, brownish sericeous without, glabrous within, margin fimbriate. *Corolla* 3—3.5 mm long, 10-lobed, outer 5 lobes spatulate or ovate, acute, inner 5 lobes ovate, obtuse, both types 2—2.5 by c. 1.5 mm and whitish-ferruginously sericeous without. *Stamens* 10 or 11, in 2 rows, inserted near base of corolla, filaments subulate, curved outwards at apex, 0.5—1 mm long, anthers sagittate, 0.2—

0.7 mm long, apex mucronate, dehiscing extrorsely, base of thecae obtuse. *Ovary* conoid, c. 1 by 0.5 mm, 5-celled, ferruginously sericeous, at apex contracted in 5 stigmas, cells one-ovuled, ovules inserted slightly above the middle of the placentas, subcampylotropous. *Fruits* obliquely ovoid or ellipsoid, up to 3.5 by 1.5 cm, apex obtusely acuminate, brownish sericeous, glabrescent, one-seeded, pericarp thin, woody; seeds fusiform, slightly shorter than the fruit, acute at either end, testa thin, crustaceous, nitidous, scar covering slightly less than half of the seed, embryo exalbuminous, up to 25 by 12 mm, radicle terete, up to 6 mm long.

Type specimen: *NIFS bb 10106* in BO.

Vernacular name: tetah.

Distr.: Amboina.

AMBOENA. Waal, alt. c. 40 m: *NIFS bb 10106* (BO, L), fl. June; ibidem, alt. c. 100 m: *NIFS bb 25965* (BO, L, SING), fr. Sept.; ibidem, alt. c. 100 m: *NIFS bb 25974* (BO, L, SING), Sept.; ibidem, alt. c. 100 m: *Buwalda 6100* (BO), tree, fr. Sept.

Remarks: The fruit has been described from *NIFS bb 25965* in the Rijksherbarium, and *Buwalda 6100* in BO.

4. *D. butyraceoides* (Scott) H. J. Lam, l. c. 1927, 465 — *Bassia butyraceoides* Scott, Kew Bull. Misc. Inf. 1916, 36; Burkill, Bot. Abor Exp., Rec. Bot. Surv. Ind. 10, 2, 1925, 316 — Fig. 5.

Trees. Branchlets densely brownish tomentose. *Leaves* scattered, obovate-oblong, 15—25 by 6—11 cm, apex acutely acuminate, acumen up to 1 cm long, base cuneate, margin undulate; glabrous, nitidous above, nitidulous below, membranous; midrib shallowly grooved above and minutely

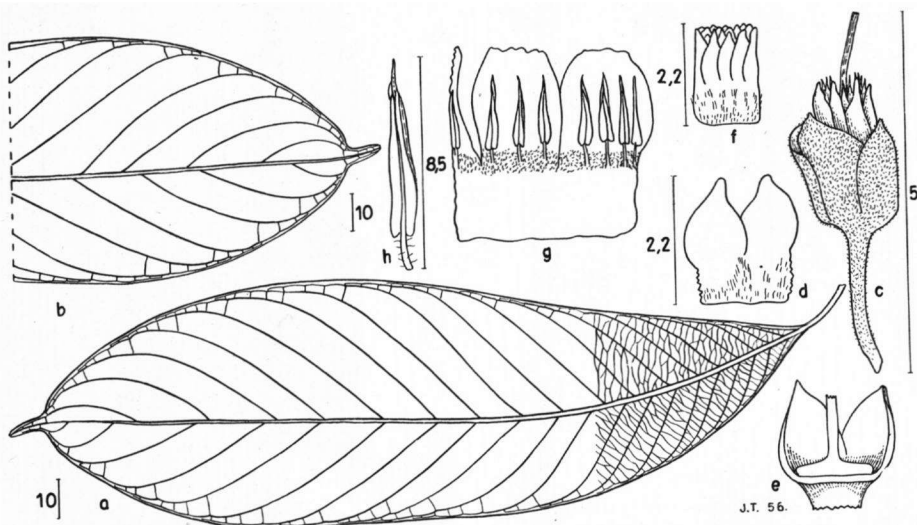


Fig. 5. *Diploknema butyraceoides*, a. leaf, b. apex of leaf, c. flower, d. part of corolla, outside, e. ovary, f. corolla, outside, g. part of corolla, inside, h. stamen. (from type specimen).

crested, prominent below, secondary nerves 16—23, ascending at an angle of c. 45°, straight and curved at tip, apical nerves curved, diminishing until inconspicuous, prominulous above, prominent below, tertiary nerves transverse, inconspicuous above, slightly more distinct below; petioles terete, 2—4 cm long, grooved above, basal part subincrassate, glabrous. *Flowers* in 12- (or more?) flowered, axillary clusters conferted near apex of branchlets; pedicels angular, 1.5—2.5 cm long, brownish woolly, subincrassate at apex. *Sepals* broadly ovate, 1.5—2 by 1.2—1.8 cm, apex obtuse or acute, subacuminate or acuminate, light brownish woolly without, margins of inner sepals ciliate in the basal part, glabrous within. *Corolla* 2—2.6 cm long, lobes 16, obovate, 10—15 by 8—10 mm, subacute, outside ferruginously hirsute at the base, inside ferruginously woolly in the throat between the stamens. *Stamens* 70—80, 7—9 mm long, filaments subulate, 1.5—3 mm long, sparsely brownish woolly, anthers sagittate, 5.5—6 mm long, apex caudate. *Ovary* disciform, c. 1.5 by 7 mm, 14-celled, glabrous, ovules anatropous; style 1.8—2.5 cm long, glabrous, truncate, with 14 stigmas. *Fruits* unknown.

Type specimen: *Kanjilal 3137* in K.

Distr.: India and Burma.

INDIA. Assam, NE frontier, Nizamghat, alt. 160 m, Upendranath: *Kanjilal 3137* (K, CAL); Rengging: *Burkill 36605* (CAL), fl. Febr.; hill over the Jamme mouth: *Burkill 36162* (CAL), fl. Jan.; Dihong river, alt. 250 m: *Burkill 37509* (CAL), fl. Dec.  
BURMA. According to Scott also reported from this country.

5. *D. butyracea* (Roxburgh) H. J. Lam, l. c. 1925, 186; Lam, l. c. 1927, 465 — *Bassia butyracea* Roxburgh, Asiatic Res. (Transact. Soc. Inst. Bengal etc.) 8, 1808, 499, fig.; D. Don, Prodr. Fl. Nep., 1825, 146; Wallich, List of, etc., 1828, nr 4164; Roxburgh, Fl. Ind. 2, 1832, 527; Royle, Bot. Himalayan Mts. 1, 1839, 263; DC, Prodr. 8, 1844, 198; Roxburgh, Fl. Ind., ed. Clarke, 1874, 411; Brandis, Forest Flora, 1874, 290, t. 35; Gamble, Man. Ind. Timbers, 1881, 448; Clarke in Hooker f., Fl. Brit. Ind. 3, 1882, 546; Kanjilal, Forest Fl. etc., 1901, 219; Brandis, Indian Trees, 1906, 427; Duthie, Fl. Upper Gangetic Plain etc. 2, 1911, 12; Haines, Bot. Bihar and Orissa 4, 1922, 512; Cowan & Cowan, Trees Northern Bengal, 1929, 86 — *Illipe butyracea* (Roxburgh) Engler, Bot. Jahrb. 12, 1890, 509 — *Mixandra butyracea* (Roxburgh) Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 196 — *Madhuca butyracea* (Roxburgh) MacBride, Contrib. Gray Herb. Harv. Univ., NS 53, 1918, 18.

Trees, up to 25 m. Branchlets terete or subterete, 4—10 mm in diam., striate, lenticellate, rugose, yellowish, cinnamomous or brownish tomentose or woolly, glabrescent; terminal cone 4—7 mm long, densely woolly or tomentose, in the same colour as the indumentum of the branchlets; stipules lanceolate, c. 5 mm long, apex acute, brownish or yellowish woolly or tomentose, caducous. *Leaves* usually conferted or subconferted at apex of branchlets, sometimes scattered, elliptic-oblong, obovate or obovate-oblong (6—)17—35 by (3—)8—17 cm, apex obtuse or obtusely acuminate, acumen 2—9 mm long, margin crenulate, with a narrow marginal nerve, base cuneate, not or shortly decurrent; yellowish, cinnamomous or brownish tomentose or woolly on one or either side, glabrescent above



and then nitidous, sometimes glabrescent below also, coriaceous; midrib broadly and shallowly grooved above and sometimes either with one or with 2 crests, prominent below, secondary nerves 14—21, ascending at an angle of 40°—65°, straight or curved but sometimes only so at the tip, diminishing until inconspicuous and joined by some thickened tertiary nerves, prominulous above, prominent below, tertiary nervation transverse with interjacent reticulate nerves, inconspicuous above, more distinct below; petioles 1.8—4.4 cm long, grooved above, yellowish, cinnamomous or brownish tomentose or woolly. *Flowers* solitary or in up to 6-flowered, axillary clusters, conferted near apex of branchlets; pedicels 2—4.5 cm long, in fruit up to 5 cm, yellowish, cinnamomous or brownish tomentose or woolly, in fruit glabrous or almost completely so. *Sepals* (4—)5(—6), ovate, 9—15 by 6—10 mm, apex obtuse or subobtuse or acute, brownish or yellowish woolly without, glabrous within, but with scattered brownish woolly hairs in the apical part, or entirely ferruginously sericeous (var. *andamanensis*). *Corolla* pale yellow, 1.5—2 cm long, lobes 8—10, oblong, ovate, or narrowly obovate or broadly spatulate, (7—)8—10 by (4—)5—8 mm long, apex obtuse or subacute, often irregularly crenulate. *Stamens* (18—)20—40, inserted at the base of the lobes, 9—12 mm long, filaments subulate, c. 2 mm or 5—7 mm long, glabrous or brownish woolly, anthers sagittate, c. 5 mm long, apex aristate, dehiscing laterally, glabrous or with long brownish hairs. *Ovary* conoid, c. 2 by 5 mm, ferruginously sericeous, tapering into the style, 7—12-celled, each cell continuing into the style as a hollow vessel, base surrounded by an adnate, ferruginously tomentose disk; style terete or subangular, 1.5—5 cm long, glabrous, with 7—12 hollow vessels. *Fruits* ovoid or oblong, 2—2.5 by 1—1.5 cm, 1—3(—5)-seeded, generally pointed by a remaining portion of the style, smooth, pericarp fleshy, seeds oblong-obovoid, differing in shape according to the number in each fruit, up to 1.3 by 1 by 0.6 cm, glossy, light brown, scar lanceolate, 2—3 mm wide, pale yellow, testa crustaceous, embryo unknown.

Type specimen: *Roxburgh s. n.* in BR.

Distr.: India, Tibet, Bhotan, Nepal, Assam, Andamans.

#### Var. *butyracea*.

Calyx glabrous within except for a few scattered brown woolly hairs, apex of sepals obtuse or subobtuse, corolla-lobes broadly spatulate, stamens 20—40, filaments 5—7 mm long, glabrous, anthers glabrous.

Type specimen: *Roxburgh s. n.* in BR.

Vern. names: chiura, chaiura, frelwa, phulwara (Kamaon); cheuli (Oudh); chiwari, yel-kung (Bengal); butterfly bassia, east india butter tree, big-leaved *Gordonia* (English).

Use: The seeds yield a white substance resembling lard, which remains solid and does not deteriorate in the plains during hot weather. It is used in the manufacture of soap and candles, and in the preparation of an ointment for relieving rheumatic pains. In the latter case it is often perfumed with cloves or attar of roses. The pulp of the fruit and the oil-cake are eaten.

Ecology: This species is found in the sub-Himalayan tract and outer Himalayan ranges at 500—1000 m alt. It is sparsely found as a small

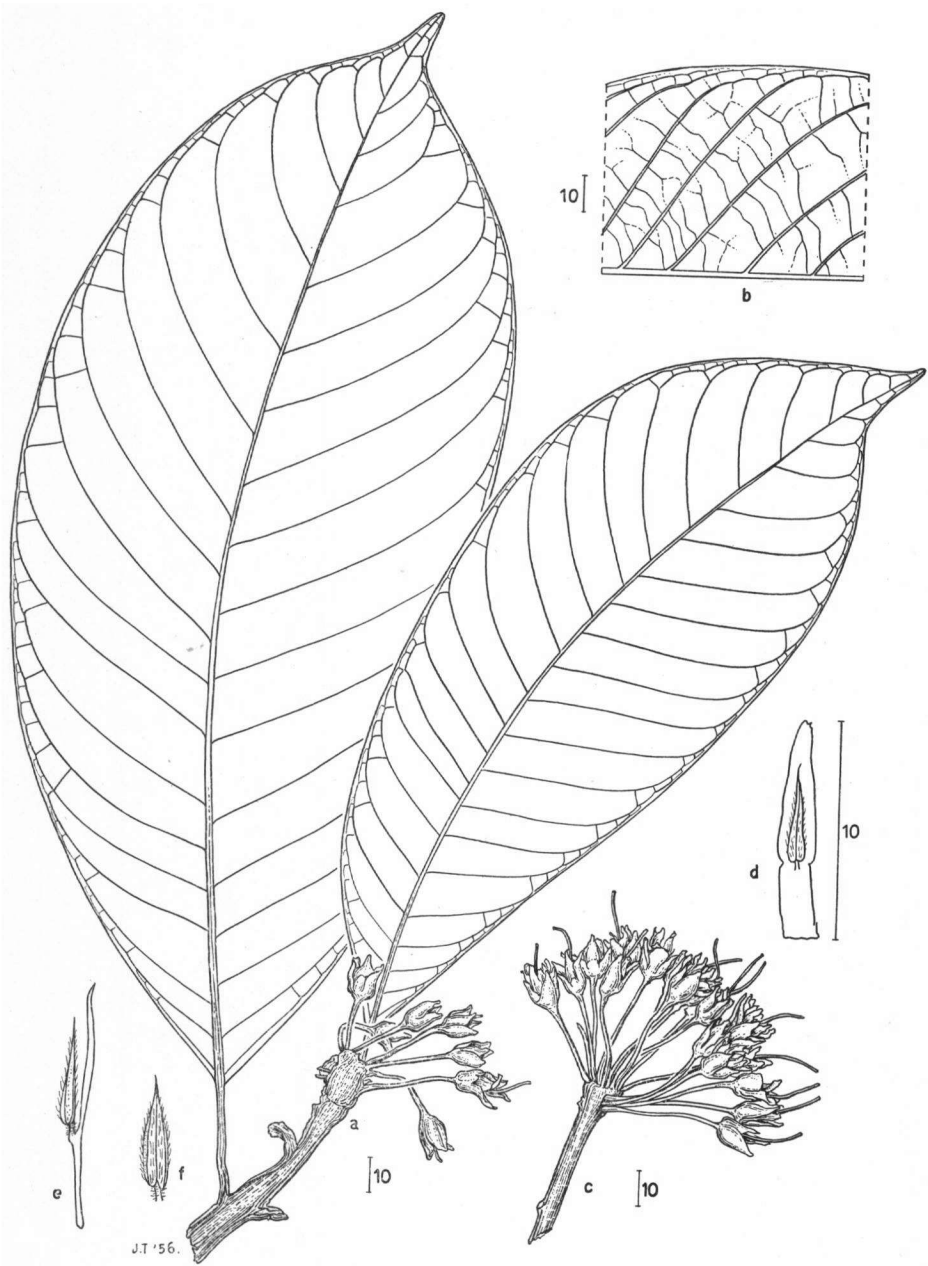


Fig. 6. *Diploknema butyracea*, var. *andamanensis*, a. flowering branchlet with leaves, b. part of leaf with secondary and tertiary nervation, c. top of flowering branchlet, d. part of corolla, with stamen, e. idem, seen from aside, f. anther. (from type specimen).

tree in the hill forests of the Gonda division of the Oudh forests. It flowers from November to January and the seeds are ripe in August.

Distr.: Tibet, India, Bhotan and Nepal.

TIBET. prov. Samling, Nyam Jang Shu, alt. 1800 m, hillside: *Ludlow c. s. 7038* (BM), tree, fr. Nov.

INDIA. Sikkim, without loc.: *Hooker s. n.* (BM, K), fl.; ibidem: *Clarke 27566* (BM), fl. April; Choori P., Yealkung La: *Gamble 2301 A & 2302 A* (K), large tree; Darjeeling, Mongho, alt. 600 m: *Clarke 11902* (BM), fr. June; Darjeeling, Pomong, alt. 1000 m: *Clarke 13629* (BM), tree 13 m, fr. Oct.; Goromara river, Terai: *Gamble 1019 A* (K), April; Great Rangit: *Gamble 7495* (K), fl. Dec.; Mayanghi Khola, alt. 1000 m: *Stainton c. s. 9191* (BM), large spreading tree, fl. white, Oct. — Kumaon, forests of Ramnagar State: *Haines 3982* (K) — Behar, in cultiv.: *Hooker s. n.* (K), fl. — without known province, Balasim valley, alt. 600 m: *Treutler 1054* (K), fl. Nov.; below Bheemtal, alt. 1300 m: *Madden s. n.* (K) — without locality: *Casey s. n.* (K), fl.; ibidem: *Falcomer s. n.* (K), juv. fr.; *Hawulbangh 564* (K).

NEPAL. Sikar, Karnali valley, alt. 1600 m: *Polunin c. s. 3975* (BM), tree 16—20 m, fr. green, Sept.; Sarju river, alt. 1000 m: *Strachey & Winterbottom 1* (BM, K) & 2 (K), fl. & juv. fr.; Phewa Tal, alt. 800 m: *Stainton c. s. 5294* (BM), tree 16—20 m, fr. green, May; Baglung, Kali Gandahi river, alt. 800 m: *Stainton c. s. 7005* (BM), tree 10 m, fl. creamy, Sept. — without locality: *Wallich HP 4164* (BM, K), fr.

BHOTAN. Khoma, Khoma Chu, alt. 1500 m: *Ludlow c. s. 21244* (BM), tree 10 m, fl. white, Sept.; Mirichoma Dimpu, alt. 1100 m: *Cooper 1066 & 3664* (BM), tree 10 m, juv. fr. July & fl. Nov., white, scented; Baolein: *Griffith 2279* (BM, K), juv. fr.

Without locality: *Griffith 2280* (BM) & *3604 (3607?)* (BM, K, S), fr.; *Roxburgh s. n.* (BR, K), fl.

Remarks: The fruits are described from *Gamble 2302 A* in K.

Var. *andamanensis* van Royen, nov. var.<sup>1)</sup> — *Fig. 6.*

Calyx ferruginously sericeous within, lobes acute at apex, corolla-lobes narrowly ovate, stamens c. 18, filaments c. 2 mm long, densely brownish woolly, anthers with long brownish hairs.

Type specimen: *Parkinson 376* in K.

Ver. name: hill-mohwa.

Distr.: Andamans.

ANDAMANS. Mid Andaman, Ali-Masjid-Reserve: *Parkinson 376* (K), fl. March.

6. *D. siamensis* Fletcher, Kew Bulletin 1937, 379 — *Fig. 7.*

Trees, c. 10 m high. Branchlets terete, 8—15 mm in diam., striate, brownish sericeous, glabrescent. *Leaves* scattered, obovate or elliptic, 20—45 by 7—18 cm, apex short obtusely acuminate, acumen up to 1 cm long, base cuneate, oblique, the margins decurrent along adaxial side of the petiole; glabrous, nitidulous above, dull below, chartaceous-coriaceous; midrib deeply grooved above, prominent below, secondary nerves 14—17, ascending at an angle of 40°—50°, slightly curved and archingly joined, but sometimes the more basal nerves diminishing until inconspicuous, slightly grooved above, prominent below, tertiary nervation transverse, with a minute reticulation in between, prominulous on either side but stronger so below; petioles

<sup>1)</sup> *Diploknema butyracea* (Roxburgh) H. J. Lam, var. *andamanensis* van Royen, nov. var. — Calycis lobi apice acuti, intus ferrugineo-sericei. Corollae lacinae anguste ovatae. Stamina c. 18, filamentis c. 2 mm longis, pilis fuscis dense lanatis, antheris pilis fuscis longe setosis.

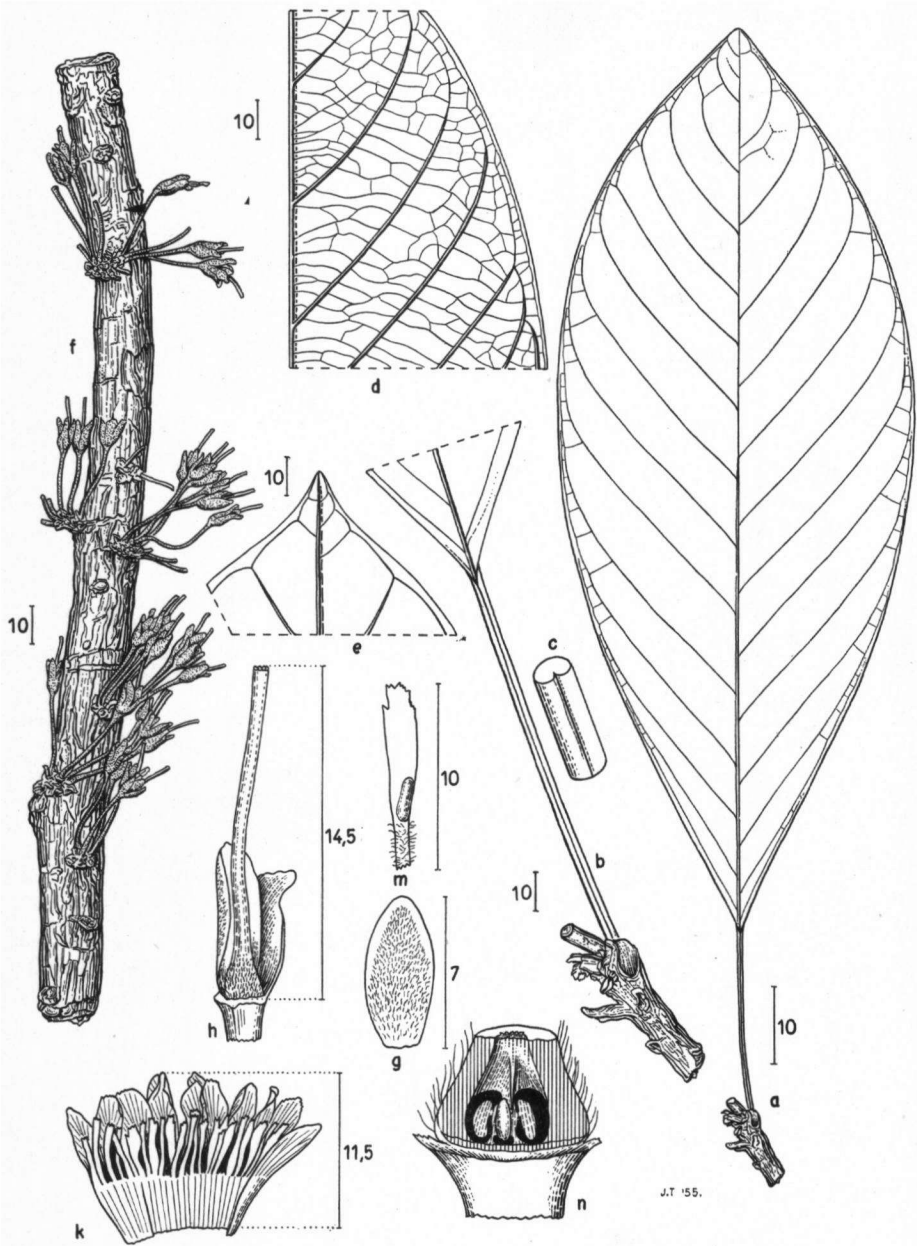


Fig. 7. *Diploknema siamensis*, a. top of branchlet with leaf, b. petiole, c. part of petiole, enlarged, d. part of leaf with secondary and tertiary nervation, e. apex of leaf, f. part of flowering branchlet, g. sepal, outside, h. gynaecium, k. part of corolla, inside, m. staminode, n. longitudinal section of ovary. (from *type specimen*).

terete, 4—12 cm long, deeply grooved above, brownish puberulous, glabrescent. *Flowers* ♂ or unisexual, in 4—10-flowered clusters on distinct prominent warts below the leaves in the axil of lanceolate-triangular, 2—3 by 1—2 mm large, acute bracts, which are ferruginously sericeous on either side; pedicels angular, c. 2 cm long, apex incrassate, ferruginously sericeous. *Sepals* ovate or lanceolate, 6—7.5 by 4—5 mm, apex subacute or obtuse, ferruginously sericeous without, margins woolly, glabrous within except in the apical part. *Corolla* 10—12 mm long, tube 3—4 mm long, lobes 14, obovate or oblong, 7—8 by 1.5—2.5 mm, apex obtuse, irregularly crenulate. *Stamens* not seen. *Staminodes* 26—28, irregularly spatulate or oblong, 4.5—6.5 by 0.5—1.5 mm, apex rounded, entire or irregularly dentate, basal part brownish woolly. *Ovary* conoid, c. 2.5 by 2.5 mm, densely ferruginously velutinous, 9-celled, with anatropous ovules; styles angular, 10—15 mm long, sparsely velutinous in the most basal part, apex with 9 distinct stigmas. *Fruits* unknown.

Type specimen: *Kerr 16260* in K.

Distr.: Siam.

STAM. Surat, Chumpawa, Siepyuan, alt. c. 20 m, evergreen forests: *Kerr 16260* (K), tree c. 20 m, fl. creamy white, Dec.

#### Excluded species

1. *D. grandiflora* (Ridley) H. J. Lam, l. c. 1925, 185; Lam, l. c. 1927, 463; Wyatt-Smith, *Man. Mal. Timber Trees* 1954, 47 = *Payena grandiflora* Ridley, *Journ. As. Soc. Straits* 61, 1912, 28; Ridley, *Fl. Mal. Penins.* 2, 1923, 262 = *Payena maingayi* Clarke in Hooker, see van Bruggen, *Blumea* 9, 1, 1958, 104.

2. *D. butyracea* Blanco, *Fl. Fil.* 4, 1880, 125 = *Palaquium* sp.?

As the material is sterile, it cannot be decided whether this species is a *Palaquium* or not. It certainly does not represent *Diploknema butyracea* (Roxb.) H. J. Lam.

#### List of collectors' numbers

The numbers between brackets indicate the number of the species in the text.

Barnes 189 (2), 583 (2); Burkill 36605 (4), 36162 (4), 37509 (4); Buwalda 6100 (3); Casey s. n. (5); Clarke 11902 (5), 13629 (5), 10394 (2); Falconer s. n. (5); Gamble 1019 A (5), 2301 A (5), 2302 A (5), 7495 (5); Griffith 2279 (5), 2280 (5), 3604 (3607?) (5); Haines 3982 (5); Hawulbangh 564 (5); Hooker s. n. (5); Kanjilal 3137 (4); Kerr 16260 (6); Knappert s. n. (1); Ludlow c. s. 7088 (5), 21244 (5); Madden s. n. (5); NIFS bb 10166 (3), bb 25965 (3), bb 25974 (3); Parkinson 376 (5); Polunin c. s. 3975 (5); Roxburgh s. n. (5); Stainton c. s. 5294 (5); 7005 (5), 9191 (5); Strachey & Winterbottom 1 (5), 2 (5); Treutler 1054 (5); Wallich HP 4164 (5); Williams 554 (2).

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