

MONOGRAPH OF DAPHNIPHYLLUM (II)⁽²⁾

TSENG-CHIENG HUANG⁽¹⁾

XIII. SYSTEMATIC TREATMENT

DAPHNIPHYLLOALES Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 215.
1954. (sensu stricto).

This is a monotypic order, consisting of the family, Daphniphyllaceae.

DAPHNIPHYLLOACEAE Muell.-Arg. in DC., Prodr 16(1): 1. 1869.

Rhamnaceae, Genera Rhamneaceis affinis, Blume, Bijdr. Fl. Nederl. 17: 1153. 1826.

Euphorbiaceae Baill., Étud. Gén. Euph. 565, t. 21, f. 25-7. 1858.

Hamamelidaceae, tribe Trochodendreen or Daphniphylleen Hallier, Bot. Mag. Tokyo 18: 55-69. 1904.

Trees or shrubs, evergreen, dioecious, rarely polygamodioecious in *D. glaucescens* subsp. *oldhamii*, glabrous, branchlets terete, usually longitudinally canaliculate, smooth or rugose, lenticels usually present, sometimes distinctly elevated, circular or elliptic, petiole scars usually triangular. Leaves simple, alternate, fasciculate, rarely opposite, subverticillate to verticillate, rarely dimorphic, estipulate; blades elliptic, oblong, obovate to ovate, frequently falcate or oblique, rounded, obtuse, acute to cuneate at base, rounded, mucronate, obtuse, acute to acuminate at apex, margins entire or revolute, infrequently dentate near the apex, chartaceous, membranous to coriaceous, green or yellow on both surfaces, sometimes shining above, usually glaucous and papillate beneath, midrib frequently impressed above, prominent or not so beneath. Inflorescences axillary, rarely subterminal, racemiform, axes angulate, terete or flat, sometimes flexuous, pedicels angulate or flat, rarely pendent; bracts on the base of inflorescences in 1-several whorls, imbricate, ovate, triangular or linear-ovate or elliptic, usually caducous, sometimes larger than the flower; calyx none, or when present 3-6 lobes, with imbricate aestivation, campanulate, cupulate or completely divided when mature, lobes variable in size, shape and margin, rarely larger than the androecium or gymnoecium, sometimes articulate, caducous or persistent; stamens 5-14, free or coherent at apex, subsessile or with long filaments, androgynophore rarely present, anthers lunate, oblong, oblong-elliptic, elliptic, broadly elliptic to ovate, compressed or oblique, apex apiculate, triangular, obtuse to emarginate or beaked; staminodia frequently present, rarely articulate, pistillodes rarely present in staminate flowers; ovary globose to elliptic-globose, imperfectly 2(-3-4) septate; each carpel

(1) Associate Professor of Botany, National Taiwan University.

(2) I wish to express my sincere gratitude to Prof. Dr. C. G. G. J. van Steenis, Director of the Rijksherbarium, Leiden, Netherlands, for his help in reviewing the manuscript. I also appreciated very much for the kind suggestion of Dr. W. T. Stearn, British museum, England that one sectional nomenclature, CALYCIFERA, should be changed to DAPHNIPHYLLOUM.

with (1-)2 anatropous ovules; placentation suspended or subapical; staminodia on the ovary usually present; style 1-2(-4) lobes, usually shorter than ovary, stigmas divaricate, revolute, discoid to circinate or versatile; drupes obovoid, elliptic-globose, ovoid to ellipsoid, apex obtuse, base round to obtuse, rarely suddenly constricted base, shining, smooth, rugose to tuberculate, staminodia frequently persistent, style usually persistent. Seed 1(-2), various in shape and size; germination epigeous. Cotyledons two.

A monotypic family, *Daphniphyllum* consists of nine species. In Greek, *daphne* refers to laurel, *phyllon* to leaf, and *Daphniphyllum* to the resemblance to laurel leaves.

DAPHNIPHYLLUM Blume, Bijdr. Fl. Nederl. Ind. 17: 1153. 1826.

(Type: *D. glaucescens* Blume)

Daphniphyllum Hassk. Catal. Pl. Bogor. 2: 232. 1844 (etymological variant).

Gouphia Wight, Ic. Pl. Ind. Or. 5: 22, t. 1878-9. 1852.

(Type: *Gouphia neilgherrensis* Wight.)

Gyrandra Lindl. in Wall., Catal. n. 8020. 1847-9, nomen.

(Type: *Gyrandra neilgherrensis* Lindl.)

KEY TO SECTIONS

- a. Anthers lunate, introrse, coherent at apex, subsessile; calyx persistent, at least, on staminate flowers; drupes strongly tuberculate, usually distinctly glaucous, styles short, erect; stigmas divaricate; blades usually prominently papillate
..... I. LUNATA
- aa. Anthers usually oblong or elliptic, compressed or oblique, extrorse, completely free, with a usually long filament; calyx usually caducous, at least, on drupes or absent; drupes smooth to tuberculate, usually not glaucous; styles and stigmas long, various; blades both papillate and epapillate beneath.
 - b. Calyx 4 to 6 lobes; drupes from lustrous and smooth to rugose or tuberculate; blades usually papillate, chartaceous to coriaceous, all veins prominent and reticulate above..... II. DAPHNIPHYLLUM
 - bb. Calyx absent or rarely 1 to 2 lobes, linear, affixed to the base of stamens; drupes usually tuberculate; blades usually epapillate, membranous to chartaceous, all veins obscure and delicate or impressed above
..... III. STAMINODIA

SECTIO 1. Lunata Huang, sect. nov.

Section *Calycifera* Hurusawa, Jour. Jap. Bot. 18: 157. 1942, ex parte.

Series *Calycifera* (Hurusawa) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 218. 1954, ex parte.

Antherae lunatae, subsessiles, apice cohaerentes; calyx 3-6-lobatus persistens; drupa valde tuberculata saepe manifeste glauca, stylo brevi, stigmatibus divaricatis;

foliorum lamina infra saepe manifeste prominenterque papillata; bracteae pedicelli breviores quam flores, caducae vel persistentes.

Type species: *D. laurinum* (Benth.) Baill.

I have presently accepted three species in this section. But their separation was made mainly on the basis of their different geographical pattern. Morphologically, the distinction among these three species is less distinct, besides, various intermediate forms can be observed from some external characteristics among them. Thus, there is need for further collections from Indochina, Thailand, Burma and Yunnan (China) before I can definitely decide whether the section Lunata consists of three species or of the single species, *D. laurinum* with three subspecies, subsp. *laurinum*, subsp. *calycinum*, and subsp. *majus*.

KEY TO SPECIES

- a. Calyx shallowly divided, 0.6–1(–1.8) mm. long; staminate flowers 1–1.5(–2.5) mm. long, 1–2(–4) mm. wide; Borneo, Sumatra, Malay Peninsula and Bangka 1. *D. laurinum*
- aa. Calyx of free lobes or deeply divided, 1–2 mm. long; staminate flowers 1.5–4 mm. long, 2–5 mm. wide.
 - b. Calyx lobes united basally, especially in mature staminate flowers, usually one-half as long as the stamens; leaves frequently dimorphic, distinctly papillate and glabrous beneath, usually less than 16 cm. long, less than 6 cm. wide; S. E. China and Vietnam 2. *D. calycinum*
 - bb. Calyx lobes free, usually as long as the stamens; leaves monomorphic, evanescently papillate and glaucous beneath, usually more than 16 cm. long, more than 6 cm. wide; Thailand, Cambodia, Vietnam, Laos, Burma, and S. W. China 3. *D. majus*

1. DAPHNIPHYLLUM LAURINUM (Benth.) Baill., Étud. Gen. Euph. 565, t. 21.

1858—**Fig. 13.** (Named for its leaves resembling to that of Lauraceae)

Gyrantra laurina Wall., Catal. n. 8020. 1847–9, nomen.

Gouphia laurina Benth. in Hook. Kew Jour. 6: 9. 1854.

Daphniphyllum bancanum Kurz., Natuurk. Tijdschr. Nederl. Ind. 27: 51. 1864 (in Teysmann & Binn., Pl. Nov. Hort. Bogor. Cult. 1864).

Daphniphyllum platiphyllum Merr., nomen.

Shrubs about 1.5–1.6 m. high, trunks 30 cm. in diam., branchlets terete, smooth or canaliculate, brown. Leaves alternate to fasciculate, petioles terete or triangular in section, 3–13 cm. long, 1–2 mm. wide, brown; blades large, elliptic to narrowly elliptic, narrowly ovate, base obtuse to cuneate, apex acute to acuminate or falcate, margins remotely undulate, 11–28 cm. long, 3.5–12 cm. wide, firmly chartaceous, brown on both surfaces, sometimes, papillate and glaucous beneath, lateral veins 10–12, obscure, midrib triangular, impressed above. Staminate Inflorescences racemiform, terete, 1–9

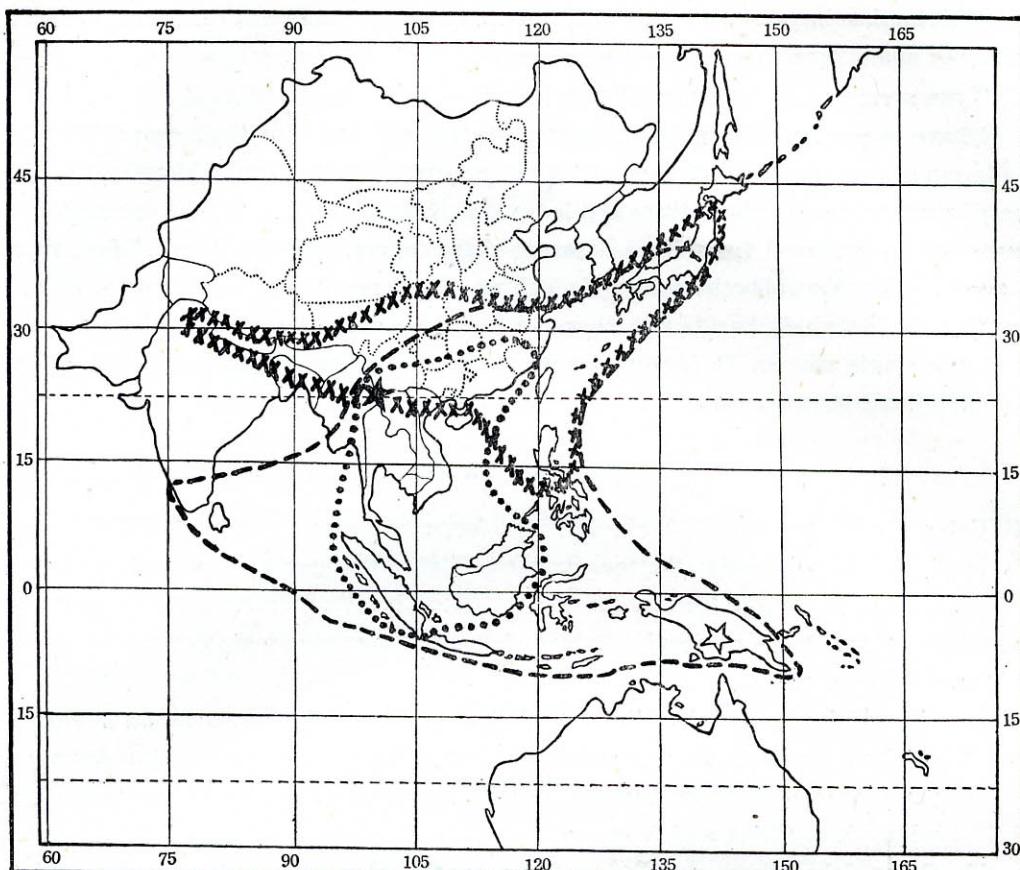


Fig. 10. Revised distributional map of *Daphniphyllum*: section *Lunata* (•••), section *Daphniphyllum* (---), and section *Staminodia* (×××), noting possible center of origin (★) and center of survival (☆).

cm. long, 0.5 mm. wide, pedicels terete, 5–20 mm. long, 0.2 mm. wide, bracts caducous, flowers 1–1.5(–2.5) mm. long, 1(–2–4) mm. wide; calyx 3–4 lobes, united basally, lobes broadly triangular, unequal, serrate, usually one-half as long as the stamens; stamens 8–9, filaments broadly oblong, 0.4 mm. long, 0.1 mm. wide, anthers lunate, non-beaked, 0.3 mm. long, 0.2 mm. wide, rarely pistillodes present. *Fruiting axes* racemiform, terete, finely grooved, 2–4.5 cm. long, 1 mm. wide, pedicels 0.7–1.6 cm. long, 1 mm. wide, brown; bracts caducous; calyx discoid or campanulate, 4 lobes, lobes triangular, unequal, reflexed, united at the base, persistent; drupes elliptic-obovoid, elliptic-globose or ovoid, 0.7–1.2 cm. long, 5–7 mm. in diam., tuberculate, brown, style very short, divaricate, staminodia rarely present.

The species is widely distributed in Sumatra, Borneo, and the Malay Peninsula and it has also been cultivated in Java.

Daphniphyllum laurinum is common on sea shores, in sandy soil, on sandstone rocks, exposed limestone ridges, and among the secondary vegetation near mangrove

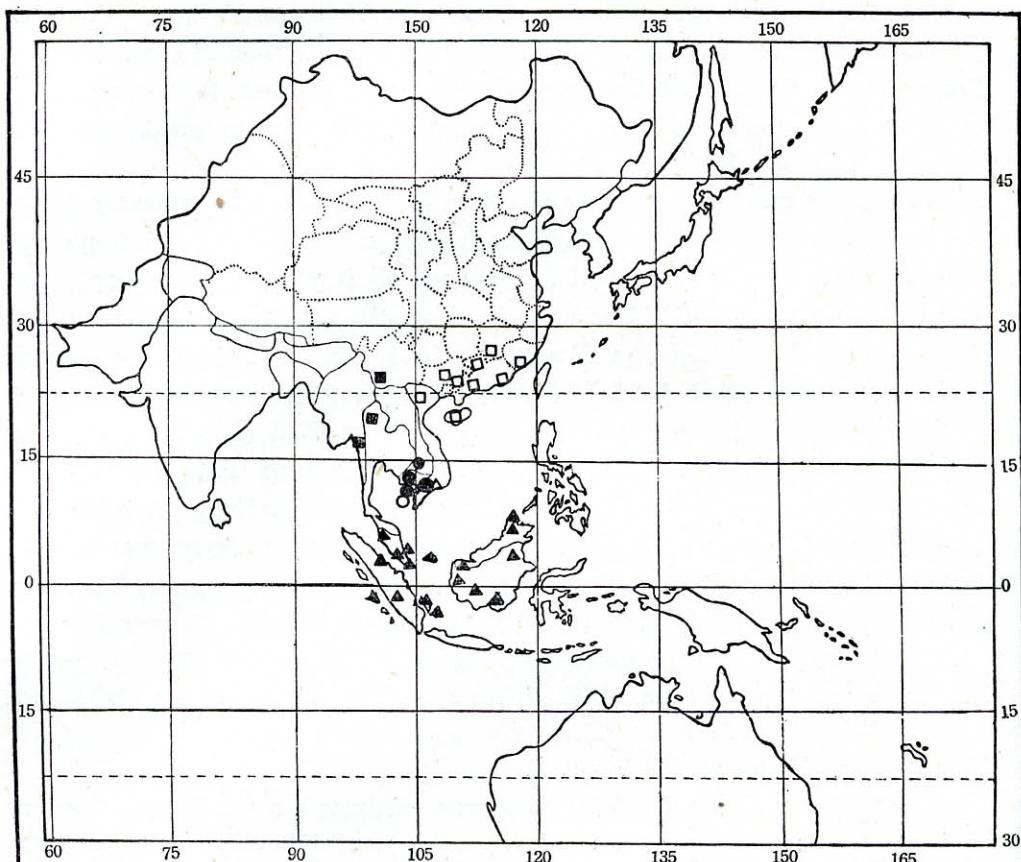


Fig. 12. Distributions of *D. laurinum* (▲); *D. calycinum* (□); *D. majus* var. *majus* (■), var. *phanrangense* (△), var. *pierre* (●), and var. *deciduum* (○).

swamps as well as at forest edges and in high jungle crests at altitudes of from 500 to 900 m. The flowers are white, white-orange, cream-white to yellow-green, and the fruit varies from white to black-red and purple. Based on herbarium collecting data, the staminate flowering period is usually from February to April, but may last until October in Borneo and Java. The pistillate flowering period is from September to March with fruit forming from January and November.

Vernacular names used include: *Krau* in Malaysian, and *Pepetic* or *Peptic* in the Banggi dialect, *Rosakdi-siri* in the Tamanowa dialect, *Kajoe si roep-roep*, and *Medang Siloewang*, these spoken in Borneo.

The following specimens show staminodia on fruits or pistillodes on staminate flowers; presence of staminodia on fruit collected by Abu 3344 (K) at Klumpus in S. Bulik, *Scortechini s.n.* (K) in Perak, ? *Sweklie* 594 (UC) at Changi, Singapore, and an unknown collector *s.n.* (BM) at Malacca; presence of pistillodes on staminate flowers collected by *Burkill s.n.* (US) at Singapore, and *Creagh s.n.* (K) in N. Borneo,

Specimens with large staminate flowers and also large, ovoid, brownish, tuberculate drupes have been collected in Borneo more frequently than in other areas.

Professors van Steenis and Kostermans kindly verified that *D. laurinum* is not native in Java; the specimens from Java mentioned below were collected from plants cultivated in the Bogor Botanic Garden.

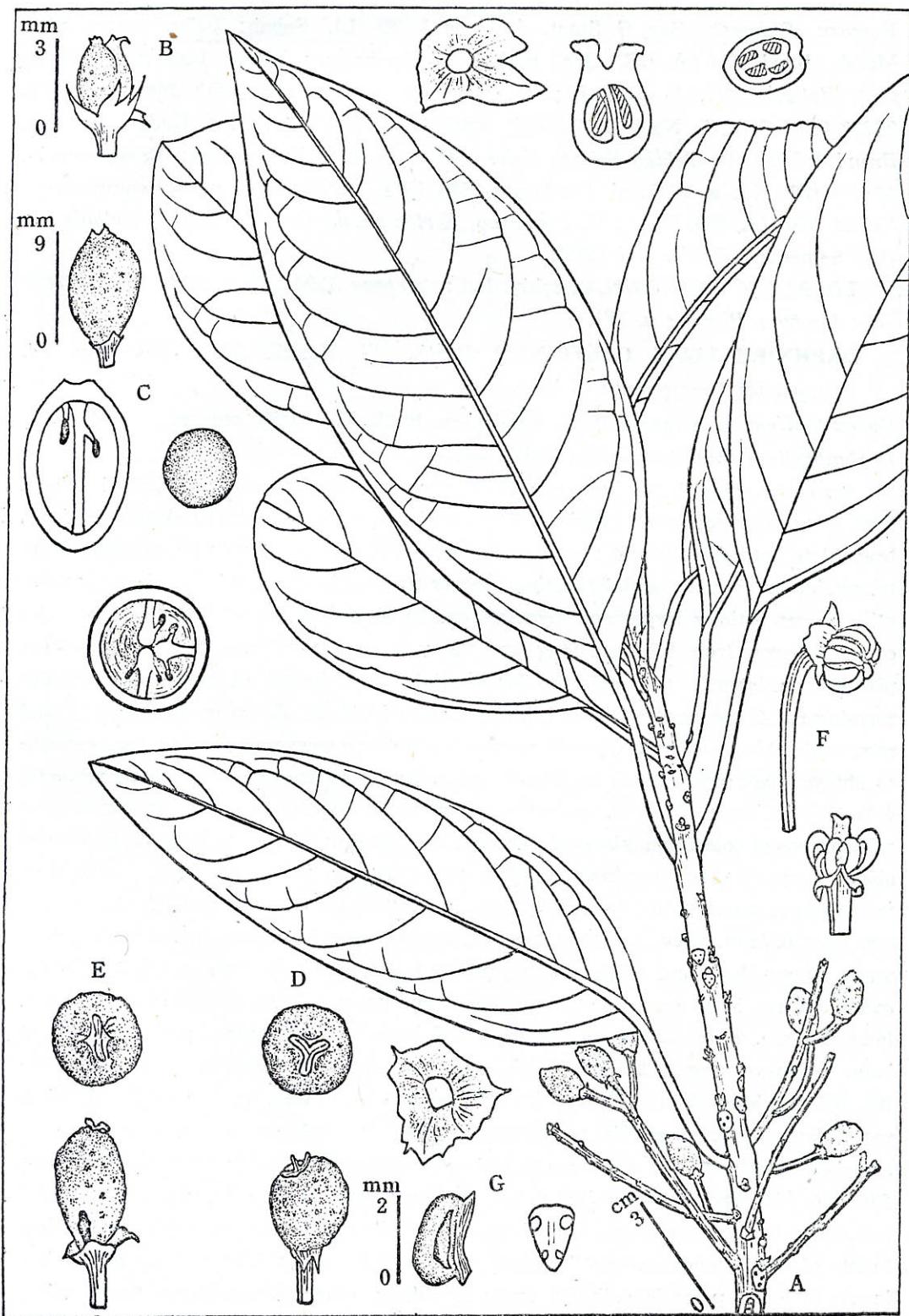
MALESIA. Islands west off Sumatra: **Batu I.**, *Raap* 374 (BO). **Sumatra** proper: Asahan, east coast, vicinity of Hoeta Bagasan, *Rahmat si Boeea* 6891 (A, US, syntypes of *D. platyphyllum* Merr.), 7377 (A, US, syntypes of *D. platyphyllum* Merr.), 7381 (A UC, US), 7699 (A. MICH); Hochangkola, *Junghuhn s. n.* (L); Kota Pinang, Sub-division Laboehan Batoe, *Rahmat si Toroes* 4125 (A, L, NY, UC, US); Langga Pajoeng, *Rahmat si Toroes* 3284 (A, NY, UC, US); Lubuk Bangku, 20 km. north of Pajakumbuh, *Meijer* 5273 (L); Taram, east of Pajakumbuh, *Meijer* 6719 (L); Mt. Sago, near Pajakumbuh, Hutan Batu Badinding, *Maradjo* 206 (L); from Pajakumbuh 28 km. towards Pakan Baru, *Jacobs* 4621 (L); *Marsden s. n.* (K); Sidjundjung, *Teysmann* 1006 (BO); Palembang, *Teysmann* 3831 (BO); Tarabangion, Sampong, *Teysmann s. n.* (BO); *Forbes* 3132a (K, L); Palembang: *Gusdorf* 38 (BO). **Bangka**: Lobok besar, *Kostermans & Anta* 661 (A, BO, L, PNH), 1059 (BO, L), 1079 (BO); Muntok, *Bünnemeijer* 1463 (BO, L), 1481 (BO), 1829 (BO), 1863 (BO); Bladju, *W. Grashoff* 81 (BO, L); precise locality unknown: *Berkhout s. n.* (BO), *Kobus s. n.* (BO), *Teysmann s. n.* (BO), 3316 (BO), 3453 (BO).

Billiton: Billiton, *Teysmann HB* 17560 (BO).

Java (see note above, all derived from specimens cultivated in the Botanic Gardens, Bogor, imported from Sumatra): *Bakhuisen van den Brink* 3010 (BO), *Jong* 2665 (BO), *Backer* 26011 (BO, L), Preanger, *Ploem s. n.* (L), Bantardjati, *Boerlage s. n.* (L), *Teysmann s. n.* (BO, US, type specimens of *D. bancanum* Kurz), 71867 (L).

Malay Peninsula: Malacca, *Griffith s. n.* (BM, GH, K), 4915 (A, GH, K), 4916 (K), *Harvey s. n.* (K), *Maingay* 1419 (K); Ayer Panas, *Holmberg* 667 (BM); Bukit Bruang, *Holmberg* 716 (A), 719 (BM), 10116 (BM); Perak, Larut, *King's collector* 4323 (K), 5707 (L), 6127 (BM, US), 10116 (BM), *Scortechini s. n.* (BO), 226b (L); Selangor, Kuala Lwaffer, near Kelass, Kause and Museum, *Ridley s. n.* (K); Setul, *Ridley* 14963 (BM, K); Pahang, The gap, near Raul, *Burkill & Haniff* 16804 (BO, K); Pulau Tioman, G. Kajang, *Henderson* 21653 (A, BO, K), *Kiah & Strugnell* 23935 (BO, L); Singapore: *Wallich* 1836 in DC. 8020 (K, lectotype, BM, E, K, isolectotypes); Changi, *Ridley s. n.* (BM, UC), 1816 (BM), 1893 (BM), 3436a (K), *Sweklie* 524 (UC), 594 (UC); Negri Sembilan, foot of Tamping hill, *Burkill* 799 (BM), 2523 (BO). Anambas Islands: Jemaja, padang in w. Letong, *Henderson* 20323 (A, BO, K, UC).

Fig. 13. **Daphniphyllum laurinum** (Benth.) Baill. A: Twig with fruits (*Wallich* 1836, K); B: Ovary, longitudinal and cross sections, and calyx (*Hervey s. n.*, K); C: Fruit and longitudinal section, and seed (*Wallich* 1836, K); D: Tricarpellate fruit, cross section and top view (*Clemens* 30674, NY); E: Bicarpellate fruit with a staminodium and top view (*Scortechini s. n.*, K); F: Staminate flower (*Wallich* 1836, K), and a second staminate flower with a pistillode (*Creagh s. n.*, K); G: Stamen, anther in cross section and a staminate calyx (*Wallich* 1836, K).



Borneo: Sarawak: Bau, G. Staat, *Anderson* 15286 (L). Sabah: Balembangan, near Marsh, *Wood* 1724 (A, UC), 1767 (BO, UC); Jambangan Island, *Cabiling* 3923 (A, UC), *Valera* 4831 (L), 4836 (L); Mt. Kinabalu, *Clemens s. n.* (BO), 26819 (A, NY), 26822 (A, BO, K, L, NY), 30674 (L), 35035 (L), 40553 (A, K); Kudat, Lagatan, *Brand* 30945 (L); Telaga Kudat, *Valera* 4831 (K, L). Kalimantan: Bandjermasin, *Motley* 870 (K); west Kutai, *Posthumus* 2140 (BO), 2213 (BO), near Benuwa-tuwa, *Endert* 1576 (A, BO, K, L); G. Pamatton, *Korthals s. n.*; G. Sakumbang, *Korthals s. n.* (L); Semedum, *Hallier* 691 (BO).

LOCALITY UNKNOWN. Archip. Ind.: *Tiepena* 3390 (BO); Herb. Hooker 7612 (K); Muuvoq, *Pierre s. n.* (P).

2. DAPHNIPHYLLUM CALYCINUM Benth., Fl. Hongk. 316. 1861—**Fig. 14.**

(Named for the presence of its calyx).

Daphniphyllum calleryanum Baill., Étud. Gén. Euph. 565. 1858, nomen.

Daphniphyllum gaudichaudianum Baill., loc. cit., nomen.

Shrubs or trees, 2–2 m. high, trunks erect or sparsely branched, 6–45 cm. in diam., bark gray, pale yellow or grayish-yellow, with numerous circular or elliptic lenticels, branchlets both smooth and rugose, reddish-brown, yellow, dark red, petioles scars triangular or circular, with 3 bundles. Leaves frequently dimorphic, fasciculate, those with longer petioles larger and desposed on the upper position of branchlets, petioles of small leaves from 0.2–2 cm. long, and those of large ones from 2.5–6(–9) cm. long, petioles consistently flat, sulcate above, slightly thickened at both ends, usually forming ca. 45° upward with branchlets, then twisted ca. 45° up or downward, 1–1.5 mm. wide; blades elliptic, obovate, narrowly elliptic to narrowly obovate, base cuneate to obtuse, apex mucronulate to broadly mucronate, margins entire or slightly revolute, 4–11(–21) cm. long, 1.2–4(–9) cm. wide, chartaceous to membranous, drying with a wide range of coloration, glaucous and papillate beneath, lateral veins 9–12, impressed above, some having prominent veinlets revealing the reticulate form. Staminate inflorescences racemiform, flat, 4–5(–7) cm. long, 0.3–0.4 mm. wide, pedicels flat, 0.7–0.9 cm. long, 0.2 mm. wide, bracts at base of inflorescences imbricate in 2 whorls, ovate, up to 1.5 mm. long and wide, usually persistent, bracts at base of the pedicells solitary, ovate, 1.5 mm. long, 2 mm. wide, persistent; mature staminate flowers ovate, 2–4 mm. long, 2–4 mm. wide; calyx campanulate, 4–5 lobes broadly ovate, partly united at base, 2–3 mm. long, 1–2.5 mm. wide, serrulate, unequal; stamens 8–10, filaments flat, 0.5 mm. long, 0.2 mm. wide, anthers lunate, 1.6–2.1 mm. long, 0.3–0.7 mm. wide, verticillate, introrse, erectly to reflexed beaked in each stamen two anther sacs attached directly to the median connective, the other two adhering to the first pair. Pistillate inflorescences racemiform, 1–2 cm. long, 0.8–1 mm. wide, pedicels flat, 5–7 mm. long, 0.5 mm. wide, bracts solitary, ovate, yellowish-brown, sometimes persistent, bracts of basal inflorescences imbricate in 3 whorls, about 1.5 mm. long and wide, bracts of basal pedicels solitary, ovate or oblong, about 1.5 mm. long, 2 mm. wide,

caducous; calyx usually free, (3-)4-5 lobes, lobes about 1 mm. long, 1.5 mm. wide, usually acute at apex, margins entire or serrulate; ovary elliptic-globose, style very short, erect, discoid or divaricate. *Fruiting axes* angulate, 1-2(-5) cm. long, 0.5-1.6 mm. wide, pedicels angulate, 5-7 mm. long, 0.3-0.6 mm. wide; calyx lobes persistent; drupes elliptic-globose, distinctly tuberculate, grayish to yellowish, 6-9(-11) mm. long, 3(-6) mm. in diam., style very short, erect. *Seeds* usually single, elliptic, 6 mm. long, 3 mm. wide, dark.

Fairly common in South China, the species ranges from the islands of Lantau, Hainan and Hongkong, to the continental provinces of Kwangsi, Kwangtung, Kiangsi and Fukien, and to the northern parts of Vietnam. It grows on roadsides, forested ravines, hillsides, and as undergrowth in dense mixed woods from elevations of 150 m. to 1800 m. Flowering begins in April. The staminate flowers are variously colored from pink, purplish-white, light reddish to white, while pistillate flowers have pale green calyces and green, white or black fruits.

Vernacular names have been reported as follows: in Kwangsi, *Ngau I Fung Shue* (牛耳公樹) and *Chii Too Muk* (豬肚木); in parts of Kwangtung, *Ngau I Kung Muk* (牛耳空木), *Chue Luk Muk* (猪肚木), *Nagu I Hung* (牛耳空), *Ap Keuk Shue*, (鴨脚樹), *Ngau I Fung* (牛耳楓, 牛耳風), *Ngau I Ling* (牛耳菱), *Heo-pe* (葉白); and in Hainan, *Ngau Sun Fung* (牛身楓).

On his herbarium labels *Lei 61* (UC) reported used of wine soaked leaves on wounds in the vicinity of Hainan, while *Chan 14070* (A) ascribed medicinal value to the plant in Kwangtung.

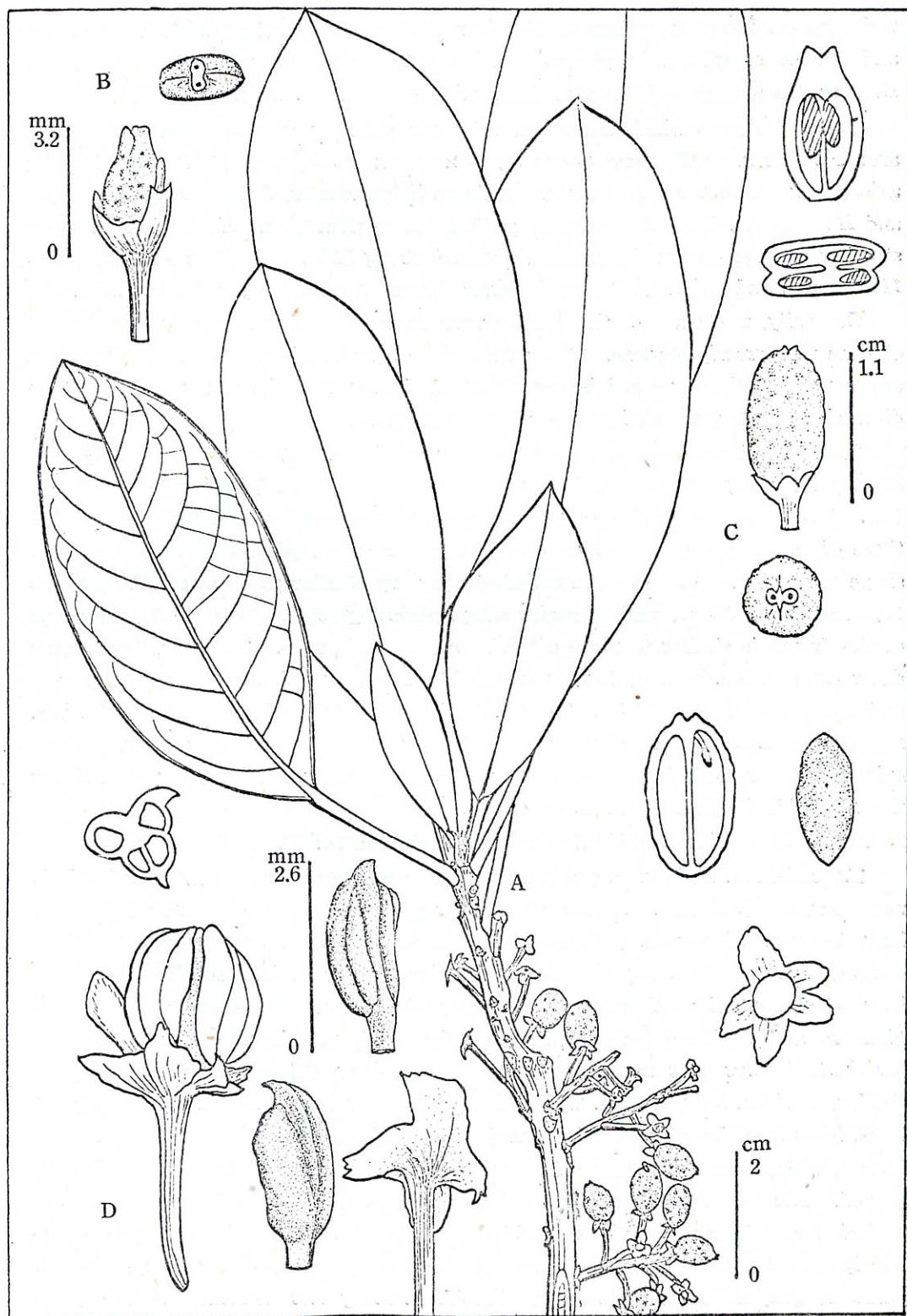
VIETNAM. Tonkin: *Pételot 4683* (NY, US); Phu-ly, *D'Alleizette s. n.* (L); Prov. de Thai-Nguyen, *Pételot 6811* (A); Hanoi & Bae-niuh, *Balansa 4429* (A), 4583 (P), 4679 (A); Haut Dayaii, *Poilane 21747* (A); precise locality unknown, *Poilane 21927* (A, UC).

CHINA. Fukien: Chuanchow, *Chung 1070* (UC). Kiangsi: Kiennan district, Sai Hang Cheung, near Tung Lei village, *Lau 4002* (A, US); Lungnan district, *Lau 4492* (A, BM, US); Wong Sa Shue, *Gressitt 1633* (A, BM, E, MO), 38169 (TAIF); Su Chuan, Linghow, *Hu 51912* (A). Kwangsi: Se Tze Shan, near Tung Chung village, *Tsang 23343* (A); Shap Man Taai Shan, Nam She village, *Tsang 24798* (A, F, MO, NY), 24217 (A, F, MO, NY), 22143 (A, BM); Swe-Chner and southward roadside, *Hu 885* (A); Ta Tse Tsuen, Yung Hsien, *Steward & Cheo 769* (A, BM, BO, NY); Tang Gior Poo, southeast of Luchen, *Ching 3244* (A, US); Tian Chen, north foot of Seh-feng, War Shan, *Ching 7801* (A, NY, UC, US); Wuchow, *Tsoong 3711* (A), 81724 (A); Yao Shan, *Wang 40657* (A). Kwangtung: Yun-fon, *Wang 37503* (TAI); Suri, *Wang 38169* (TAI) Chang Riang to Cheng Rou, *Chun 6104* (A); Chong Uen Shan, near Kau Fung, *Tsang 20879* (A, BO, MO, UC); Fang Cheng district, Kung Ping Shan, Taan Faan, *Tsang 26869* (A, K); Huang Chuk I and vicinity, Tsing Wan Shan, *Lau 2170* (A); Ho-yuen district, Nam Shan, *Tsang*

28724 (A), *Tso* 21556 (NY); Hwei-yang district, Lin Fa Shan, Sam Hang Shek T'au village, *Tsang* 25925 (A); Kam Ngau Haang, Nan Kong Han, *McClure* 13609 (UC); Supai, Central University, *Hosokawa* 10003 (TAI), 10474 (TAI); Kowchow, *Tsiang* 933 (A, E, UC); Moliangling, *Tsiang* 2241 (NY); Lai Ka Shan, *Tse* 10 (A); Lin district, *Levine* 3367 (A, MO, US); Lin Chow, Yang Shan and vicinity, *Tsui* 431 (F, MO, NY, US), 635 (A, K, MO, NY); Lu village, Lung Tau Shan, *To*, *Tsang* & *Tsang* 12443 (E, UC, US); Tsing Uen Mt. of Lung Tong Hue, *Tak* 11805 (UC); Lochang, Sie-kun, *Tsiang* 1461 (A, E, US); Lok Chong, *Tso* 20409 (BO, E, NY TAI), 20490 (NY), 20554 (NY); Lung Chun district, *Tso* 21610 (NY); vicinity of Hooyuen, *Tso* 21556 (NY); Lung-men district, Naam Kwan Shan, Sheung Ping village, *Tsang* 25418 (A); Miu-yen district, *Chan* 14070 (A); Kaying, *Gressitt* 1310 (A, E, MO), 1421 (A, E, MO); Pak Wan Cheung, *Tsui* 117 (A, K, NY, MO); Pei Yun Shan, *Tsiang* 1596 (A, E); Pok-lo district, *Tsui* 79 (F, NY); Lofoushan, *Tsiang* 1687 (A, BO, E TAI), *Merrill* 10225 (A), 10946 (A, NY, UC), *Levine* & *McClure* 7005A (F, US); Schautachou, *Adiw* 346 (A); Sin-fung district, Sha Lo Shan, Lo Lo Ha village, *Taam* 1066 (A); Wa Mei Tong village, *Taam* 168 (A); Ah Po Kai Shan, Cha Ping village, *Taam* 615 (A); Taai Ue Shan, *Tsang* 16518 (A, F, MO, US); Ting Wu Shan, *Chun* 6428 (A, E, UC, US); Wan Tong Shan, *Tsui* 353 (A, K, MO, NY, US); Wung-yuen district, Yung Yung city & vicinity, *Lau* 618 (A, NY), 24123 (TAI), 24472 (TAI); Wah Uk, Taai Tsan, *Tsang* & *Wong* 14248 (UC), *Tsiang* 1983 (UC); Precise locality unknown, *Levine* s.n. (A), 361 (A, US), 669 (A, F, MO), 1624 (A, E, GH, MO, US), 2080 (A, MO), 2342 (E, P), *McClure* 147.4377 (A, MO, NY), *Reeves* 57-151 (NY). **Hainan:** *Konishi* 21983 (UC); Liamui, *Gressitt* 1169 (A, BM, E, MO); Ling Warn, *Henry* s.n. (K); Po Ting, *Hw* 71894 (A); Manning, *How* 73028 (A); Pak Sik Ling, Ku Tung village, *Lei* 61 (BO, F, L, NY, P, UC); Tingen, *Lau* 28120 (A). **Hongkong:** *Bodinier* 604 (E); *Chapion* 184 (K, syntype), *Coulter* 320 (F), *Forbes* s.n. (BM), *Ford* s.n. (NY), *Hance* 1523 (BM, syntype), *Mipred* s.n. (NY), *Seemann* 2448 (K, lectotype, BM, isolectotype), *Tse* 20095 (K, NY), *Wilford* s.n. (GH, K, syntype), *Setchell* & *McClure* s.n. (UC), *D'Alleizette* s.n. (L); Huang Tse Kong, *Tsiang* 159 (A, E, UC, US); Palang, *Tucher* 10756 (K); Peak, *Tsiang* 360 (A, E, UC); near Sai Wan, *Lament* 674 (BM); Saiwan, *Taam* 2204 (F, UC); Satin, *Chun* 4933 (UC), 6850 (K, UC); Kowloon, *Kao* 6571 (TAI). **Lantao island:** Hsak Biak, *Chun* 4800 (UC), 4889 (UC). **Macao:** *Callery* 77 (P, type of *D. calleryanum* Baill.), *Gaudichaud* 245 (P, type of *D. gaudichaudianum* Baill.), 275 (L, type of *D. gaudichaudianum* Baill.), *EmWeip* 2770 (BO), 3441 (BO).

In spite of its polymorphic leaves, few taxonomists have misidentified collections of *D. calycinum*. The species is distinguished by its leaves which are firm, glaucous

Fig. 14. *D. calycinum* Benth. A: Twig with fruits (*Seemann* 2448, K); B: Ovary, top and side views, and longitudinal and cross sections (*Champion* 184, K); C: Fruit, top and side views, longitudinal section, seed, and calyx (*Forbes* s.n., BM); D: Staminate flower, calyx, stamen in dorsal and ventral views, and anther in cross section (*Hance*, 1523, BM).



and papillose beneath; anthers lunate, introrse, coherent at tips; style very short; and drupes conspicuously glaucous and tuberculated with persistent calyx-lobes. Even so, the species is difficult to distinguish from *D. laurinum*.

Some specimens which are noteworthy for showing specific types of variation are: *Forbes s.n.* (BM), largest drupes, 11×6 mm.; *Tsui 431* (US), longest fruiting axis, 5 cm.; *Taam 615* (A), longest staminate inflorescences, 7 cm.; *Tsang 28724* (A) and *Hu 885* (A), longest staminate pedicels, more than 1 cm.; *Hu 885* (A), largest staminate flowers, 4 mm. long and wide; and *Tsang 16518* (A), *Chun 6104* (A), *Tak 11805* (UC), and *Lei 61* (UC), small leaves, less than 9 cm. long and 4 cm. wide.

Generally, the leaves of this species vary from elliptic to narrowly elliptic and obovate to narrowly obovate. The fruits collected from Hainan and Kwangsi province are more round in shape and larger than that known from the other provinces. The dimension of the perianth is not a diagnostic feature.

Some specimens may be considered as varieties of *D. calycinum*, namely *How 72897* (A), *Liang 62698* (NY), *Ching 5244* (A, US), 5366 (NY, UC) and *Wang 40932* (A). These fruiting specimens possess some characteristics intermediate between those of *D. calycinum*, *D. laurinum* and *D. majus* subsp. *phanrangense*. While the shape of the leaves of those five collections is very similar to those of *D. laurinum* (*Clemens 26819*, 35035) and *D. majus* subsp. *phanrangense* (*Poilane 10009*), the shape of the drupes is similar to those of *D. laurinum* in Borneo. These five specimens differ from *D. laurinum* by having free calyx lobes, conspicuously glaucous leaves and fruits, and shorter blades. They are also distinguishable from *D. majus* var. *majus* (*Cavalerie 1040*, E) by their glaucous leaves and entire calyx lobes. In my opinion, further study is necessary before new, distinct varieties are proposed for these individual specimens of *D. calycinum*.

3. DAPHNIPHYLLUM MAJUS Muell.-Arg., Linnaea 34: 76. 1865.

Trees, 5–10 m. high, trunks 30 cm. in diam., branchlets terete, straw-color, lenticels numerous, small, elevate. *Leaves* alternate, petioles terete, finely sulcate, 3–11 cm. long, 1–3 mm. wide, pale yellow; blades large, elliptic or angular-ovate, slightly oblique, base cuneate, apex acuminate, margins flat or slightly revolute, 11–29 cm. long, 4.5–13 cm. wide, chartaceous to firmly chartaceous, green on both surfaces, glaucous and papillous beneath, lateral veins 9–15, prominent on both surfaces. *Staminate inflorescences* racemiform, flat, 2–6 cm. long, 0.2 mm. wide, pedicels flat, slender, 1–2.5 cm. long, 0.1 mm. wide; flowers 2.5 mm. long, 3.5 mm. wide; calyx 4 lobes, lobes free, broadly elliptic, serrulate, sometimes unequal, about 2 mm. long, 1.6 mm. wide; stamens 12, subsessile, anthers lunate, 2.2–3.5 mm. long, 0.8 mm. wide, beaked. *Pistillate inflorescences* racemiform, angulate, 3.5–5 cm. long, 2 mm. wide, pedicels flat, 1–1.5 mm. long, 1 mm. wide; calyx 3–5 lobes, free, lobes elliptic, often widely so, apex usually broadly obtuse, serrulate, ovary globose, distinctly tuberculate, glaucous, grayish black, style short, discoid. *Fruiting axes* flexuous, 3.5–4.5(–7) cm.

long, 2 mm. wide, pedicels terete, dilated on upper end, 1.7–2 cm. long, 1 mm. wide; calyx 4–5 lobes, lobes ovate, oblong, deeply divided, unequal, serrulate, 2 mm. long, 1.5 mm. wide, persistent; drupes ellipsoid, rotundate on both ends, tuberculate, 1–1.2 cm. long, 6 mm. in diam., black, style discoid or divaricate.

The species is found at altitudes from 1130 to 1540 m. in thickets or evergreen jungle having deep humus soil.

KEY TO VARIETIES

- a. Calyx lobes persistent.
 - b. Calyx lobes oblong-elliptic or broadly elliptic, obtuse apex, regularly serrulate margins; leaves distinctly glaucous beneath; Burma, Thailand, and China
..... 3a. var. *majus*
 - bb. Calyx lobes narrowly elliptic or broadly elliptic, acute to acuminate apex, entire or irregularly serrate margins; leaves brownish-green beneath.
 - c. Calyx lobes broadly elliptic; leaves ovate-elliptic, 8–13 cm. wide; Vietnam
..... 3b. var. *phanrangense*
 - cc. Calyx lobes narrowly elliptic; leaves narrowly ovate-elliptic, 5–8 cm. wide; Cambodia, Laos and Vietnam 3c. var. *pierrei*
 - aa. Calyx lobes caducous; Cambodia 3d. var. *deciduum*
- 3a. DAPHNIPHYLLUM MAJUS** var. **MAJUS** (Named for the large size leaves.)—

Fig. 15.

Daphniphyllum latifolium Rosenth. in Engl., Pflanzenreich 68(IV. 147a): 12. 1919.

Daphniphyllum longipes Craib, Kew Bull. 1924: 97. 1924.

Daphniphyllum candelabrum Croizat & Metcalf, Ling. Sci. Jour. 20: 110. 1941.

The holotype, Wallich 7805, collected near Amherst, Burma is deposited in the Herbarium at Kew and was not available for examination, but a photograph of a type specimen from the Kew Herbarium was studied. I cannot separate *D. majus* from *D. latifolium*. That the taxa *D. longipes* and *D. latifolium* are conspecific is so obvious that no additional discussion is necessary. After critical study of leaves and calyx lobes, I consider, moreover, that *D. candelabrum* is merely one of the synonyms of *D. majus*. In this study, it was noted that pistillate plants of *D. majus* have never been collected in Burma nor the staminate plants in China. *Daphniphyllum majus*, *D. latifolium*, and *D. longipes* were described from staminate specimens, while *D. candelabrum* was described from fruiting specimens only.

BURMA. Amherst: Wallich 7805 in part (K, photo of type).

THAILAND. Doi Suthep: Kerr 1816 (K, syntype of *D. latifolium* Rosenth.), 3592 (E, K, type of *D. longipes* Craib); Chiengmai, Sörensen, Larsen & Hansen 3090 (K).

CHINA. Yunnan: Fo Hai, Wang 74475 (A); Szemao, Henry 12793 (A, K, MO, NY, types of *D. candelabrum* Croizat & Metcalf); Precise locality unknown, Cavalerie 1040 (E156, E178).



The specimens collected by Cavalerie (1040) represent an intermediate form between *D. calycinum* (How 7289, A), *D. majus* var. *majus* and, var. *phanrangense*, because they share the leaf shape with *D. calycinum*, a similar leaf texture and shape known for var. *phanrangense*, and a regularly serrulated calyx lobe found for var. *majus*. More collections should be examined and questions involving hybridization must be resolved before such specimens can be considered as belonging to a definite taxon of *D. majus*.

3b. DAPHNIPHYLLUM MAJUS var. ***phanrangense*** (Gagnep.) Huang, stat. nov.
(Named for the Phanrang province.)—Fig. 16.

Daphniphyllum phanrangense Gagnep., Bull. Soc. Bot. Fr. 72: 465. 1925.

VIETNAM. Data: Evrard 2001 (A). Phanrang: Trai-ca, Poilane 10,008 (A, syntype), 10,009 (P, lectotype, A, BM, E, NY, UC, US, isolectotypes).

It is still problematical whether var. *phanrangense* should be considered a synonym of *D. laurinum* or a representative of hybridization between *D. laurinum* and *D. calycinum*. The division of calyx lobes is similar to that of *D. calycinum* and *D. laurinum*, but the size of staminate flowers is similar to that of *D. majus* var. *majus*, and *D. calycinum*. The shape of leaves in the type pistillate specimens resembles the leaf shape of *D. majus* var. *majus*, but the texture resembles that of *D. laurinum*. I suggest that this taxon may be composed of two different entities: staminate branches may belong to either *D. majus* var. *majus* or *D. calycinum*, and pistillate branches to *D. laurinum*. But the taxon will be retained until additional staminate branches from the type collections have been examined.

3c. DAPHNIPHYLLUM MAJUS var. ***pierrei*** (Hance) Huang, stat. nov. (Named for L. Pierre.)—Fig. 17.

Daphniphyllum pierrei Hance, Jour. Bot. 16: 261. 1876.

CAMBODIA. Anglond Veng Province: Stung Treng, Dam Co He, Poilane 14073 (A). Kampat: Poilane 14767 (NY). Krepeuh: Kuang Mountain, Pierre s.n. (E, UC). Spurg Province, Kuang Repven Mountain, Pierre 858 (A, UC); Phu Kok, bay of Siam, Pierre 19067 (BM, holotype); Phuqoi, Pierre s.n., Aug. 1874 (A).

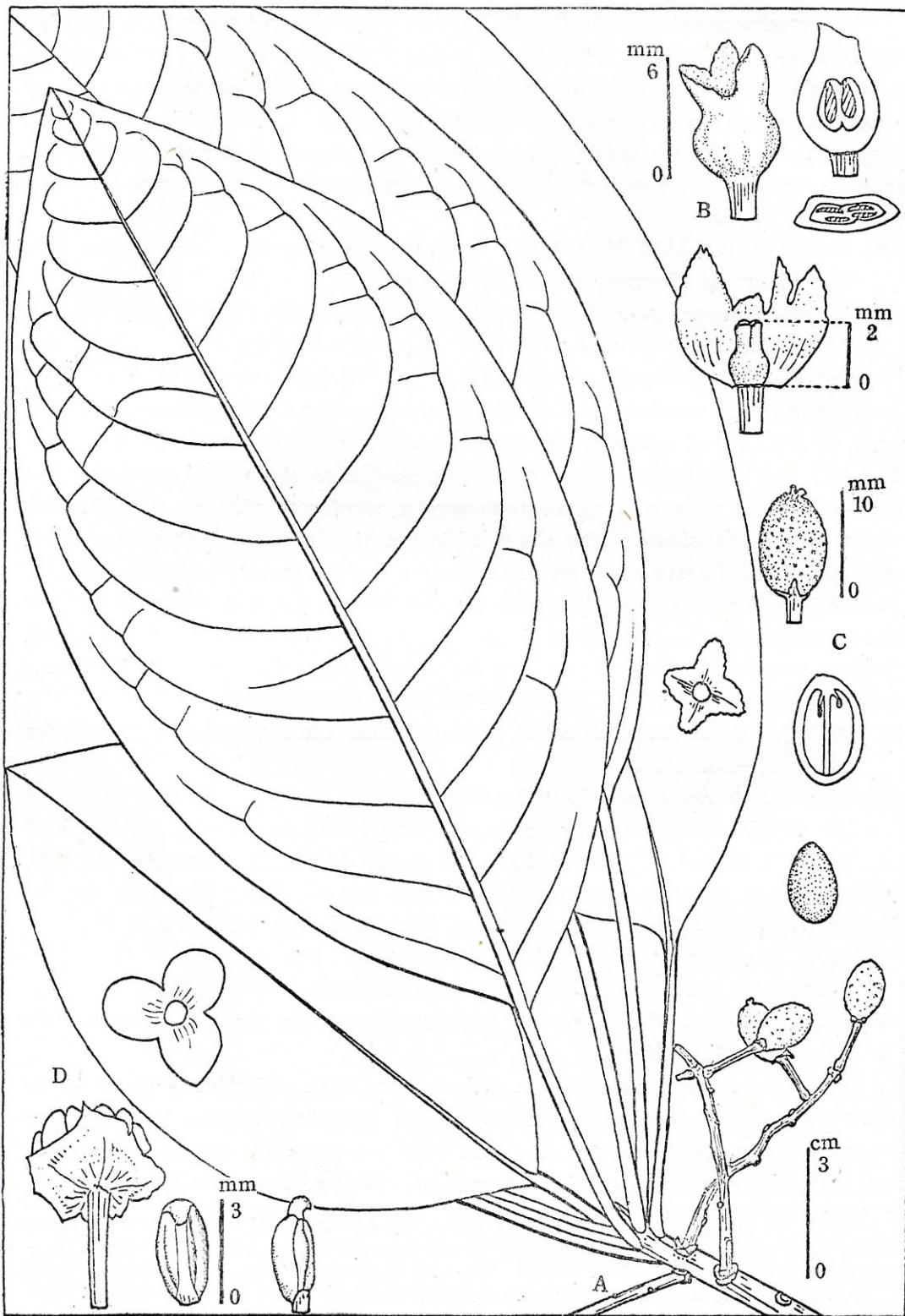
LAOS. Mulu Duy: Se Moun Basin, Harmand 329 (P).

VIETNAM. Haut Donaii: Moi Krong, Blao Kil, Poilane 21021 (A, P).

3d. DAPHNIPHYLLUM MAJUS var. ***deciduum*** Huang, var. nov. A varietate majoris calycibus caducis differt.

Leaves fasciculate, petioles, terete, 4–9 cm. long, 2 mm. wide; blades large elliptic or narrowly elliptic-obovate, base attenuate-acute, apex broadly acuminate, margins obscurely revolute, 18–27 cm. long, 6.5–10 cm. wide, thin but firmly chartaceous, green on both surfaces, lateral veins about 12, prominent. Fruiting axes racemiform, angulate,

Fig. 15. **D. majus** Muell.-Arg. A: Twig with fruits (Henry 12793, NY) and one large leaf (Henry 12793, MO); B: Ovary, longitudinal and cross sections (Kerr 1816, K); C: Fruit, longitudinal section and calyx (Henry 12793, NY); D: Staminate flower, front and back views (Kerr 1824, K); and E: Stamen in dorsal and lateral views, and calyx (Kerr 1824, K).



2 cm. long, 1–1.5 cm. wide, pedicels 6–7 mm. long, 0.5 mm. wide; calyx caducous; drupes ovoid, 6 mm. long and in diam., glaucous, tuberculate, style short, divaricate.

CAMBODIA. North Kampot: *Poilane 14640* (A, paratypes). Krapaen: *Poilane 17636* (A, holotype). Phuquae Island: *Contest Lacour 126* (A, P).

Variety *deciduum* is always a pistillate plant with a caducous calyx on the immature drupes. Thus it is an intermediate between section Lunata and *Daphniphyllum*.

SECTION 2. DAPHNIPHYLLUM

Section *Calycifera* Hurusawa, Jour. Jap. Bot. 18: 157. 1942, ex parte; Huang, Taiwania 11: 57, 62, 66, 70–72, 74, 76, 81–83, 87–94. 1965.

Series *Calycifera* (Hurusawa) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 218. 1954, ex parte. Type species: *D. teijsmanni* Zoll. ex Teijsm. & Binn.=*D. glaucescens* subsp. *teijsmannii* (Zoll. ex Teijsm. & Binn.) Huang.

Dioecious, rarely polygamodioecious; calyx present, usually caducous; staminodia frequently present in both staminate and pistillate flowers, prominent in tropical Asia and reduced size in temperate Asia; mature anthers oblong or elliptic and compressed or oblique, free, usually long filaments; pistillodes sometimes present; drupes with various shapes and texture of color.

Type species: *D. glaucescens* Blume

KEY TO SUBSECTIONS

- a. Calyx present in both staminate and pistillate flowers.
 - b. Calyx longer than the androecium and gynoecium, articulate and caducous I. LONGICALYCIFERA
 - bb. Calyx shorter than the androecium and gynoecium, inarticulate, usually persistent in staminate flowers II. DAPHNIPHYLLUM
- aa. Calyx present in pistillate flowers only III. UNICALYCIFERA

SUBSECTIO 1. Longicalycifera Huang, subsect. nov.

Calyx, petiolus staminodiaque caduci et articulati; calyx quam stamina ovariumque longior; staminodia prominentia.

Type species: *D. gracile* Gage

4. DAPHNIPHYLLUM GRACILE Gage in Nova Guinea 12: 480. 1917, non Rosenthal (1919).—Fig. 22.

Shrubs or trees, 4–20 m. high, trunks 20–80 cm. in diam., branchlets terete, canaliculate, brown, lenticels elliptic, elevate, petiole scars prominently elevate, 3 bundles nearly in a horizontal line. Leaves alternate to fasciculate, petioles triangular, sulcate above, articulate, 1–5 cm. long, 1–2 mm. wide, red or black after dry; blades variously

Fig. 16. *D. majus* var. *phanrangense* (Gagnep.) Huang. A: Twig with fruits (*Evraud 2001*, A); B: Ovary, longitudinal and cross sections (*Poilane 10009*, P); C: Fruit, longitudinal section, seed, and calyx (*Evraud 2001*, A); and D: Staminate flower, stamen illustrating ventral and lateral views, and calyx (*Poilane 10008*, A).



from oblong-elliptic, oblong-obovate, narrowly elliptic-lanceolate to broadly elliptic and narrowly ovate to ovate, sometimes slightly oblique, base cuneate, apex mucronate or obtuse or acuminate-cuspidate, margins revolute, 4–20 cm. long, 1.2–7.5 mm. wide, firmly chartaceous or subcoriaceous, shining brown or green on both surfaces, papillate and frequently glaucous beneath, lateral veins 7–14, impressed above, slightly ascending below. *Staminate inflorescences* racemiform, terete, about 3–7 cm. long, 0.5–1.5 mm. wide, pedicels terete, 2–12 cm. long, 0.4 mm. wide; calyx 4–6 lobes, lobes narrowly elliptic, free, entire or serrulate apex, 1.5 mm. long, 0.3–0.7 mm. wide, longer than androecium, caducous, articulate; stamens 5–8, filaments oblong, about 0.2–1 mm. long, 0.2 mm. wide, anthers elliptic, oblong-obovate, obtuse, apiculate, compressed, 1–5 mm. long, 0.5–1 mm. wide. *Pistillate inflorescences* racemiform, flat, 3–5 cm. long, 0.8 mm. wide, pedicels flat, 2–12 cm. long, 0.4 mm. wide, bracts narrowly elliptic, 3 mm. long, partially persistent; calyx 4–6 lobes, linear, 1–6 mm. long, 0.4–0.6 mm. wide, longer than gynoecium, caducous, articulate (called glands by Gage), short, divaricate, *Fruiting axes* angulate, 2–8.5 cm. long, 1 mm. wide, pedicels angulate, 4–15 mm. long, 1 mm. wide; calyx caducous; drupes lustrous ovoid or elliptic-globose, 5–9 mm. in diam., round on both ends, black, brown or glaucous, style divaricate, staminodia scars persistent.

The species is distributed in the highlands of New Guinea at altitudes of from 200 to 3000 m. and in the Celebes, where it is rare. Since *D. gracile* is a polymorphic species, it may consist of more than two varieties, i. e., var. *gracile* and var. *tuberculatum*.

KEY TO VARIETIES

- a. Drupes smooth or lustrous 4a. var. *gracile*
- aa. Drupes tuberculate 4b. var. *tuberculatum*
- 4a. DAPHNIPHYLLUM GRACILE** var. **GRACILE**. (Named for its long slender pedicels).

Daphniphyllum papuanum Hallier f. Meded. Herb. Leid. 37: 13. 1918.

The color of living plants has been described by collectors on herbarium labels as gray-brown or gray-green for outer bark, brown or straw for inner bark, for young leaves, deep-purple and red for staminate flowers with reddish-purple stamens, and green for pistillate flowers with purple to brown stigmas. Fertile branches have been collected throughout the year, although the blooming period is predominantly from April to August.

The vernacular names for this variety are abundant and include: *Direhkogil* (Chimbu language in Masul), *Gongili* (Chimbu in Waimambano), *Kaik*, *Kailk*, *Kag*

Fig. 17. **D. majus** var. **pierrei** (Hance) Huang. A: Twig with fruits (*Poilane 21021*, P); B: Ovary, longitudinal section, and two top views with cross sections (*Pierre 858*, UC); C: Fruit, longitudinal and cross sections and seed (*Poilane 21021*, P); and D: Staminate flower, calyx, and stamen showing dorsal and lateral views (*Hance 19067*, BM).

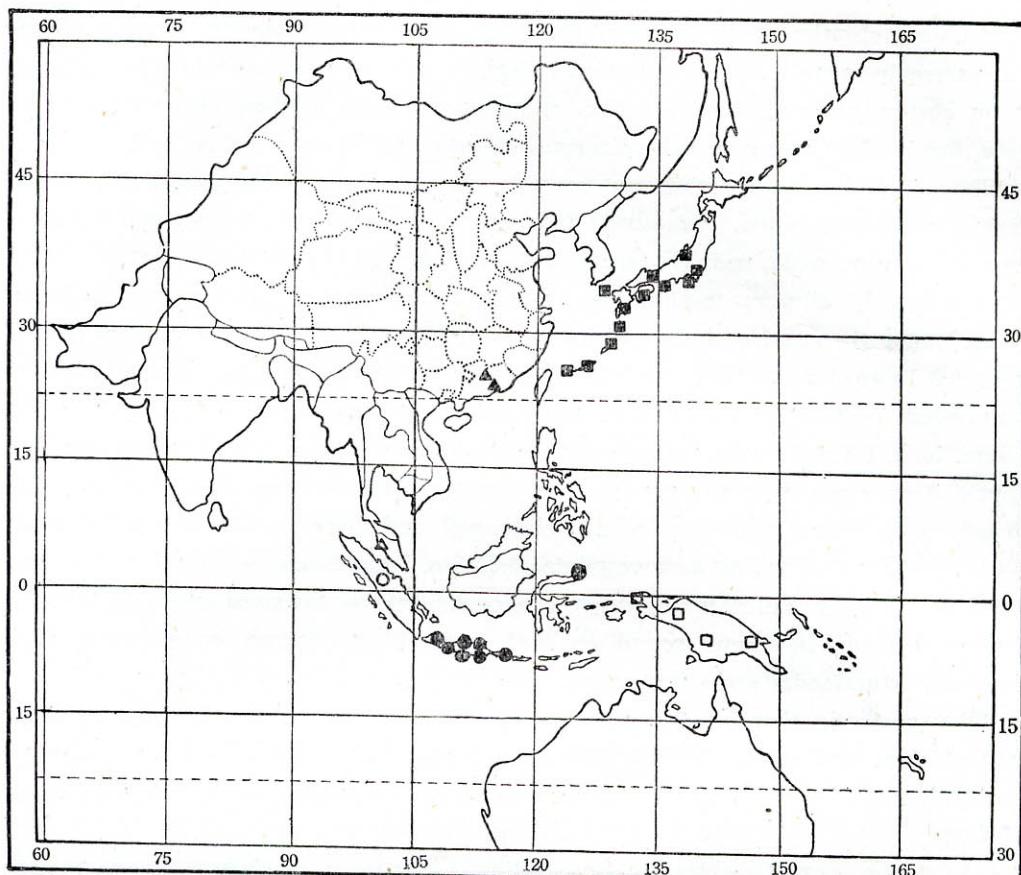


Fig. 18. Distributions of *D. gracile* (□); *D. glaucescens* subsp. *glaucescens* (●), subsp. *lanatifolium* (△), subsp. *sumatraense* (○), subsp. *subverticillatum* (▲), and subsp. *teijsmannii* (■).

(Hagen in Togoba or Togopa), *Kandi* (Mairi in Watabung), *Lemoipaja* (Mairi in Mondo), *Kareh* (Enga in Poio), *Nepnambugel* (Hagen in Wanki), *Pafara*, *Kamen*, *Pabereh* (Wahgi in Minj), and *Midipibi*, *Tipap*, *Pak*, *Rank*, *Papf* (Mendi).

NEW GUINEA. N.W. Highlands: Papua, Carr 13857 (CANB, L, NY), 15094 (A, K, L, NY), 15235 (A, K, L, NY); Bozidi, Carr 13390 (CANB, K, L), 14433 (A, CANB, K, L, NY), 15234 (L), 73390 (NY), Mt. Dayman, Maneau range, Brass 22602 (A, K); Mt. Obree, Sayers s.n., 1887 (L, holotype of *D. papuanum* Hallier), Lane Poole s.n. (A, K). Western highlands: Kubor range, Pullen 5030 (CANB), Mt. Kinbain, Saunders 715 (CANB), Robbins 538 (CANB, L); Mt. Giluwe, Robbins 425 (CANB, L); Mt. Amungwiwa, Womersley s.n. (NGF, 17942, CANB); Porget logging area, Wabag, Womersley s.n. (NGF, 11236, BO, L); Nondugl, Womersley 4487 (BO), Poio village, Yaki river valley, Hoogland & Schodde 6778 (CANB; BO, L, PNH), 6814 (A, CANB, L), 6821 (A, BO, CANB, L, PNH, US); Tomba village, Hoogland & Pullen 6112 (BM, CANB, L, US), Robbins 1082 (CANB), 1116 (CANB), Hoogland & Pullen

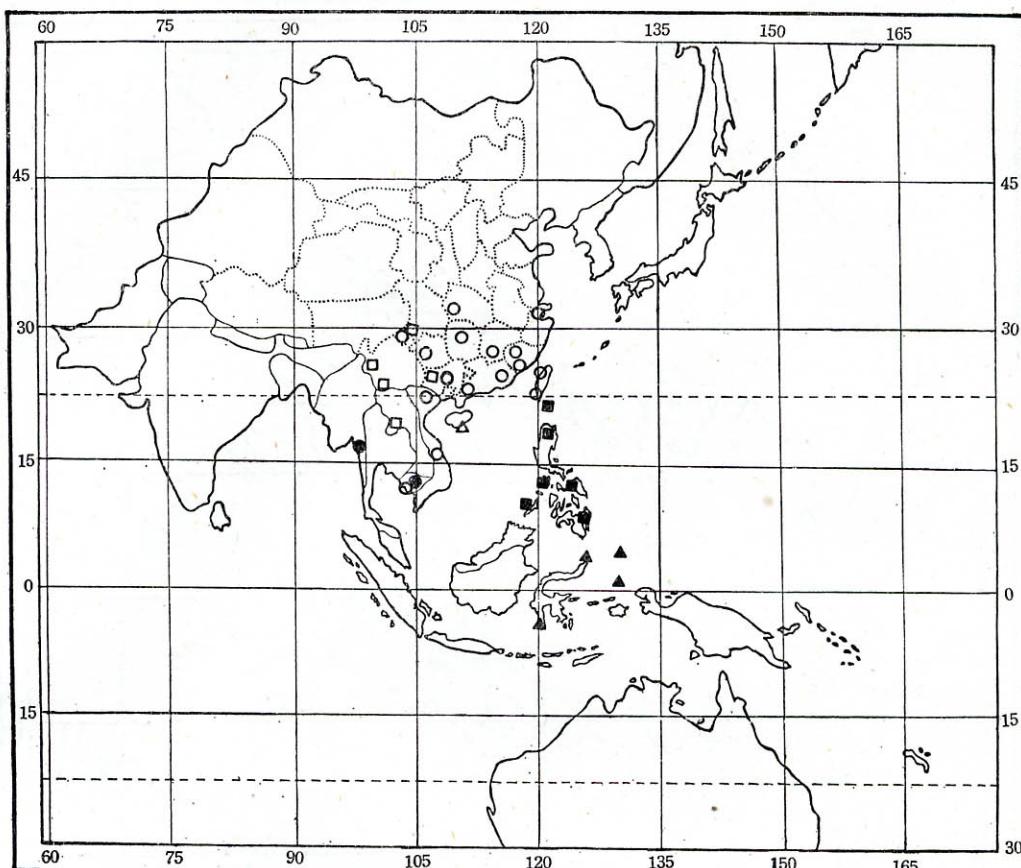


Fig. 19. Distributions of *D. glaucescens* subsp. *paxianum* (□), subsp. *atxbadium* (△), subsp. *oldhamii* (○), subsp. *celebense* (▲), subsp. *beddomei* (●), and subsp. *luzonense* (■).

6113 (BM, CANB, L); Idenburg river, Brass 12188 (A), 12632 (A); Mt. Hubrecht, Pulle 2439 (L, lectotype, BO, isolectotype); Mt. Nassau. Docters van. Leeuwen-Reynvaan 10866 (BO, L), 10917 (BO, L); Mt. Tisi, Mangold s.n. (BW. 2257, CANB, L); Rawlinson range, Clemens 12352 (A); Mt. Wichmann, Pulle 1029 (BO L, syntype), Wissel lake region, Eyma 4821 (BO, L), 5202 (BO), 5289 (BO). **Eastern highland:** Kortumi, S. D. A. Mill via Goroka, Floyd & Womersley 6765 (BO), 6781 (BO); Mt. Kuni, Womersley s.n. (NGF. 9451, CANB, K, L); Asaromirifutica divide. Pullen 375 (CANB, L, US), 432 (CANB, L), Hoogland & Pullen 5484 (CANB, BO, K, L), 5521 (BM, CANB, L, US); Kurumigi-bohwa, Kuaki river, Pullen 300 (BO, CANB, K, L, US); Mt. Wilhelm, Pullen 332 (CANB, L), Brass 30139 (A, K, L, NY, PNH, US), 30190 (A), 30260 (A, K, L, NY), 30254 (A, K, L, NY, PNH, US), Hoogland & Pullen 5730 (BM, CANB, K, L, US), Robbins 721 (CANB, L); Papua, Tau, near Chuave, Womersley s.n. (NGF. 14102, CANB, K, L); upper Chirima river, Brass 4374 (A, BO, NY, US); ridge between Barala & Komperi, west of Kainantu, Pullen 722 (CANB,

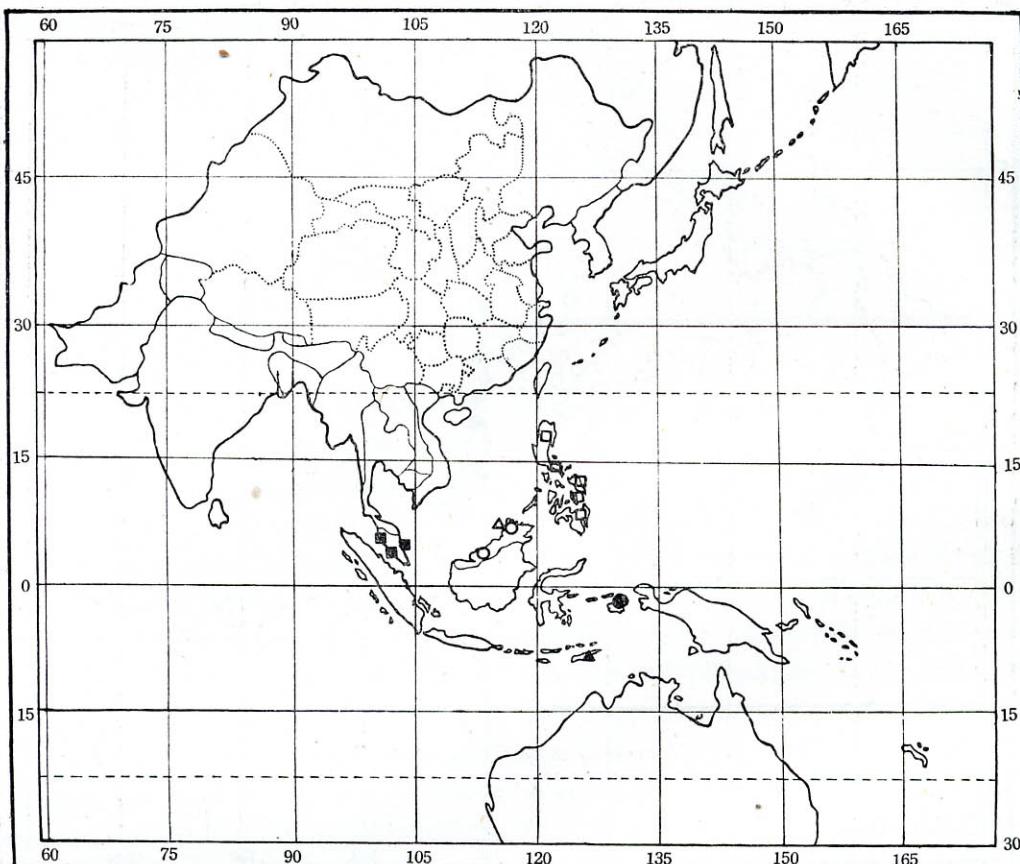


Fig. 20. Distributions of *D. glaucescens* subsp. *dichotomum* (○), subsp. *ceramense* (●), subsp. *borneense* (△), *timorianum* (▲), subsp. *buchananiifolium* (□), and subsp. *scortechinii* (■).

L); Mt. Elandora, Brass & Collins 32157 (L, US); Kini creek, Mt. Michael, Womersley s. n. (NGF. 11719, BM, BO, CANB, K, L), Brass 31468 (BO), 31469 (A, K, L, NY, US). **Southern highlands:** Papus, Mt. Giluwe, Schdode 1712 (CANB, K), 1895 (CANB), 1900 (CANB, K), 2057 (CANB, K); Anga valley, Schodde 1487 (CANB, K), 1598 (CANB, K). Sepik; Mt. Torricelli, Derbyshire 354 (CANB, E, K). Mt. Carstensz: Base camp, Kloss s. n. (BM); Locality unknown: Brass 9525 (A). Vogelkop: Mt. Nettoti, Royen & Sleumer 7867 (CANB, K); Angi, Arfak Mts., Kanehira & Hatusima 12632 (A), 13457 (A, BO), Kostermans 2184 (A, BO, L), 2202 (BO, L), 2522 (BO, L); Aifat valley, Tohkiri Mt., Royen & Sleumer 7279 (CANB, K, L).

CELEBES. Masamba: northern side of Ramboneo, Eyma 1352 (A, BO, K, L); Teymann 14126 (L).

The variety is characterized by its uniquely long calyx which is longer than either the androecium or gynoecium. This character is also the only one by which the variety can be separated from related *D. glaucescens*. The shape and size of leaves, stamens, and drupes is quite variable in var. *gracile*.

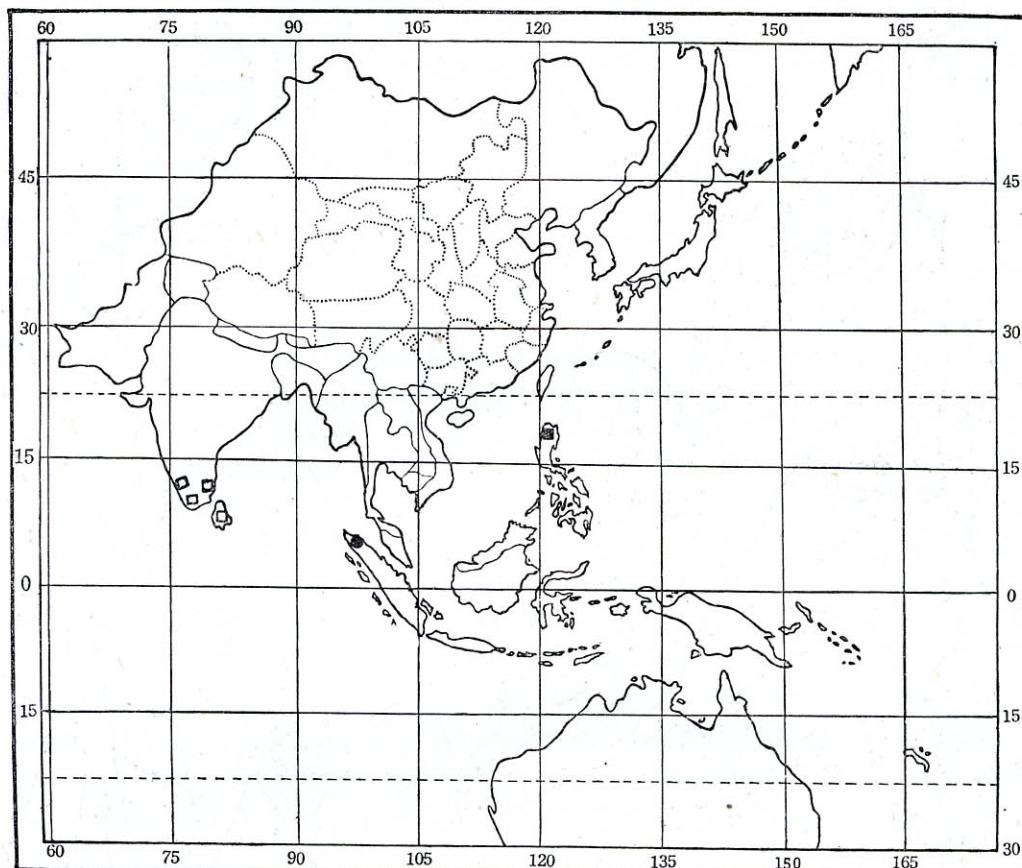


Fig. 21. Distributions of *D. glaucescens* subsp. *neilgherrense* (□), *D. philippinense* (■), and *D. woodsonianum* (●).

4b. DAPHNIPHYLLUM GRACILE var. *tuberculatum* Huang, var. nov. A varietate *gracile* drupis prominenter tuberculatis differt.

The newly described variety is limited in habitat and locality to the thickets of the eastern highlands of New Guinea. The blooming period is reported on herbarium labels as September. The color of living plants is described by the collectors as gray-brown for outer bark, straw for inner bark, white for wood, red for young leaves, chocolate for staminate flowers, green or purple for pistillate flowers, and black for drupes.

The known vernacular names for *D. gracile* var. *tuberculatum* are *Kaik* in Hagen language and *Kisboroki* in Bena Bena language.

NEW GUINEA. Eastern highlands: Chimbu, Robbins 661 (A, CANB, L), Mt. Elimbari, Robbins 799 (CANB, L, paratypes); Benabena valley, Robbins 880 (CANB, L, US); Mt. Michael, Brass 31360 (A, K, L, NY, US); Idenburg river, Brass 13705 (A, holotype, BO, isotype), Brass & Versteegh 13193 (A); Bale river, lake Habbema,



Brass 11530 (A); Papus, Woitape, Corner & Gray 12947 (CANB); Dunantina valley, Yanofi, Robbins 906 (CANB, L).

The variety can be distinguished from *D. glaucescens* and all other species in the section *Daphniphyllum* only by its uniquely long calyx which like the previous variety is longer than either the androecium or gynoecium. The variety is named for its tuberculate drupes.

SUBSECTION 2. DAPHNIPHYLLUM

Dioecious, rarely polygamodioecious; leaves alternate to fasciculate, petioles long; calyx caducous or persistent on drupes; anthers compressed or oblique; staminodia and pistillodes present; drupes variable.

5. DAPHNIPHYLLUM GLAUCESCENS Blume, Bijdr. Fl. Neder. Ind. 17: 1153. 1826.

Trees, 4–15 m. high, branchlets terete brown, lenticels small elliptic, petiole scars triangular, with 3 bundles nearly in a horizontal line. Leaves fasciculate, petioles narrowly triangular, sulcate above, 1–4.5 cm. long, 0.7 mm. wide; blades elliptic, narrowly elliptic or narrowly angular-ovate, base attenuate-cuneate, apex acuminate to caudate, margins slightly revolute, 8–16 cm. long, 3–5 cm. wide, firmly chartaceous, darkish green above, grayish brown, glaucous and papillate beneath, lateral veins 7–12. Staminate inflorescences racemiform, slender, flat, 3–6 cm. long, 0.2 mm. wide, bracts caducous; calyx campanulate, 4–5 lobes, lobes varying as to serration, size and shape; stamens 8–10, filaments oblong, up to 0.2–0.6 mm. long, 0.2 mm. wide, anthers usually obliquely-lunate, oblong or small broadly elliptic acute, 0.6–1.5 mm. long, 0.2–0.5 mm. wide, strongly apiculate. Pistillate inflorescences racemiform, angulate, 4–5 cm. long, 0.5 mm. wide, pedicels terete, 6–10 mm. long, 0.2 mm. wide; calyx usually caducous, styles divaricate upward or circinate, as long as the ovary; staminodia present. Fruiting axes racemiform, angulate, about 3.5–6 cm. long, 0.3 mm. wide, pedicels terete, 10–16 mm. long, 1 mm. wide, bracts caducous; drupes elliptic-globose, ovoid, base acute to ovate, apex acute to round, 6–14 mm. long, 5–7 mm. in diam., tuberculate, styles usually caducous or circinate.

KEY TO SUBSPECIES

- a. Blades usually elliptic to narrowly elliptic, rarely obovate or obovate-lanceolate, usually acute to acuminate at apex; drupes tuberculate or rugose to the naked eye.
 - b. Drupes usually tuberculate to the naked eye (*glaucescens* subcomplex).
 - Fig. 22. *D. gracile* var. *gracile* (A, B, C, D, F, G) and var. *tuberculatum* Huang (E). A: Twig with fruits (*Gage 2439*, L); B: Ovary showing a staminodium and calyx scars as well as longitudinal and cross sections and seed (*Hoagland & Pullen 5730*, CANB); D: Smooth, ovoid fruit (*Brass 12632*, A); E: Tuberculate, obovoid fruit (*Robbins 880*, CANB); F: Staminate flower, stamen, and anther in cross section (*Robbins 425*, CANB); and G: Staminate flowers with pistillodes (*Darby 354*, CANB).

- c. Styles nearly as long as ovaries or longer.
 - d. Fruiting pedicels more than 1 cm. long; styles usually caducous; Java, Lombok, and Celebes.....5a. subsp. *glaucescens*
 - dd. Fruiting pedicels less than 1 cm long; styles persistent.
 - e. Styles circinate; drupes 6-7 mm. in diameter; Perak5b. subsp. *lancifolium*
 - ee. Styles recurved; drupes 4 mm. in diameter; Sumatra5c. subsp. *sumatraense*
- cc. Styles shorter than ovaries
 - f. Blades epapillate.
 - g. Fruiting pedicels 2-3(-5) mm. long; leaves subverticillate; China5d. subsp. *subverticillatum*
 - gg. Fruiting pedicels (2-)3-10 mm. long; leaves alternate to fasciculate.
 - h. Blades usually narrowly oblong-elliptic, obovate to obovate-elliptic; Japan, Korea, and the Ryukyu Islands.....5e. subsp. *teijsmannii*
 - hh. Blades narrowly falcate, elliptic to obliquely elliptic.
 - i. Drupes elliptic-globose, both ends rounded or obtuse, 6-10 mm. long, 5-6 mm. in diameter; China and Laos.....5f. subsp. *paxianum*
 - ii. Drupes ovoid, elliptic-obovoid or ellipsoid, usually constricted at base, (8-) 10-13 mm. long, 5-7 mm. in diameter; China5g. subsp. *atrobadium*
 - ff. Blades papillate.
 - j. Blades glaucous beneath; China, Cambodia, and Vietnam5h. subsp. *oldhamii*
 - jj. Blades eglaucous beneath; Celebes.....5i. subsp. *celebense*
 - bb. Drupes usually smooth or rugose to the naked eye (*borneense* subcomplex).
 - k. Blades narrowly elliptic; drupes ovoid, ovoid to elliptic globose, 6-8mm. long.
 - l. Blades falcate-elliptic.
 - m. Calyx usually caducous in fruit; Burma, Cambodia, Thailand, and Vietnam.....5j. subsp. *beddomei*
 - mm. Calyx usually persistent in fruit; Philippines, and Botel Tobago5k. subsp. *luzonense*
 - ll. Blades angular-ovate-elliptic; Sumatra.....5l. subsp. *dichotomum*
 - kk. Blades elliptic; drupes ellipsoid to elliptic-globose, 6-15 mm. long.
 - n. Calyces of staminate flowers caducous; veins obscure; Ceram5m. subsp. *ceramense*

- nn. Calyces of staminate flowers persistent; veins prominent.
 - o. Leaves cuspidate; Borneo.....5n. subsp. *borneense*
 - oo. Leaves acuminate; Timor5o. subsp. *timorianum*
- aa. Blades oblong-obovate, obovate, rounded to mucronate at apex; drupes smooth to rugose to the naked eye (*neilgherrense* subcomplex).
 - p. Drupes lustrous and smooth to the naked eye; styles derived separately from the inner wall of ovary; blades smooth or rugose to touch.
 - q. Blades rugose, veins prominently pinnate; Philippines
 -5p. subsp. *buchananifolium*
 - qq. Blades smooth, veins prominently reticulate; Perak..5q. subsp. *scortechinii*
 - pp. Drupes rugose or obscurely tuberculate to the naked eye; styles developed directly from the ovary wall; blades rugose to touch; Ceylon
 -5r. subsp. *neilgherrense*

5a. DAPHNIPHYLLUM GLAUCESCENS subsp. GLAUCESCENS.—Fig. 23.

KEY TO VARIETIES

- a. Blades papillate.....5a(a). var. *glaucescens*
- aa. Blades epapillate.....5a(b). var. *blumeanum*

5a(a). DAPHNIPHYLLUM GLAUCESCENS subsp. GLAUCESCENS var. GLAUCESCENS. (Named for its blue-green color of leaves).

INDONESIA. Java: Prov. Bantam, *Kuhl & van Hasselt s.n.* (L), *Koorders* 3466 (L). Prov. Batavia, Tjikopo Estate, *H.J. Lam* 3782 (BO, L), *Zippelius s.n.*, *van Steenis* 3020 (BO), *L.R. Lanjouw* 75 (L), *Koorders* 24359 (BO, L, UC); Mt. Salak, *Blume* 1908 (L, holotype, L, NY, isotypes, L, US, paratypes), *Koorders* 24365 (BO, L), 33228 (BO). Prov. Preanger, G. Tjisalak, *s.n. coll. no. 120* (L), *Blume* 235 (L), *Bakhuisen* 582 (BO), *van Steenis* 4700 (BO), *Buwalda* 3637 (BO); Mt. Gedeh, sine coll., Houtsoorten van den Gedeh 350 (GH, L); G. Beser, Tjidadap near Tjibeber, *Backer* 22544 (BO, L); Tjgenteng, *Koorders* 2122 (BO, L), 2126 (BO), 2127 (BO, L), 2201 (BO), 11746 (BO), 13833 (BO), 13850 (BO), 13890 (BO, L), 13947 (BO), 14088 (BO, L), 24362 (BO), 26523 (BO, L), 26557 (BO, L), 32166 (BO), 33319 (BO, L); Tangkuban Prahu, *Korthals s.n.* (L); Trogon, *Korthals s.n.* (L). Prov. Banjumas, *Koorders* 39027 (BO, L), 39031 (BO, L). Prov. Semarang, *Koorders* 2128 (L), 2129 (BO, L), 2130 (BO), 2131 (BO, L), 2132 (BO, L), 2133 (L), 2136 (BO, L), 7670 (BO), 9970 (BO, L), 27900 (BO), 27988 (BO, L), 27990 (BO, L), 27991 (BO, L), 27996 (BO, L), 27998 (L), 36025 (BO, L); Mt. Ungaran, Medinie, *Junghuhn s.n.* (L); Medinie, *Waitz s.n.* Prov. Surabaja, Mt. Tengger, *Koorders* 37930 (BO, L).

Without precise locality: *Koorders* 9923 (L), *Zollinger* 228 (L), 2140 (A), 13952 (L), *Teysmann s.n.* (A), *Backer* 11191 (BO), 12202 (BO), 13616 (BO), *Junghuhn s.n.* (L).

The variety is found at altitudes of from 1300 to 2600 m. Staminate flowers are reported by collectors as yellowish in color.

Huru minjak, *Kihadja*, *Kihandjerre*, *Kipahang*, and *Mentijing beurit* are names used in the Sunda language.



5a(b). DAPHNIPHYLLUM GLAUCESCENS subsp. **GLAUCESCENS** var. **BLUMEANUM** (Baill. ex Muell.-Arg.) Smith (Named for C. L. Blume).

Daphniphyllum blumeanum Baill., Étud. Gén. Euph. 568. 1858, nomen,

Daphniphyllum zollingeri Muell.-Arg. in DC., Prodr. 16(1): 2. 1868.

Daphniphyllum blumeanum Baill. ex Muell.-Arg., loc. cit. 3.

Daphniphyllum acutifolium Muell.-Arg., loc. cit. 5.

Daphniphyllum glaucescens var. *blumeanum* (Baill. ex Muell.-Arg.) Smith in Koord. et Val., Bijdr. Boomsoorten Java 12: 328. 1910.

INDONESIA. Java: Prov. Batavia, Mt. Gedeh, Kandangbadak, s. coll. 406 (L), *Korthals* 406 (L), *Korthals s. n.* (L); Tjibodas, *J. J. Smith s. n.* (BO, L); Tjibeureum, near waterfall, *Blume s. n.* (L, holotype and isotypes of *D. acutifolium* Muell.-Arg.; F, L, NY, US, paratypes of *D. glaucescens* Bl.); Geger-Bintang, *van Steenis* 4133 (BO), 5023 (BO), 5027 (BO, L), *Bruggeman* 3720 (BO), 3740 (BO); Mt. Sela, above Tjibodas, *Djamhari* 243 (BO, L), *Hasan* 1 (CANB); Tjibodas, *Koorders* 2123 (A, BO, L), 2124 (BO), 2125 (BO), 3103 (BO, L), 12484 (BO, L), 12650 (BO), 15548 (BO), 26021 (BO, L), 32166 (BO, L), 41927 (BO), 42061 (BO, L). Prov. Preanger, Mt. Malabar, Poentjak, *Reinwardt* 848 (L). Central Java: Mt. Lawu, *Brinkman* 748 (A, BO, L, NY); Mt. Wilis, Tulung-Agoeng, *FRI. bb.* 3600 (BO). East Java: Lumadjang, *FRI. Ja.* 3000 (A, BO, L); Probolinggo, *van Harreveld* 3000 (BO); Mt. Kawi, *Docters van Leeuwen-Reynvaan* 12479 (BO, L). West Java: without locality, Herb. *Reinwardt* 13 (L).

Lesser Sunda Islands. Bali: G. Batu Kau, *Sarip* (*exp. Maier*) 395 (BO, L). Lombok: Mt. Rindjani, s. slope above Kembang-Kerang, *Elbert* 2140 (L), 2211 (L), 2225 (L), 2277 (BO, L), Sangkareang, Taimanuk summit, *Elbert* 2302 (A, BM, BO, L, PNH), 2330 (BO, L), 2740 (A, BM, BO, L, PNH); w. Rindjani, *de Voogd* 2698 (BO).

Celebes: NE. Celebes, Minahassa, *Koorders* 16843 (L); Lokha Panthain, *Teysmann* 14064 (L).

J. J. Smith limited var. *blumeanum* to those plants having short, narrowly angular, ovate, lustrous and epapillate leaves, oblique stamens, and obovoidal drupes, but his concept has been widened to include plants having epapillate leaves and any type of stamen and drupe.

5b. DAPHNIPHYLLUM GLAUCESCENS subsp. **lanceifolium** (Hook. f.) Huang, stat. nov.

Daphniphyllum lanceifolium Hook. f., Fl. Brit. Ind. 5: 354. 1887 (Named for its lanceolate leaves).

MALAYSIA. Malay Peninsula, Perak: Dense Pin, top of Gunong Ejon, *King's collector* 7007 (K, holotype, BM, L, isotypes).

Fig. 23. *D. glaucescens* subsp. *glaucescens* var. *glaucescens*. (B, D) and var. *blumeanum* (Baill. ex Muell.-Arg.) Smith (A, C, E). A: Twig with fruits (*Blume s. n.*, Gedeh, L); B: Ovary, longitudinal and cross sections (*Hasan* 1, CANB); C: Fruit, longitudinal section, and seed (*Blume s. n.*, Gedeh, L); D: Staminate flower, stamen and anther in cross section (*Blume* 1908, L); and E: Staminate flower, stamen and anther in cross section (*Elbert* 2740, A).

The subspecies is characterized by its narrowly angular, ovate leaves, slender branchlets, and circinate styles. Subspecies *lancifolium* is very similar to subsp. *glaucescens* and subsp. *beddomei*, but can be distinguished from them by its shorter fruiting pedicels. Subspecies *lancifolium* is also similar to subsp. *dichotomum* in its shape of leaves and elliptic globose drupes, but differs from the latter by its large tuberculate drupes. The vernacular names for this subspecies is *Rosa* in the Malay dialect.

5c. DAPHNIPHYLLUM GLAUCESCENS subsp. **sumatraense** Huang, subsp. nov.
(Named for the island of Sumatra.)—**Fig. 24.**

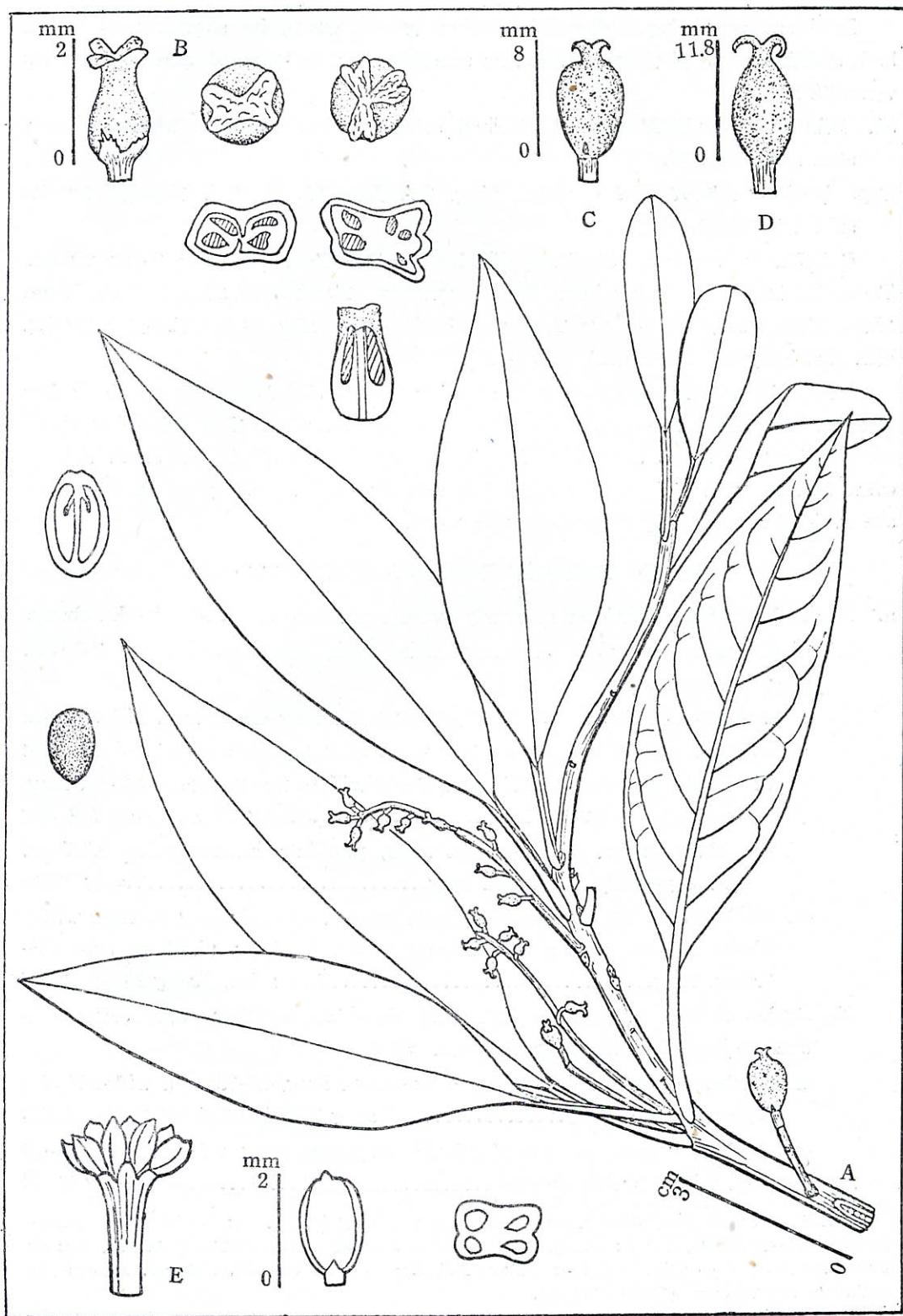
A subspecie typico pedicellis fructiferibus 1-7 mm. longis et stigmatibus recurvatis differt.

Trees 2-4 m. high, trunks 12-18 cm. in diam; branchlets terete, canaliculate, smooth at apex, rugose at lower portion, lenticels elliptic to round, numerous, slightly elevate. *Leaves* alternate-fasciculate, petioles semispherical, 1.5-2.5 cm. long, 0.8 mm. wide, sulcate above, slightly thickened at both ends; blades narrowly elliptic, narrowly angular-ovate, slightly falcate, base attenuate, apex acuminate, 5-10 cm. long, 2-4 cm. wide, chartaceous, green above, glaucous and papillose beneath, veins 7-10, very thin, obscurely ascending on both surfaces, midrib slightly ascending beneath. *Staminate inflorescences* racemiform, flat, 1.5-4.5 cm. long, 0.6 mm. wide, pedicels flat, 2-4 mm. long, 0.2 mm. wide; calyx shallowly campanulate, 4-5-lobes, lobes short, broadly triangular, acute at apex, with entire or serrulate margins, about 0.2 mm. long, 0.4 mm. wide; stamens 7-10, subsessile, filaments oblong, 0.1 mm. long, 0.2 mm. wide, anthers broadly obovate-elliptic or broadly elliptic, 0.4-0.5 mm. long, 0.5-0.8 mm. wide, apiculate or mucronate at apex, dorsally compressed. *Pistillate inflorescences* racemiform, angulate, 2-4 cm. long, 0.5 mm. wide, pedicels terete, 1-2 mm. long, 0.5 mm. wide; calyx 4 to many lobes, ovate or oblong, subentire, acute or irregularly divided at apex, about 0.2 mm. long, 0.2 mm. wide, articulate, caducous; ovary elliptic-globose, styles nearly as long as ovary, stigma radiate-revolute. *Fruiting axes* angulate, 1.5-3.5 cm. long, 1 mm. wide, pedicels terete, 1-3 mm. long, 1 mm. wide; drupes obliquely ovoid, acute at base, round at apex, 7 mm. long, 4 mm. in diam., black, tuberculate, staminodia persistent.

Subspecies *sumatraense* is found in secondary forests at altitudes of from 500 to 1000 m.

INDONESIA. Sumatra: West central Sumatra, Mt. Sago, Pajakumbuh, *Meijer* 7199 (L, holotype, CANB, K, L, isotypes), 3994 (L). West Sumatra, G. Solok, near Suliki, west of Pajakumbuh, *Meijer* 7587 (K, L).

Fig. 24. *D. glaucescens* subsp. **sumatraense** Huang. A: Twig with pistillate flowers (*Meijer* 7199, L); B: Ovaries, two top views, two cross sections, and one longitudinal section (*Meijer* 7199, L); C: Fruit with staminodium (*Meijer* 7199, L); D: Fruit, longitudinal section, and seed (*Meijer* 7587, L); and E: Staminate flower, stamen, and anther in cross section (*Meijer* 3994, L).



It differs from subsp. *oldhamii* and subsp. *glaucescens* by its shorter pedicels on both staminate and pistillate flowers, its subsessile and compressed anthers, and its versatile styles.

5d. DAPHNIPHYLLUM GLAUCESCENS subsp. **subverticillatum** (Merr.) Huang, stat. nov.—**Fig. 25.**

Daphniphyllum subverticillatum Merr., Ling. Sci. Jour. 13: 34. 1934. (Named for its subverticillate leaves).

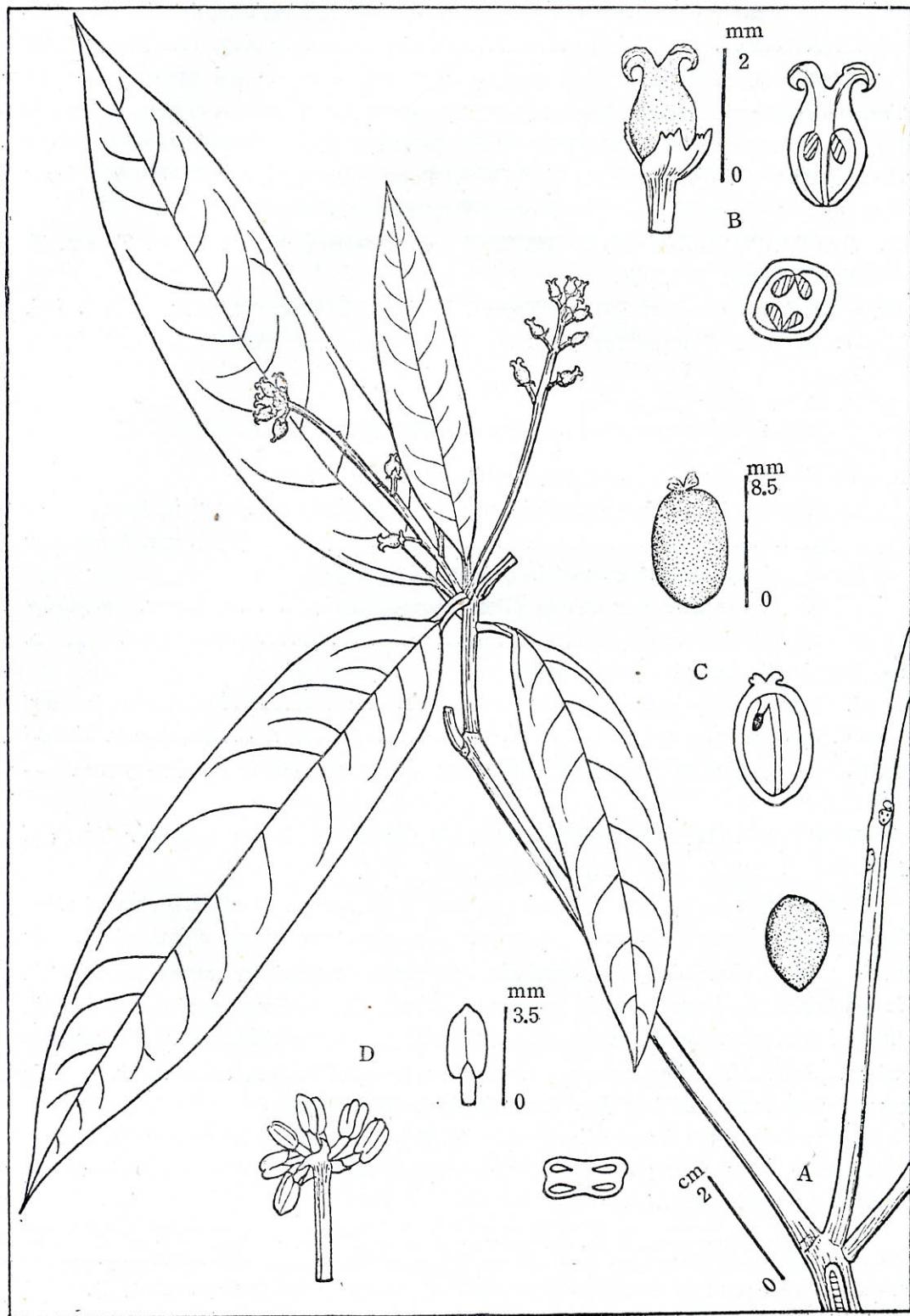
CHINA. Kwangtung: Sin Fung district, Sha Lo Shan, Wa Mei Tong village, *Taam 119* (A), Ngok Shing Shan, Sai Ling village, *Taam 523* (A), 538 (A), Naam Kwan Shan, *Tsang 25310* (A); Tsungfa district, Sam Kok Shan, *Tsang 20483* (A, MO, NY, isotypes), 25188 (A), 25251 (A).

Subspecies *subverticillatum* is very similar to subsp. *dichotomum* except that it has more or less falcate leaves with obscure secondary venation. The following specimens differ from subsp. *subverticillatum* by having smaller elliptic or short oblong-ovate leaves. Thus they can be treated as new forms, but new taxa at this rank are avoided intentionally throughout this work.

KEY TO POSSIBLE INFRASUBSPECIFIC TAXA

- a. Blades lanceolate, elliptic or narrowly ovate, acuminate apex: staminodia absent
- b. Blades narrowly ovate, acuminate-acute apex, obtuse-acute base, 7–16 cm. long, 1–3.5 cm. wide
 - c. Anthers elliptic, mucronate apex, 1–1.2 mm. long, 0.7–0.8 mm. wide; blades oblique; staminate inflorescences 3 cm. long, pistillate ones 3.7–5 cm. long
 - d. Blades broader, 1.9–3.5 cm. wide; pistillate inflorescences 3.7 cm. long, pedicels 0.1–0.2 cm. long *Tsang 20483, Taam 119, 523*
 - dd. Blades narrower, 1–1.8 cm. wide; pistillate inflorescences 3.5–5 cm. long, pedicels 0.3–0.6 cm. long *Tsang 25310*
 - cc. Anthers broadly elliptic, emarginate apex, 0.6–0.7 mm. long, 0.6 mm. wide; blades falcate; staminate inflorescences 5–7 cm. long, pistillate ones 4.5–7.5 cm. long *Taam 538, Tsang 25188, 25251*
- bb. Blades elliptic, obovate to lanceolate, cuspidate-acuminate apex, attenuate-cuneate base, 5–10 cm. long, 2–3.5 cm. wide
 - e. Anthers elliptic, apiculate apex, 0.8–1 mm. long, 0.5–0.7 mm. wide; blades lanceolate to elliptic *Tsang 20255, 20324, 21221, Taam 543*
 - ee. Anthers transversely broad-elliptic, mucronate apex, 0.5 mm. long, 0.5–0.6 mm. wide; blades obovate *Tsang 25101*

Fig. 25. **D. glaucescens** subsp. **subverticillatum** (Merr.) Huang. A: Twig with pistillate flowers (*Tsang 20483*, K); B: Ovary, longitudinal and cross sections (*Tsang 20483*, K); C: Fruit, longitudinal section, and seed (*Taam 119*, A); and D: Staminate flower, stamen and anther in cross section (*Taam 523*, A).



- aa. Blades broadly oblong-ovate, mucronate apex, obtuse base; staminodia present *Tsang 25316*

CHINA. Kwangtung: Tapu district, Tai Mo Shan, *Tsang 21221* (A, NY); Tsengshing district, Naam Kwan Shan, *Tsang 20324* (A, MO, NY, US), 20255 (A, NY); Sin Fung district, Ngok Shing Shan, Sai Ling village *Taam 543* (A); Tsung Hwa district, Sam Kok Shan, Chan Wok Tung village, *Tsang 25101* (A); Lung Men district, Naam Kwan Shan, Sheung Ping village, *Tsang 25316* (A).

- 5e. **DAPHNIPHYLLUM GLAUCESCENS** subsp. *teijsmannii* (Zoll. ex Teysm. & Binn.) Huang, stat. nov.

Daphniphyllum teijsmanni Zoll. ex Teysm. & Binn. Natuurk. Tijdschr. Nederl. Ind. 27: 52. 1864. (Named for Johannes Elias Teijsmann 18089-1882, Netherlands, Java.)

KEY TO VARIETIES

- a. Staminodia or pistillodes present in the pistillate flowers.
 b. Staminodia in three series and pistillodes present; cultivated in Java 52(a). var. *teijsmannii*
 bb. Staminodia one to several in one series, pistillode absent.
 c. Blades narrowly oblong-elliptic, ovate-elliptic 5e(b). var. *amamiense*
 cc. Blades obovate-elliptic 5e(c). var. *iriomotense*
 aa. Staminodia and pistillodes absent.
 d. Inflorescences spreading or ascending 5e(d). var. *buergeri*
 dd. Inflorescences pendent 5e(e). var. *hisautii*

- 5e(a). **DAPHNIPHYLLUM GLAUCESCENS** subsp. *teijsmannii* var. *teijsmannii*.—

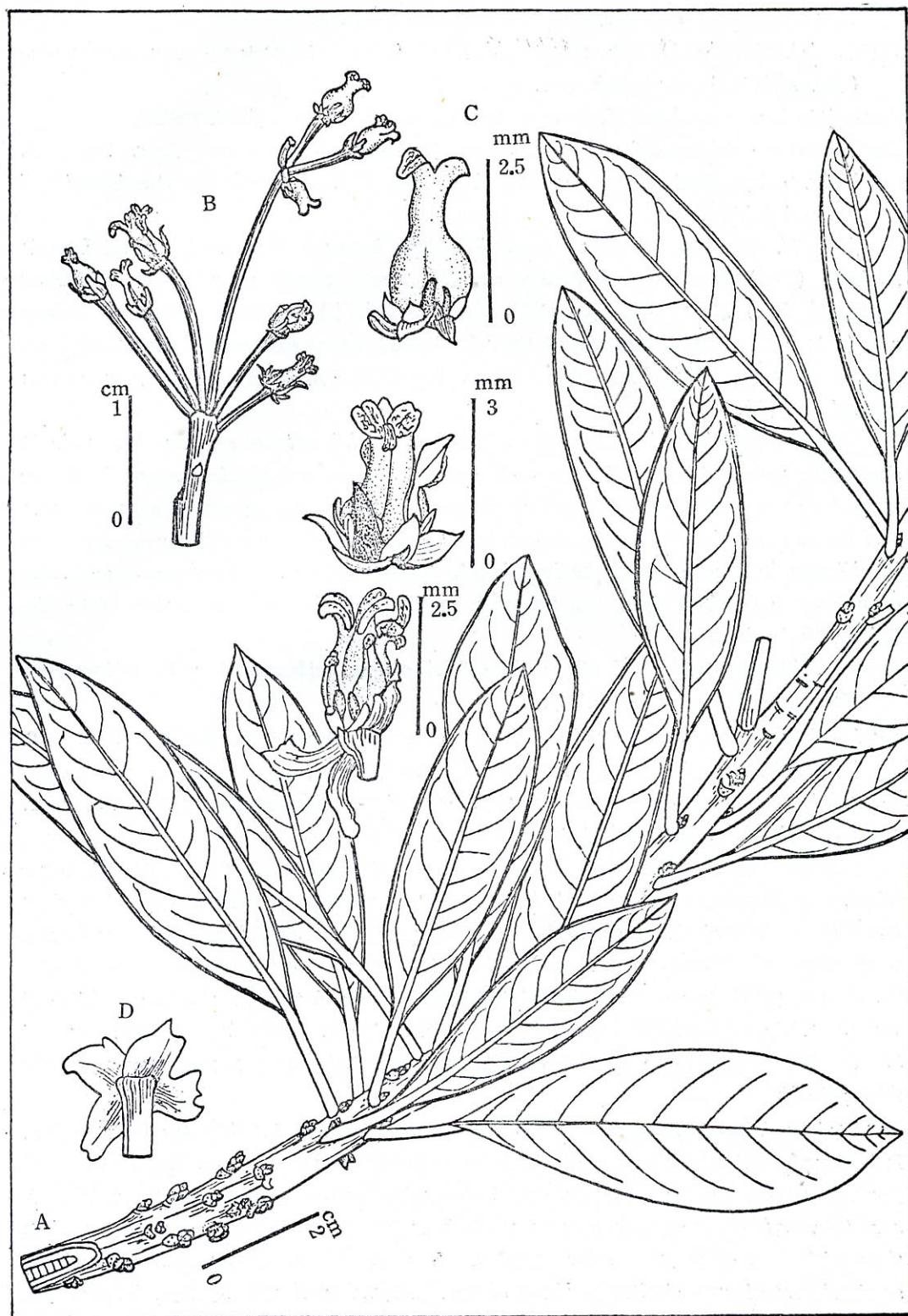
Fig. 26.

INDONESIA. Java: cultivated in Botanic Garden at Bogor. *Zollinger 1029* (A, lectotype, A, BO, L, isolectotypes), 2611 (BO).

Variety *teijsmannii* is a cultivated variant of *D. glaucescens* which is characterized by complex pistillate flowers; calyx partially caducous; ovary elliptic-globose or ovoid, various pistillodes, 2-4 carpellate, completely or partially united; staminodia in 3 whorls, the largest one in innermost whorl, the smallest one stamen-like in the middle whorl, and the medium-sized staminodia bract-like in the outermost whorl. Such aberrations may be due to environmental factors as a result of this plant being introduced into Java from Japan in 1848.

According to the International code of Botanical nomenclature (1961), recommendation 73C paragraph b and c, the original spelling of *teijsmanni* should be corrected to *teijsmannii*.

Fig. 26. *D. glaucescens* subsp. *teijsmannii* (Zoll. ex Teijsm. & Binn.) Huang. A: Twig with pistillate flowers (*Zollinger 1029*, A); B: Pistillate inflorescence (*Zollinger 1029*, A); C: Three abnormal pistillate flowers (*Zollinger 1029*, A); and D: Calyx (*Zollinger 1029*, A).



Yuzuri-ha is the name used in the Japanese language.

5e(b). DAPHNIPHYLLUM GLAUCESCENS subsp. *teijsmannii* var. **amamiense** (Hurusawa) Huang, comb. nov.

Daphniphyllum amamiense Hurusawa, Jour. Jap. Bot. 18: 273, f. 14. 1942.

Daphniphyllum teijsmanni var. *amamiense* (Hurusawa) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 221, f. 5, A-D, 1954. (Named for the islands of Amami-Oshima)

JAPAN. Ryukyu islands: Amami-Oshima, between Nase and Oshima Island: Nishi 77 (7AI); Kosyukyu, *Hurusawa s.n.* (TI, photo, type); near Koniya, *Hatusima* 23992 (A, NA), *Faurie* 4185 (A, BM), *Warburg* 1887 (A, K, UC). Okinawa: *Amano s.n.* (A); Nakagami, Goeku-son, *Walker* 5920 (US). **Japan proper. Kiushu:** Taradake, *Faurie* 3270 (A, BM), Nagasaki, *Oldham* 740 (GH, L). Precise locality unknown: *Siebold s.n.* (L).

Variety *amamiense* is intermediate between var. *iriomotense* and var. *buergeri*. It shares the presence of staminodia with var. *iriomotense* and the leaf shape is similar to that of var. *buergeri*. This variety might be treated as a synonym of var. *buergeri* because staminodia do not appear in all flowers of the same inflorescences nor in different inflorescences of the individual. Thus *Oldham* 740 possesses staminodia on a Gray Herbarium sheet, but not on a specimen of the same collection from the Leiden Herbarium.

5e(c). DAPHNIPHYLLUM GLAUCESCENS subsp. *teijsmannii* var. **iriomotense** (Hurusawa) Huang, comb. nov.

Daphniphyllum teijsmanni var. *iriomotense* Hurusawa, Jour. Jap. Bot. 18: 270. 1942.
(Named for the island of Iriomote, southern Ryukyu)

Daphniphyllum pentandrum Hayata var. *iriomotense* (Hurusawa) Hurusawa, Jour. Fac. Sci. Univ. Tokyo Sect. 3, Bot. 6: 223. 1954.

JAPAN. Ryukyu Islands: Iriomote Island, *Miyazaki s.n.* (TAI); Mt. Mehbaru, *Kimura & Hurusawa s.n.* (TI, photo, type, TI, isotype); Urauchi river, *Hatusima* 18802 (US); Hidori river, Funauki bay, *Walker & Tawad* 6776 (US); Ishigaki-shima, west slope of Yabage-dake, *Fosberg* 38010 (MO); Siraham-Hositate, *Masamuue & Suzuki s.n.* (TAI) drupes with constricted base similar to those of the subsp. *oldhamii* var. *longistylum*); Hoshitate, *Gressitt* 528 (NY). O'shima: *Boehmer* 54A (NY). *Gressitt* 217 (A, NY, BM, L, were labeled as collected from Taiwan, but they are probably mislabelled).

Variety *iriomotense* grows in the forests and coastal hillside at about 200 m. It is morphologically intermediate between members of the sections Staminodia and *Daphniphyllum*. The large membranous leaves with impressed veins of the var. *iriomotense* (*Fosberg* 38010) suggest a greater affinity with *D. himalaense* subsp. *macropodium* than with taxa of *D. glaucescens* complex. Some specimens of var. *iriomotense* have small obovate leaves similar to those of var. *buergeri* from the Ryukyu Islands, yet

they have staminodia on drupes and were collected on the Iriomote Island. Thus they are intermediate.

5e(d). DAPHNIPHYLLUM GLAUCESCENS subsp. *teijsmannii* var. *buergeri* (Muell.-Arg.) Huang, comb. nov.

Daphniphyllum buergeri Muell.-Arg. in DC., Prodr. 16(1): 3. 1868 (named for Heinrich Buerger, 1804-1858, Germany and Holland).

Daphniphyllum roxburghii Rosenth. in Engl., Pflanzenreich 68 (IV. 147a): 9. 1919.

Daphniphyllum teijsmanni var. *teijsmanni* f. *brevipes* Hurusawa, Jour. Jap. Bot. 18: 262. 1942.

Daphniphyllum teijsmanni var. *okinawaense* Hurusawa, loc. cit. 262.

Daphniphyllum teijsmanni var. *oldhamii* (Hemsl.) Hurusawa, loc. cit. 270, ex parte; Walker, Imp't Trees. 161. f. 90. 1954.

Daphniphyllum pentandrum var. *okinawaense* (Hurusawa) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 223. f. 6. 1954.

JAPAN. Honshu, Kanagawa Ken, Suzuki s.n. (TAI), 2589 (TAI), Beattie & Kurihara 10439 (A, US); Wadano Mura, Awa Gun, Furse 19998 (A); Nishimisak Mura, Furse 20085 (UC); Kadzusa, Taitto Mura, Furse s.n. (UC); Idzu, Atami, Mitsushima 869 (A); Kii, Shirahama Chyo, Murata 13862 (NY); Chiba, Mt. Nokogiri Yama, Suzuki s.n. (A, UC); Idsui, Ito, Wilson s.n. (A); Kanuki, Makino 14604 (TAIF); Yokohama Nursery CO., s.n., Sept. 1908 (E); Yokosuka, Drake 1110 (A); Wakayama Ken, Suzuki 21329 (TAI), Kume s.n. (A); Hyogo, Ishikawa s.n., Feb. 1940; Akasi, Muroi 305 (A); Kobe, Ikishima, Muroi 866 (A); Simonoseki, Yamasaki s.n., May 1914 (TAI); Enoshima: Wilson s.n. (A). Hachijo Island: Wilson 8406 (NY). Kiushu: Kagoshima Ken, Hurusawa 207 (US). Sonagi: central range, Esq s.n. (K); north of Tikitsu, near shore of Omura bay, Esq s.n. (K). Shikoku: Tosa, Sasaki s.n. (GH). Sinodu, Wright s.n. (GH, L, NY, US). Precise locality unknown: Buerger s.n. (L, holotype, isotype), Siebold s.n. (L), Hurusawa s.n. (A). Ryukyu Islands: Okinawa, Aoki 5 (TAI); Kunigami, Sonohara 27 (US), Walker & al. 6215 (A, US), Jones 28 (US), Kanehira 3285 (NY); Mabaira, Moran 4985 (E, GH, L, MO, NY, UC, US), 4986 (E, GH, MO, NY, UC, US); Onagaku, Tayo 27641 (TAIF), Simada 14606 (TAIF), Wright 275 (GH, L); Yakushima, Nagata s.n., Aug. 1920 (TAI); Minami Daito, Yanagihara 313 (TAI); Loochow, Price s.n. (K), Wilson 8146 (TAIF); Genkayama, Amano 6960 (A); Nagodake, Amano 6055 (A, US); Yabuson, Amano 7275 (US); Mt. Onnadake, Nakagami Hatusima 17696 (US); Yono Wadake, Masamune & Shinabukuro s.n. (TAI); Ikevazuna, Suzuki s.n. (TAI); Ins. Kumeshima, Kuroiwa s.n. (TI, photo of type of *D. teijsmanni* var. *okinawaense* Hurusawa); Aka Island, Wilson 8056 (A, BM, US). O'shima: Asamimura, Boehmer s.n. (NY), Kamiya 14605 (TAIF) Kanehira 3432 (NY); near Kadena, central port, Carow 9 (US); Gutomura, Nishi 77 (TAI); Isigaki Shima, Fosberg 37178 (MO), 38047 (MO).

KOREA. Quelpaert Island: Chun 1199 (F, MICH), Taquet 744 (A, E), 3176 (A,

E, K), 5956 (E), 5957 (E); Hallensan, Faurie 1986 (A, BM, E), 1987 (E); port Hamilton, Wildford s.n. (GH, NY); Seiki Ho to mushroom home, Wilson s.n. (BM, K, US).

Cultivated. Hongkong: Hance 22309 (BM), s. coll. s. n. (K).

Variety *buergeri* is endemic to Japan, Korea and the Ryukyu Islands and differs from the type which was introduced from Japan to Java. Variety *buergeri* is commonly a bush or small tree on sea shores or islands at low altitudes of from 150 to 300 m. and is cultivated frequently as an ornamental. Flowers are described by collectors as red. Some members of var. *buergeri*, especially plants in the Ryukyu Islands, are very similar to those of subsp. *oldhamii* in Taiwan and continental China. The former differs from the latter usually by having epapillate leaves, yet this character is unconstant. Variety *buergeri* is also similar to subsp. *atrobadium* of the Hainan plants but they can be distinguished by the size of their drupes. Again, some small leaved specimens of var. *buergeri* in the Ryukyu Islands are almost identical to specimens with small elliptic leaves of subsp. *subverticillatum* in Kwangtung province.

Himeyuzuriha, *Yumura*, and *Yumuna* are the Japanese names used in Japan and the Ryukyu Islands.

5e(e). **DAPHNIPHYLLUM GLAUCESCENS** subsp. **teijsmannii** var. **hisautii** (Hurusawa) Huang, comb. nov.

Daphniphyllum pendulum Hurusawa in Hisauti, Jour. Jap. Bot. 16: 308. 1940, nomen.

Daphniphyllum teijsmanni var. *hisautii* Hurusawa, loc. cit. 18: 265. 1942 (Named for Hisauti K., Japanese).

JAPAN. Namazu park, *Hisauti* 2706 (A, paratypes), 2707 (A, isotypes).

Hurusawa separated var. *hisautii* from var. *buergeri* because he observed living plants of both varieties in the same habitat exhibiting different growth forms and fruiting axes, but I cannot distinguish them by herbarium specimens alone.

5f. **DAPHNIPHYLLUM GLAUCESCENS** subsp. **paxianum** (Rosenth.) Huang, stat. nov.—**Fig. 27.**

Daphniphyllum paxianum Rosenth. in Engl., Pflanzenreich 68 (IV. 147a): 13. 1919.

CHINA. Yunnan: Tengyueh, Forrest 7600 (E), 7697 (A, BM, E, K), 9326 (E), 9381 (A, E), 9786 (E), 12323 (E), 25339 (E), 26265 (E, P, US), Rock 6737 (A, UC, US); Szemes, Henry 12064 (A, K, topotypes), 12657 (MO, holotype, A, E, K, NY, isotypes, NY, paratype), 12657a (A, E, K, MO, paratypes); Shweli Salwin divide, Forrest 8243 (E, K), 11903 (A, BM, UC), 13669 (E, K, staminodia present), 17217 (E), 24089 (E), 24186 (E), 25260 (E), 26087 (E, K), Rock 7939 (A, US); Lung Ling Hsien, Tsai 55595 (A), 55680 (A, BO, with very long staminate inflorescences), 55769 (A); Tschangakon, Handel Mazzetti 1094 (A, E, US); Precise locality unknown, Forrest

Fig. 27. **D. glaucescens** subsp. **paxianum** (Rosenth.) Huang. A: Twig with fruits (*Henry* 12657, MO); B: Ovary, longitudinal and cross sections (*Henry* 12657, NY); C: Fruit, longitudinal section, and seed (*Henry* 12657, MO); D: Staminate flower (*Henry* 12657A, E); and E: Stamen, dorsal and ventral views, and anther in cross section (*Henry* 12657, E).



8494 (A, E, K), 26060 (E), 30427 (E). **Szechuan:** Mt. Omei, Omei Hsien, *Fang* 2306 (A, E, NY), 2332 (A, E, K, NY), 3874 (A, E, K), *Chow* 4790 (E), *Hu* 9197 (E, US), *Lee* 3334 (US), 4521 (E), *Sun* 138 (US). **Kwangsi:** Chen Pien district, *Ko* 55994 (A); Na Kan, Ling Yun Hsien, *Steward & Cheo* 181 (A, BM, BO, NY), 633 (A, BM, BO, NY); Pin Lam, *Ko* 55596 (A); Precise locality unknown; *Wang* 41250 (A).

LAOS. Between Luang Kabang and Nintiane, *Joseph s.n.* (L).

Subspecies *paxianum* is found in shady thickets on hills, by streams on hills, open sites among scrub, and in forests at altitudes of from 1800 to 2100 m. Flowers are green to brown or olive-yellow and fragrant. According to the herbarium label of *Steward* and *Cheo* 181, the pollen is gray and fragrant. The fruit is from deep blue, purple, to red-black. Subspecies *paxianum* may be a synonym of subsp. *beddomei*, but both are accepted as distinct subspecies until more specimens of subsp. *beddomei* are available for intensive comparative study. The specimens from Kwangsi suggest an intermediate form between plants from Yunnan and Hainan.

5g. DAPHNIPHYLLUM GLAUCESCENS subsp. **atrobadium** (Croizat & Metcalf)
Huang, stat. nov.

Daphniphyllum atrobadium Croizat & Metcalf, Ling. Sci. Jour. 20: 108. 1941. (Named for its uniformly dull brown color of leaves).

Subspecies *atrobadium* is very common on wooded slopes, along streams in forests, and in mixed forests on mountains at altitudes of from 360 to 1560 m. Living plants have gray bark, red to scarlet-red flowers, and green-black and dark purple drupes.

CHINA. Hainan: Po Ting, *How* 73071 (A, holotype, BM, isotype); Dung Ka to Wu Fa Shi, *Chun & Tso* 43750 (A, NY, US); Mo San Leng, *Chun & Tso* 44308 (A, NY, US); south slopes of south Tiger mountain, *Chun* 2053 (UC); Kan En district, *Lau* 3718 (A), 5264 (A), 5488 (A), 5503 (A), Bak Sa, *Lau* 26569 (A), Tingon, *Lau* 28158 (A); Yaichow, *Liang* 63122 (A, NY), 63155 (A, NY, US), 63401 (NY, US), 63416 (A, E, NY), 63420 (E, NY), 65264 (A, E, NY), *Wang* 35708 (NY, US), 36591 (A, NY, US); Peh-Sar, *Lau* 25449 (TAI).

The oblong-lanceolate leaves and obovoidal drupes of the type specimens of subsp. *atrobadium* suggest subsp. *oldhamii* and subsp. *beddomei*, respectively, but subsp. *atrobadium* can be separated from subsp. *oldhamii* because the leaves are neither papillate nor glaucous on their lower surfaces, and from subsp. *paxianum* and subsp. *beddomei* by their large, tuberculate drupes. Subspecies *atrobadium*, subsp. *paxianum* and subsp. *beddomei* differ from each other mainly by the size of their drupes.

5h. DAPHNIPHYLLUM GLAUCESCENS subsp. **oldhamii** (Hemsl.) Huang, stat. nov.
Daphniphyllum himalayense sensu Hayata, Jour. Coll. Sci. Tokyo 20: 34. 1904, non Muell.-Arg., 1869.

Daphniphyllum formosanum Rosenth., Monogr. *Daphn.* 31. 1916, non Keng 1951.

Daphniphyllum pentandrum Hayata, Jour. Coll. Sci. Tokyo 30: 265. 1911.

- Daphniphyllum teijsmanni* var. *pentandrum* (Hayata) Hurusawa, Jour. Jap. Bot. 18: 272. 1942.
- Daphniphyllum teijsmanni* subsp. *oldhamii* var. *pentandrum* Hurusawa, loc. cit. 273.
- Daphniphyllum teijsmanni* subsp. *oldhamii* var. *oldhamii* Hurusawa, loc. cit.
- Daphniphyllum glaucescens* var. *oldhamii* Hemsl., Jour. Linn. Soc. 26: 429. 1894.
- Daphniphyllum oldhamii* (Hemsl.) Rosenth. in Engl., Pflanzenreich 68 (IV. 147a): 8. 1919.
- Daphniphyllum longistylum* sensu Croizat & Metcalf, Ling. Sci. Jour. 20: 114. 1949, ex parte, non Chien 1933.
- Daphniphyllum pentandrum* var. *oldhamii* (Hemsl.) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 221. 1954.
- Webera marchandii* Léveillé, Repert. Spec. Nov. 13: 178. 1914.
- Daphniphyllum marchandii* (Léveillé) Croizat & Metcalf, Ling. Sci. Jour. 20: 117. 1941, ex parte, non Chien 1933.
- Daphniphyllum reticulatum* Keng, Jour. Wash. Acad. Sci. 41: 203. 1951, non Heine 1951.
- Daphniphyllum crispifolium* Keng, loc. cit.
- Daphniphyllum membranaceum* Hayata var. *crispifolium* (Keng) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 218. 1954.
- Daphniphyllum pentandrum* var. *reticulatum* (Keng) Hurusawa, loc. cit. 223.

KEY TO VARIETIES

- a. Calyx caducous in fruit.
 - b. Drupes without constricted base; style short.....5h(a). var. *oldhamii*
 - bb. Drupes with constricted base; style long5h(b). var. *longistylum*
 - aa. Calyx persistent in fruit.....5h(c). var. *salicifolium*
- 5h(a). DAPHNIPHYLLUM GLAUCESCENS** subsp. *oldhamii* var. ***oldhamii***. (Named for R. Oldham)—Fig. 28.

The separation of var. *pentandrum* from var. *oldhamii* has proved impossible for *Huang 2301* (Fig. 6, F), *Tanaka & Shimada 13531*, *Yu s.n.*, and *Wang s.n.* (Fig. 6, A-E), since their collections possess both staminodia in staminate flowers and perfect staminate flowers. The staminodia, called glands by Hayata (1911), in the staminate flowers occur sparingly in many subspecies of the section *Daphniphyllum*. The type specimen of *D. pentandrum* on which Hayata based his original description possesses only a few flowers when collected (Croizat, 1941). Leaves of var. *oldhamii* vary according to geographical distribution, e.g., ovate-lanceolate in Kiangsi province, elliptic-ovate in Vietnam, small, oblong-obovate in Kwangtung province, and small, oblong-elliptic to oblanceolate in Kwangtung province and Taiwan.

A correlation between the number and size of stamens and the size of inflorescences has been observed. For example, specimens of *Mori 14598* (TAIF) have

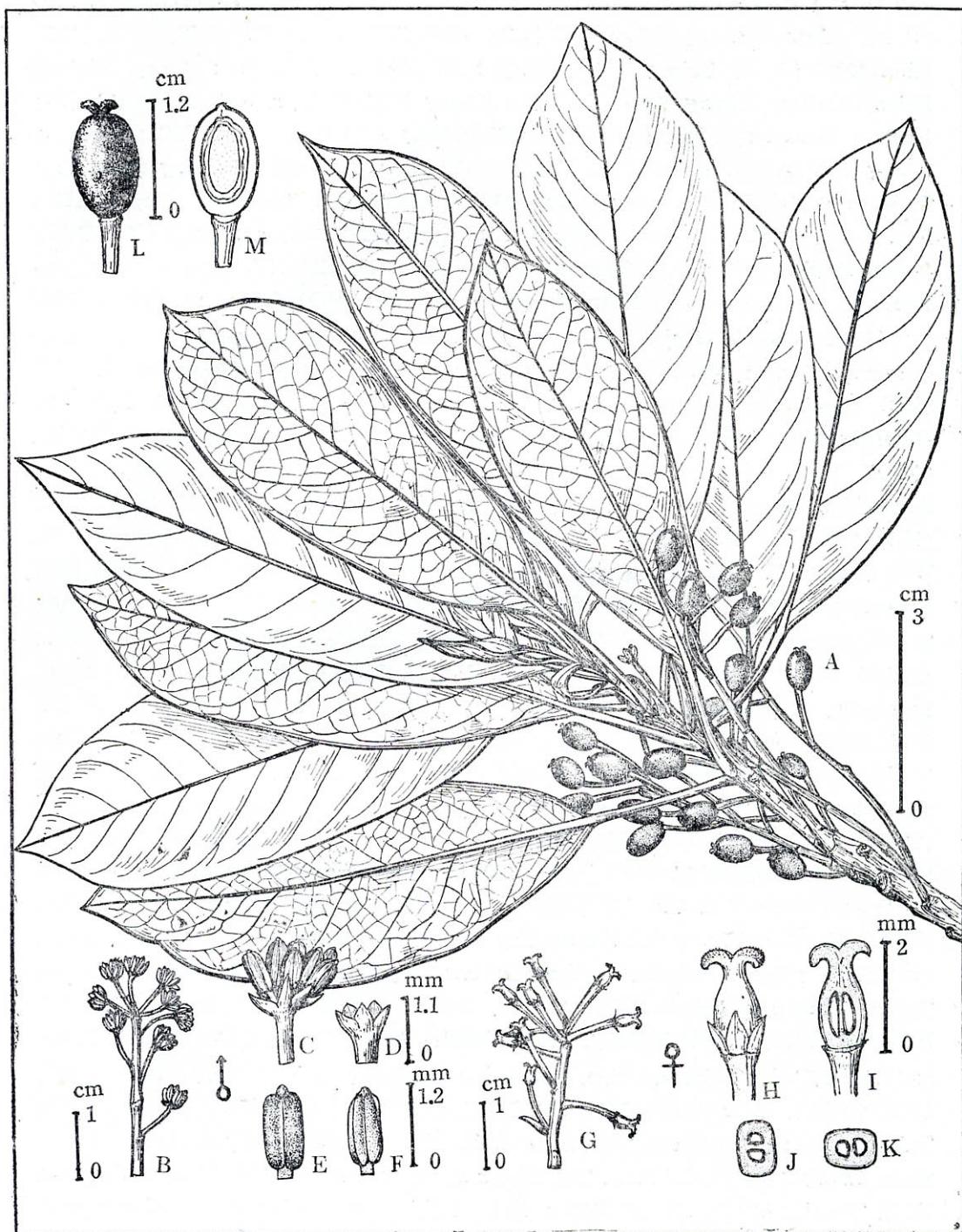
7-9 stamens per flower and the anthers are 0.5 mm. long and 0.4 mm. wide, while inflorescens are 2 cm. long with pedicels 1 cm. long. Specimens of *Sasaki 14591* (TAIF) have 10-12 stamens per flower and the anthers are 1.3 mm. long and 0.6 mm. wide, while inflorescences are 5.5 cm. long with pedicels 2 cm. long.

The following specimens show individual variations and might be accepted as distinct varieties, but names will not be attached to them at the present time.

1. *Chun 40236* (A) from Kwangtung: a plant with extremely short, small, obovate-elliptic leaves, 4-6 cm. long and 2-2.5 cm. wide; thick fruiting pedicels and pericarp; and caducous calyx.
2. *Ko 56085* (A) from Kwangsi: a plant with obovate-oblong leaves, 5.5-9.5 cm. long and 2-3.5 cm. wide (similar to *D. neilgherrense*) and very short, but thick, fruiting pedicels, 5 mm. long.
3. *Poilane 217* (A) from Cambodia: a plant with yellowish-brown, oblong-obovoidal drupes.
4. *Sasaki 14591* (TAIF) from Taiwan: a plant with long (5.5 cm.) inflorescences and long (20 mm.) pedicels, and numerous (10-12) stamens with anthers 1.3 mm. long and 0.6 mm. wide.
5. *Henry 518* (A, K, NY) from Taiwan: a plant with long filaments (5-7 mm.) and very narrow elliptic-lanceolate leaves, 6.5-12 cm. long and 1.5-2.5 cm. wide.
6. *Faurie 193* (BM) and *Liu et al. 0092* (A, MOAR, TAI) from Taiwan; plants with staminodia persistent on drupes.
7. *Sasaki 217* (A, TAIF), *Faurie 193* (BM), and *Chao 615a* (MO) from Taiwan: plants with triangular, oblique anthers.
8. *Simada 366* (UC) and *Kudo & Sasaki s.n.* (TAI) from Taiwan: plants with divided apex of leaves.
9. *Tanaka & Simada 13531* (TAIF) of Taiwan; and *Tsang 22013* (A), *Wang 39128* (A), and *Tsoong 81513* (A) from mainland China: plants with long filaments.
10. *Sasaki 14619* (TAIF) from Taiwan: a plant with epapillate leaves, similar to subsp. *teijsmannii* var. *buergeri*.
11. *Suzuki 6809* (TAI), *Chang & Lin 4789* (UC) from Taiwan; and *Tsang 30270* (A) from Vietnam: drupes with constricted base, similar to var. *longistylum*.

CHINA: **CHEKIANG:** Nanyen-tang, Shien-ku-tung, *s. coll. 142* (A); Taipai Shan, *Keng 1128* (A, UC); Tien Tai Shan, *Faber 263* (K), *Ching 2610* (A); King Yuan,

Fig. 28. *Daphniphyllum glaucescens* subsp. *oldhamii* (Hemsl.) Huang. A: Twig with matured fruits (*Lu s. n.*, September 16, 1962, MO, TAI); B: Staminate inflorescence (*Lu s. n.*, March 24, 1963, TAI); C: Staminate flower (*Lu s. n.*, March 24, 1963, TAI); D: Calyx (*Lu s. n.*, March 24, 1963, TAI); E-F: Anther (*Lu s. n.*, March 24, 1963, TAI); G: Pistillate inflorescence (*Lu s. n.*, April 21, 1963, TAI); H: Pistillate flower (*Lu s. n.*, April 21, 1963, TAI); I: Longitudinal section of ovary (*Lu s. n.*, April 21, 1963, TAI); J-K: Cross section of ovary (*Lu s. n.*, April 21, 1963, TAI); L: Fruit (*Lu s. n.*, September 16, 1962, TAI); M: Longitudinal section of fruit (*Lu s. n.*, September 16, 1962, TAI); Both pistillate flowers and fruits were collected from the same tree at different time.



Ching 2473 (A, BM, NY, UC, US); south of Ping Yung, *Ching* 1978 (A, BM, NY, UC, US); Szeton, south of Siachu, *Ching* 1720 (A, E, UC). **Hongkong:** *Bodinier* 1053 (E, P), *Cheflo* 1093 (E), *Chun* 5201 (UC), 5217 (UC, NY), 6571 (UC), 6657 (UC), *Chun* 40267 (A, E), *Tsiang* 65 (A), *Wright* 421 (GH, US). **Fukien:** Amoy, Minhow Hsien, Kushan, *Chung* 8475 (A, NY), *Cheng* 1581 (UC), s. coll. 14607 (TAIF); Kushan Monastery, *Chung* 2273 (A, UC), *Cheng* 1515 (UC), 1516 (UC); Kuliang, *Chung* 6722 (A), 7918 (A, NY), *Tsang* 13597 (A); Futshaw, *Warburg* 5868 (A); **Taiwan:** Taipei Hsien, Kiirung, *Tanaka* 342 (A, BM, TAIF), *Kawakami* 14586 (TAIF), *Faurie* 425 (A, BM, P), Ensorei, *Suzuki* s. n., April 1928 (TAI), s. n., April 1929 (TAI), *Yamamoto* s. n., 1929 (TAI), Tamsui, *Oldham* 497 (BM, GH, NY, types of *D. glaucescens* var. *oldhamii* Hemsl.), Kuan Yin Shan, *Chao* 615a (MO), 615b (MO), *Simada* 1201 (TAI), Shuhun, *Liu et al.* 001310 (TAIF), 001311 (TAIF), Yangming Shan, *Yamamoto* s. n., August 1928 (TAI), *Huang* 2401 (MO), 2403 (MO), *Chuang & Lin* 4789 (UC), *Suzuki* s. n., October 1927 (TAI), *Sasaki* 14589 (TAIF), *Hsu & Kao* 3296 (MOAR, TAI), *Kao & Kou* s. n., April 1957 (TAI), 001314 (TAF), 001315 (TAF), 001309 (TAF), *Liao et al.* 001312 (TAF), *Kudo & Suzuki* 3290 (TAI), *Kudo, Suzuki & Mori* s. n., April 1929 (TAI), Chutzehu, *Huang* 2307 (MO), 2310 (MO, TAI), 2313 (MO), 2318 (MO, TAI), 3303 (TAI), 3314 (TAI), Lu 11-19 (MO), s. n., September 16, 1962, October 21, 1962, November 4, 1962, March 24, 1963, April 21, 1963, June 30, 1963, November 14, 1964 (TAI); *Chao* 529 (MO), Hokuto, *Murakami* 148 (TAI), 110 (TAI), Sengio Shan, *Nakamura* 1986 (TAI), Sa Bo San, *Simada* 14590 (TAIF), Horan San, *Konishi* 1907 (TAIF), *Kudo & Mori* s. n. (TAI), Chihsin Shan, *Huang* 2312 (MO), Daitonzan, *Masamune* 295 (TAI), *Suzuki* S. 10200 (TAI), s. n., October 1923 (TAI), 7511 (TAI), *Suzuki* T. 6809 (TAI), Hsintien, *Keng* 1142 (A, MOAR, TAI, US), *Simizu* 2971 (TAI), *Simada* 1063 (TAI), Sufen, *Owatari* s. n., December 1897 (TI, photo type, TI, paratype), Agyoku, *Suzuki* 14738 (TAI), *Kawakami et al.* 7632 (TAIF), Urai, *Faurie* 193 (BM), Shihting, *Keng & Kao* 1314 (A, MOAR, TAI, UC, US), Taranan, *Suzuki* T. 17906 (TAI), Sendanyama, *Suzuki* T. 7414 (TAI), Precise locality unknown, *Kanehira* 367 (UC), *Sasaki* 14591 (TAIF), *Wilson* 10207 (A, BM, US), Zuiho, *Kanehira & Sasaki* s. n., May 1918 (TAI), *Sasaki* 217 (A, TAIF), s. coll. 216 (TAIF); Ilan Hsien, Suoo, *Masamune* s. n., April 1938 (TAI); Taoyuan Hsien, Toyen, *Tanaka & Simada* 13531 (TAIF), 13532 (A, E, F, L, MICH, NY, TAF, UC, US), 619 (TAF), *Sasaki* 14593 (TAIF), *Simada* 14594 (TAIF), 14609 (TAF), *Yamamoto* 9291 (TAI); Hsinchu Hsien, Ko-ko, *Sasaki* 14610 (TAIF), *Simada* 13881 (TAF), 13906 (TAF), 1731c (TAI), 1730b (TAI), Sinchu, *Simada* 366 (UC), 14611 (TAIF); Taichung Hsien, Taichung, *Yasukawa* 14613 (TAI, TAIF), 001316 (TAF), Tashe Shan, *Chang* 2 (MO), Chia Pau Tai, *Liao* s. n., September 10, 1962 (TAI), *Keng* s. n. (US), To-sei, *Liao* 6 (MO), 7 (MO); Nantou Hsien, Musyasantinozyo, *Masamune* & Nakamura 2252 (TAI), Shui She, *Kanehira & Sasaki* 14595 (TAIF), Rengechi, *Yu et al.* s. n. (MOAR, TAI), Gyochi, *Yamamoto* s. n., Oct. 1929, Sun Moon Lake, *Kudo* s. n.

(A), *Kudo & Sasaki* 15115 (TAI), (MO) 15336a (TAI, paratype of *D. crispifolium* Keng), 15336b (TAI, holotype of *D. crispifolium* Keng), *Yamamoto s.n.* (TAI), *Wilson* 11178 (A, BM, K, US), *Mori* 4529 (TAIF), *Hsitou*, *Liu* 0.01313 (TAIF), *Ching Shui Kou*, *Huang* 136 (TAF), *Lake Gandidus*, *Wilson* 9995a (BM); *Chayi Hsien*, Mt. *Ali*, *Hayata & Tanaka* 14597 (TAIF); *Hualien Hsien*, *Taroko*, *Suzuki* 9880 (TAI, type of *D. reticulatum* Keng), 9987 (TAI), *Sui Dam forest*, *Suzuki s.n.* (TAI); *Taitung Hsien*, *Sasaki* 14619 (TAIF), *Faurie* 1881 (A), *Shoucha* to *Shusui-boo*, *Liu & Keng* 2806 (MOAR TAI), *Kai Gan San Miaku*, *Hurukawa* 14602 (TAIF); *Kaoushioung Hsien*, *Liukuei*, *Wang* 9 (MO), *s.n.*, September 30, 1962 (TAI); *Pingtung Hsien*, *Keng-ting*, *Kao* 4228 (MO), *Ako*, *Airiku Gi Shan*, *Mori* 14598-9 (TAIF), *Kusukusu Kudo & Suzuki* 15947 (TAI, paratype of *D. reticulatum* Keng), *Matsuda* 14627 (TAIF), *Wang* 3 (MO), *s.n.*, March 24, 1963 (TAI), *Chang* 2106 (TAI), *Kuaru*, *Yamada* 14616 (TAIF), *Giran Shan*, *Kawakami & Sasaki* 14617 (TAIF), *Bankinsing*, *Henry* 518 (A, K, NY), *Hengchun*, *Yamada* 14615 (TAIF), *Daijurin*, *Kudo & Mori* 2793 (TAI), *Hiira Shan*, *Hurukawa* 14601 (TAIF), *Matsuda* 919 (TAI, paratype of *D. reticulatum* Keng). **Hunan:** *Tsingtschou*, *Handel-Mazzetti* 2182 (A); *I-Chia-ao*, *Changning Hsien*, *Fan & Li* 144 (A, BM, BO), *Yi Chang district*, *Ping You Shan*, *Tang Wan village*, *Tsang* 23521 (A, BM, US), 23624 (A, US). **Hupeh:** *Enshih Hsien*, *Chow* 1786 (A, E, NY); *Changyoung Hsien*, *Wilson* 3727 (A), 2960 (A, BM, E, F, K, GH, MO, US). **Kiangsi:** *An Fu Woo Kung Shan*, *Hu* 740 (A); *Tzu Chi Hsien*, *Hu* 1253 (A); *Shui Shueng Hsien*, *Hsiung* 5449 (A); *Oo Chi Shan* near *Lamuk village*, *Lau* 4677 (A, BM, US); *Sai Hang Cheung*, near *Tung Lei village*, *Lau* 3950 (A, BM, US); *Huan-ling Shan*, *Kao An*, *Tsiang* 10463 (NY). **Kwangsi:** *Seh-feng Da Shan*, *Ching* 7840 (A, NY), 8001 (A, UY); 8208 (NY); *Chuen-yuan*, *Chung* 82023 (A); *Ling-chuen district*, *Chung (Tsoong)* 83701 (A); *Kweilin district*, *Tachiang-yuan village*, *Tsang* 28228 (A, US); *Shap Man Taai Shan*, *Nam She village*, *Tsang* 22013 (A), 24152 (A, F, MO, NY), 24754 (A, F, MO, NY), 22013 (A), *Yang Wu village*, *Tsang* 27924 (A, US); *Shuen Yuen*, *Tsoong* 81513 (A); *Yao Shan*, *Wang* 39128 (A), 39368 (A), 40187 (A). **Kwangtung:** 10 li from *Bei Shen*, *Chun* 5671 (A), *Nan On* to *Chang Tung Hang*, *Chun* 5739 (A, E); *Hsung Shan*, *Paak Shui Lam*, *To* 6273 (K, NY); *Pan Ling Tsze*, *Chun* 5854 (A, UC); virgin forest of *Wabaug*, *Feuzel* 26 (UC); *Lung Tou Shan*, *Ko* 50253 (NY), *To*, *Tsang & Tsang* 12121 (E, MOAR, NY, UC); *Tsing Wan Shan*, *Lau* 2263 (A); *Nan Keng*, *Yashan*, *Sin* 1182 (NY), *Yan Shan*, *Sin* 9708 (NY), *Shih Pikeng*, *Sin* 9752 (NY); *Sha Lo Shan*, *Wa Mei Tong village*, *Taam* 137 (A), 189 (A); *Ngok Shing Shan*, *Taam* 316 (A), 496 (A); *Ah Po Kai Shan*, *Taam* 597 (A); *Hsung Shan*, *To* 6273 (K, NY); *Lok Chong*, *Tso* 20673 (NY), 20769 (NY), 20920 (NY, TAI), 21063 (NY), 21171 (NY); *Chong Uen Shan*, *Tsang* 20795 (A, BO, MO, NY, TAI, UC); *Tai Tsan*, *Tak*, *Tsang & Chow* 14660 (UC); *Sam Kok Shan*, *Tsang* 25005 (A); *Tai Mo Shan*, *Tsang* 21031 (A, NY, UC); *Man Chi Shan*, *Tsang* 26294 (A); *Naam Kwan Shan*, *Tsang* 25299 (A), 20204 (A, NY); *Yam Na Shan*, *Tsang*

21509 (A, BO, K, NY, UC); Lin Fa Shan, *Tsang* 25764 (A); Bride valley, Wu Kan Ting, *Tsiang* 0065 (E, UC); Kowloon, *Wang* 3050 (NY); Wung-yuen, Lau 24085 (TAI). **Szechuan:** Omei Shan, *Hwa* 155 (UC), *Law* 517 (K), 4550 (E), *Sun* 1982 (US), 2066 (US), *Wang* 23225 (A), 20678 (A, TAI).

CAMBODIA. Elephant mountain, *Poilane* 217 (A); *d'Alleizette*, s. n., June 1909 (L).

VIETNAM. Tonkin: Su Yang Pinch Pri Chapa, Chapa et Cholo, *Poilane* 12724 (A), Kau Nga Shan, Tien-yen, *Tsang* 27387 (A, P); Sai Wong Mo Shan, *Tsang* 30270 (A, BO); Pacsi, *Tsang* 26881 (A). Quangtri: Dent Du Tigre, *Poilane* 10296 (A), 10334 (A), 10357 (A). Bte Donnai: *Pételot* 8878 (A). Baie, Hongay, *Balansa* s. n. (A).

The vernacular names are: *Chionam* (石楠, Taiwan dialect), *Raohuei* (老虎耳, Kwangtung dialect), *Osu Hupinan* (奧氏虎皮楠), *Shiao Chiao Runmu* (小交讓木), *Nanin Hupinan* (南寧虎皮楠) in China, and *Sima Yuzuriha* in Japan.

5h(b). **DAPHNIPHYLLUM GLAUCESCENS** subsp. **oldhamii** var. **longistylum** (Chien) Huang, stat. nov.

Daphniphyllum longistylum Chien, Contr. Biol. Lab. Sci. Soc. Bot. Ser. China 8: 239. 1933. (Named for its long style on the drupe).

Daphniphyllum longistylum Croizat & Metcalf, Ling. Sci. Jour. 20: 114. 1941, pro parte, non Chien, 1933 (etymological variant for specific epithet).

CHINA. **Kwangsi:** north Luchen, Miu Shan, *Ching* 6234 (NY, isotype); Shap Man Taai Shan, *Tsang* 22558 (A, BM).

Variety *longistylum* is characterized by its drupes which are constricted at base and have long styles. The concept of *D. longistylum* by Croizat and Metcalf in the Arnold Arboretum Herbarium is too wide and includes several different entities, viz., *D. himalaense* subsp. *macropodum* and subsp. *angustifolium* of the section Staminodia, and *D. glaucescens* subsp. *paxianum* and subsp. *oldhamii* of the section Daphniphyllum.

5h(c). **DAPHNIPHYLLUM GLAUCESCENS** subsp. **oldhamii** var. **salicifolium** (Chien) Huang, stat. nov.

Daphniphyllum salicifolium Chien, Contr. Biol. Lab. Sci. Soc. Bot. Ser. China 8: 242. 1933. (Named for its leaves resembling to *Salix*).

Daphniphyllum oblongum Chien, loc. cit.

Daphniphyllum formosanum Keng, Jour. Wash. Acad. Sci 41: 223. 1951, non Rosenthal, 1916.

Daphniphyllum Kengii Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 233. 1954.

CHINA. **Taiwan:** Taipei Hsien, Kiirun, Ensorei, s. coll. s. n. (TAI), Hikiganzan, Suzuki 4814 (TAI, paratype), Yang-mingshan, *Keng* & *Kao* 2610 (A), *Faurie* 1039 (A), 1040 (A), Tamsuy, *Henry* 1399 (US), Sirin, *Tanaka* & *Simada* 17827 (TAI), *Odashima*

Fig. 29. **D. glaucescens** subsp. **beddomei** (Craib) Huang. A: Twig with fruits (*Lace* 5607, K); B: Ovary, longitudinal and cross sections (*Beddome* 72, K); C: Fruit, longitudinal section, and seed (*Lace* 5607, K); and D: Staminate flower, calyx, stamen and anther in cross section (*Kerr* 3101, BM).



17827 (A, E, F, L, NY, PNH, TAF, US), Rarasan, *Matsuda* 14587 (TAIF), 14614 (TAIF); Taichung Hsien, Mt. Ammashan, *Liu et al.* 0092 (A, MOAR, TAI); Nantou Hsien, Hori, *Kanehira* 14612 (TAIF), Musya, *Masamune & Nakamura* 2252 (TAI), Lake Gandidus, *Kanehira* 21333 (A, NY, UC), *Wilson* 9995 (A, K); Kaoshiung Hsien, Nanibuntoge, *Kudo & Suzuki* 1615 (TAI, paratype of *D. formosanum* Keng); Pingtung Hsien, Kusukusu, *Matsuda* 14600 (TAIF), 14618 (TAIF), 14620 (TAIF); south Cape, *Henry* 668 (E, K, NY), 996 (BM, US), 1290 (A, K, NY), *Syusuha, Kudo & Mori s. n.*, Dec. 1930 (TAI); Taitung Hsien, Shin Shui Ei, *Kanehira* 14603 (TAIF); Hualien Hsien, Gukutu, *Matsuda* 1155 (TAI, holotype of *D. formosanum* Keng); Ilan Hsien, Mt. Bonbon, *Kao* 5919 (TAI). **Fukien:** south of temple, Jusha, *Cheng* 1577 (UC); Ku-liang, *Chung* 6785 (A), Minhow, *Ching* 2273 (A, UC). **Hongkong:** *Chun* 40236 (A). **Kwangsi:** Paiyunan, Hwangshaho, *Tsang* 27717 (A, US), south Nanning, Hsi Wan Tai Shan, *Ching* 7938 (A, NY, UC, US, isotypes of *D. salicifolium* Chien). **Kiangsi:** Ooshi Shan, *Lau*, 4476 (A, BM, US). **Kwangtung:** Chong Uen Shan, *Tsiang* 1314 (A, E, K, UC, US). **Szechuan:** Mt. Omei, *Lee* 3127 (US), Chung Hsien, *Chiao & Fan* 442 (A). **Kweichow:** Tuhshan, *Tsiang* 6659 (A, NY, UC, US).

VIETNAM. Sai Wong Mo Shan, Long Ngon village, Damha, *Tsang* 30381 (A, BO); Taai Wong Mo Shan, *Tsang* 29517 (A, MO).

Variety *salicifolium* is always a pistillate plant with a persistent calyx on the drupes. However, calyces do not appear in all drupes of the same fruiting axis nor on different fruiting axes of the same individual.

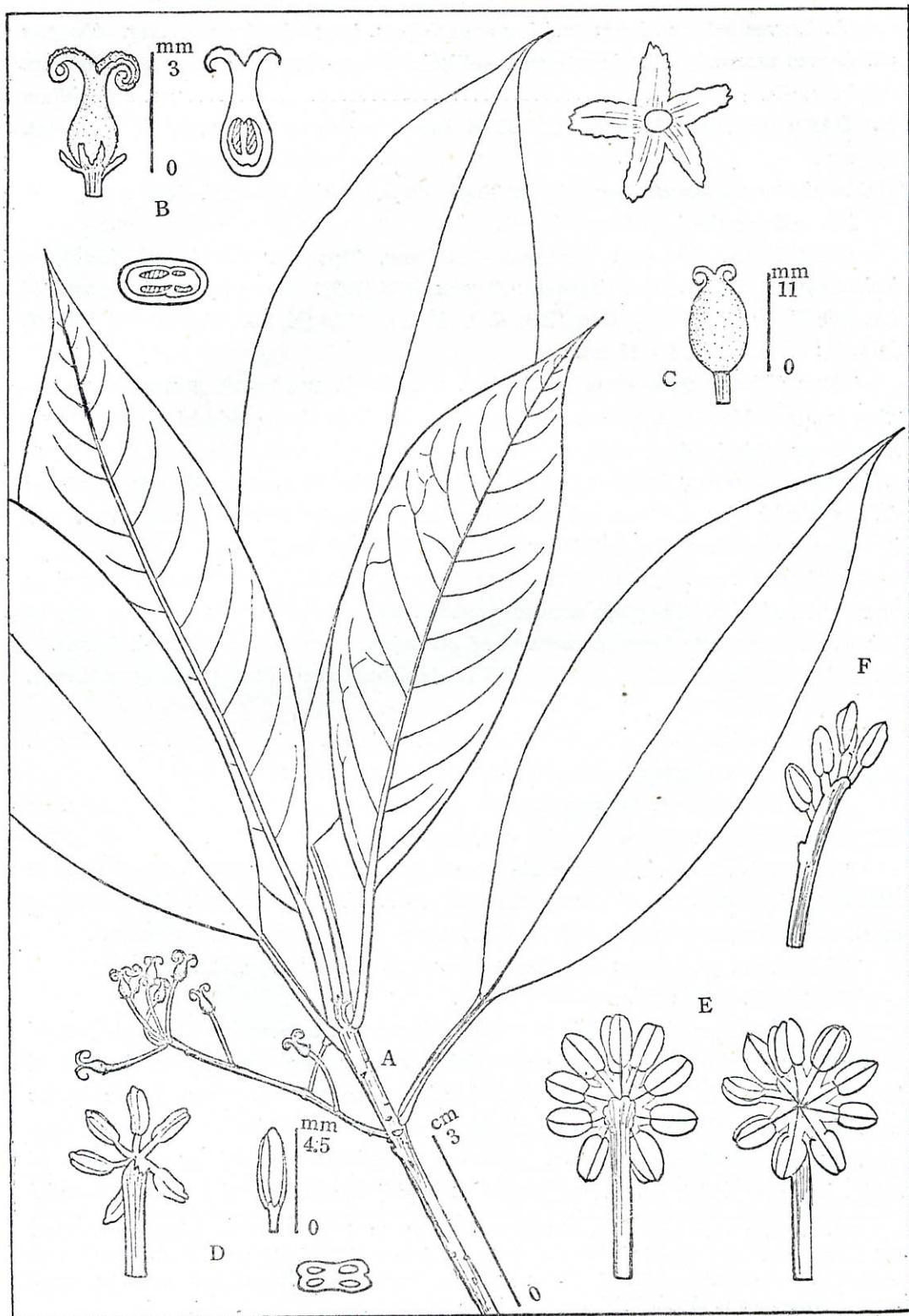
Variety *salicifolium* is very similar to the small leaves of *D. glaucescens* subsp. *subverticillatum* and subsp. *oldhamii* (or *D. marchandii*) which were collected at the same or neighbouring localities of Kwangtung province. It differs from subsp. *subverticillatum* by having papillate leaves and from subsp. *oldhamii* (*D. marchandii*) by having persistent calyx on mature drupes.

It should be pointed out that var. *salicifolium* can be separated readily from *D. kengii* and *D. oblongum* by the following key referring only to those type specimens; thus they can be considered as three different varieties or forms. However, these quantitative key characters may not hold if more collections are available in the future.

KEY TO VARIETIES

- a. Leaves oblong or oblong-elliptic.
 - b. Leaves 4-7 cm. long; fruiting axes 4-5 cm. long; Taiwan.....var. *kengii*

Fig. 30. *D. glaucescens* subsp. *Iuzonense* (Elmer) Huang (A-E) and *D. gracile* Gage (F). A: Twig with pistillate flowers (*Elmer* 8615, NY); B: Ovary, longitudinal and cross sections (*Elmer* 8615, NY); C: Fruit (*Elmer* 6290, US); D: Staminate flower, stamen, and anther in cross section (*Ramos & Edano* 38507, A); E: Abnormal flowers showing jointed adjacent filaments in back and front views (*Sulit* 21554, PNH); and F: Abnormal flower showing elongate arrangement of stamens (*Pullen* 300, CANB).



- bb. Leaves 9–13 cm. long; fruiting axes 7–8 cm. long; Szechuanvar. *oblongum*
- aa. Leaves narrowly elliptic to obovate-elliptic, 5–8 cm. long; fruiting axes 5–7 cm. long; Kwangtung..... var. *salicifolium*

5i. DAPHNIPHYLLUM GLAUCESCENS subsp. *celebense* (Rosenth.) Huang stat. nov.

Daphniphyllum celebense Rosenth. in Engl., Pflanzenreich **68** (IV. 147a): 5. 1919.
(Named for the island of Celebes).

INDONESIA. Celebes: Bonthain, Boekang, Teysmann 13664 (BO, lectotype, isolectotypes), 14088 (BO). Ternate: Beguin 1478 (BO). Morotai: Kostermans 1217 (A, BO, K, L), 1218 (K), 1229 (BO, K, L, PNH), 1329 (K, L). Sangi and Talaud Islands: Lam 3706 (BO, K, L).

Three different taxa exist in Celebes, namely *D. gracile*, *D. glaucescens* subsp. *glaucescens* and subsp. *celebense*. Although *D. celebense* is considered a subsp. of *D. glaucescens*, this is done with reservation for the type specimen of *D. celebense* collected by Warburg 16903 (Celebes) is not available for study and was destroyed during World War II. The caducous calyx on staminate flowers of subsp. *celebense* is a common characteristic of *D. gracile*.

Specimens from Morotai, Ternate, Sangi, and Talaud Islands may be treated as another subspecies. They are similar to subsp. *celebense* by having the same type of leaves, but similar to subsp. *borneense* and *ceramense* by possessing smooth drupes.

5j. DAPHNIPHYLLUM GLAUCESCENS subsp. *beddomei* (Craib) Huang, stat. nov.

—Fig. 29.

Daphniphyllum beddomei Craib, Kew Bull. **1916**: 268. 1916. (Named for R. H. Beddome).

Daphniphyllum cambodianum Gagnep., Bull. Soc. Bot. Fr. **71**: 138. 1924.

BURMA. Amherst: Spur to Mulegit from Mikalaung, Dawua range, Lace 5607 (E, K, paratypes), Beddome 72 (K, paratype), 7175 (BM, paratype).

CAMBODIA. Kompong Som: Kirisom mountain near Sihanonville, Smitinand & Abbe 6439 (K); Thepong: Knang Krepeuh, Pierre s. n. (A, E, UC, US, topotypes of *D. cambodianum* Gagnep.), 860 (A, E, P, types of *D. cambodianum* Gagnep.).

THAILAND. Pa Miang: Che Sawn, Kerr 3101 (K, holotype, E, isotype).

VIETNAM. Dalat: Evrard 1999 (A, P).

For an understanding of this taxon, it is important to examine the holotype of Kerr 3101 from the Kew Herbarium, which possesses two very different types of leaves, namely broadly falcate leaves with thick veins, and narrower elliptic leaves with thin veins. Some members of this subspecies are very similar to subsp. *luzonense*, subsp. *atrobadium*, and subsp. *paxianum*, especially the fruiting specimens of subsp. *luzonense* which cannot be separated from this subspecies satisfactorily. Material

Fig. 31. **D. glaucescens** subsp. **dichotomum** Huang. A: Twig with fruits (*Clemens s. n. Suppl.*, UC); B: Ovary, longitudinal and cross sections (*Clemens 32385*, UC); C: Fruit, longitudinal section, and seed (*Clemens 3385*, A); and D: Staminate flower, stamen and anther in cross section (*Clemens s. n. Suppl.*, UC).



of *Pierre s. n.* has numerous cross scars on the upper ends of the fruiting pedicels which might be caused by insects.

5k. DAPHNIPHYLLUM GLAUCESCENS subsp. *luzonense* (Elmer) Huang, stat. nov.—**Fig. 30.**

Daphniphyllum luzonense Elmer, Leaf. Philipp. Bot. 1: 309. 1908. (Named for the island of Luzon)

The vernacular names for this subspecies are *Halahala* and *Hawitin-human* in the Ifugao dialect and *Haigoy* in the Monobo dialect.

PHILIPPINES. **Biliran:** Suiro mountain, *Sulit* 21554 (L, PNH). **Luzon:** Benguet, Mt. Santo Tomas, *Williams* 1337 (GH, US); *Elmer* 6290 (BO, K, NY, US), 8615 (L, holotype, A, BO, E, K, MO, NY, isotypes); Ifugao, *McGregor* 19962 (US), *Conklin & Buwaya* 78704 (L, PNH); Mountain province, *Beyer* 6852 (A, PNH); Ilocos Norte province, *Ramos* 32838 (L); Tayabas province, Mt. Alzapan, *Ramos & Edano* 15660 (A, BM, BO, L, NY, US). **Mindaro:** Mt. Halcon, *Merrill* 5658 (NY, US), *Rabor* 20481 (L, PNH). **Mindanao:** Bukidnon province, Mt. Katanglad, *Sulit* 10138 (A, L, PNH); Camaguin, *Ramos* 14623 (A, BM, K, US); Mt. Lipa, *Ramos & Edano* 38507 (A, K, US), 38516 (BO, L), 38522 (A, K, US); Mt. Candoon, *Ramos & Edano* 38743 (A, BM, BO); Agusan province, Mt. Hilong-hilong, *Mendoza & Convocai* 861 (A, L, PNH). **Palawan:** Puerto Princesa, Mt. Pulgar, *Elmer* 13194 (BO, E, F, L); Mt. Capoas, *Merrill* 9494 (A, BM, BO, F, GH, MO, NY, US).

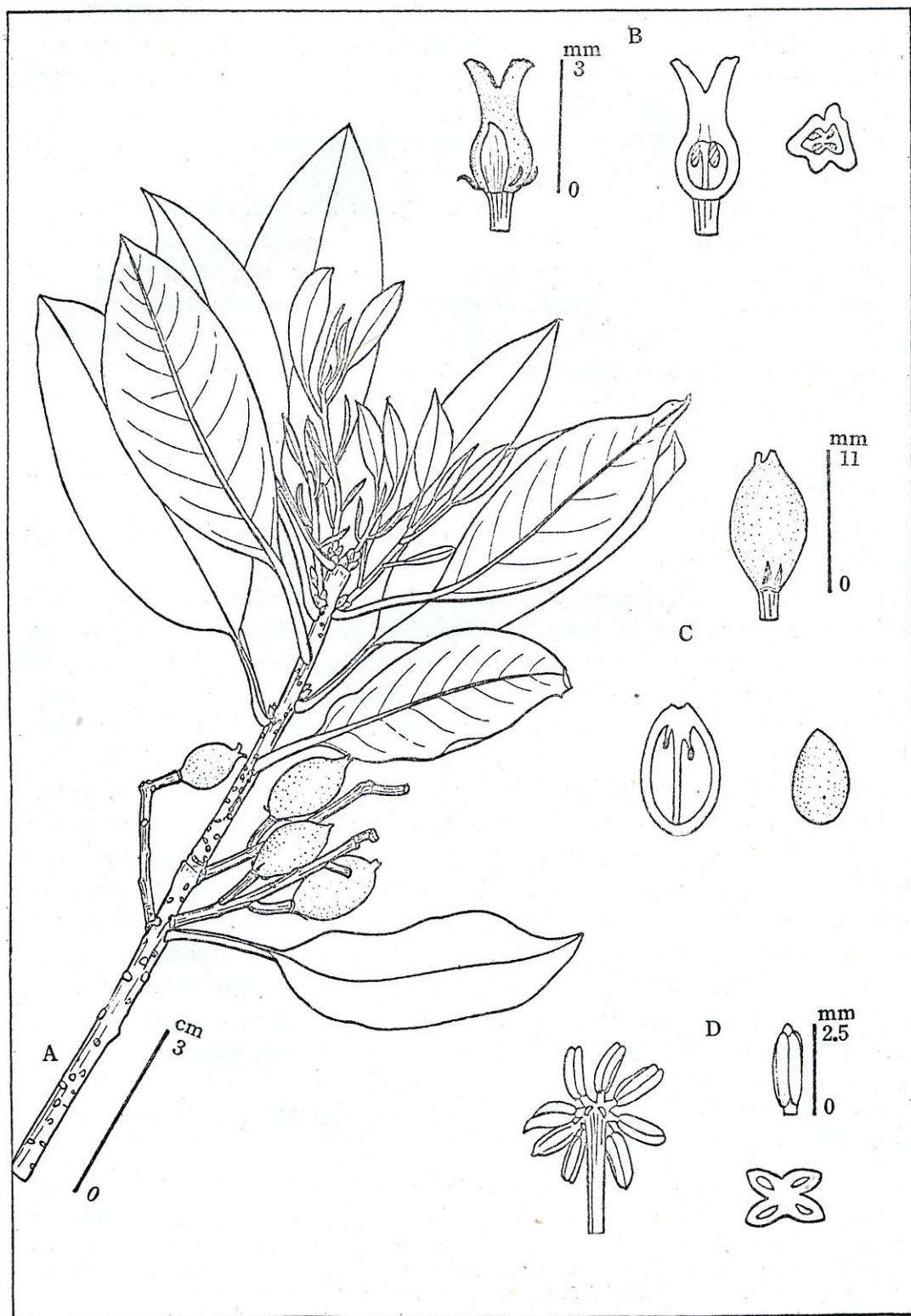
CHINA. **Taiwan:** Botel-Tobago, Mt. Koto, *Hosokawa* 9910 (TAI); Iri, *Masamune* 3867 (TAI), 3873 (TAI); Yay to My, Hongyau, *LKH et al.* 5 (TAI), 377 (TAI), 598 (TAI); Mt. Tashun *LKH et al.* 500 (MOAR).

The following collections could be treated as two distinct varieties, Luzon, Mountain province, Mt. Panawatan, *Conklin & Rosario* 72617 (L, PNH); Banaue province, Amgonad, Mt. Aanacoaton, *Conklin & Rosario* 42703 (L, PNH); Ifugao, *Concklin & Buwaya* 79562 (L, PNH), and Mindanao, Agusan Province, Urdaneta, *Elmer* 13752 (A, BM, BO, E, F, GH, L, MO, NY, UC, US), but because of limited collections and these often incomplete, it is advisable at this time not to establish additional names.

Some collections of subsp. *luzonense* having reduced leaves, drupes, and fruiting axes are very similar to subsp. *dichotomum*, differing however in having oblique and papillate leaves with less prominent veins. The distinction between subsp. *luzonense* and subsp. *buchananiiifolium* is also sometimes difficult.

The south-eastern most island of Taiwan (Botel Tobago, the western name; Antaosy, the Taiwan name; and Lanyu, the Chinese name) is well known for its rich orchid flora as well as for its disease-bearing mite "Tsutsugamushi" a tiny red

Fig. 32. **D. glaucescens** subsp. *ceramense* Huang. A: Twig with fruits (*Eyma* 2047, BO); B: Ovary, longitudinal and cross sections (*Eyma* 2046, K); C: Fruit, longitudinal section, and seed (*Eyma* 2047, BO); and D: Staminate flower, stamen and anther in cross section (*Eyma* 2046, K).



spider-like mite which penetrates the human skin and causes the Rickettsial disease: Tsutugamushi fever. Generally the affinity of the flora of this island is closer to the Philippines than to that of Taiwan and this subspecies which is known both here and in the Philippines is an additional evidence to support this view.

51. DAPHNIPHYLLUM GLAUCESCENS subsp. **dichotomum** Huang, nom. et stat. nov. (Named for its dichotomous branchlets.)—**Fig. 31.**

Daphniphyllum reticulatum Heine, Rep. Spec. Nov. 54: 232. 1951, non Keng 1951.

MALAYSIA. Northern Borneo: Ranau, Kinabalu mountain, *Clemens s. n. Suppl.* (UC, lectotype, A, BO, L, NY, UC, isolectotypes); 30912 (A, BO, NY); Marai Parai Spur., *Clemens 10946* (PNH), 32385 (A, BO, L, NY, UC). **Sawarak:** *Beccari 2119* (K); Lundre, *Piae 13614* (K, L); Pae mountain, *Foxworthy s. n.* (PNH); *Amdjah 437* (BO).

Subspecies *dichotomum* differs from subsp. *borneense* mainly by its narrowly elliptic leaves and its occurrence at lower elevation.

Teradam bukit is the name of this plant in the Dyal dialect.

5m. DAPHNIPHYLLUM GLAUCESCENS subsp. **ceramense** Huang, subsp. nov. (Named for Ceram Island.)—**Fig. 32.**

A subspecie *borneensi* calyce florum masculorum caduco et venis obsolescentibus differt.

Small trees, branchlets terete, rugose, lenticels elliptic, prominent. Leaves fasciculate, petioles angulate, sulcate above, 0.7–1.5 cm. long, 1mm. wide; blades small, oblong-elliptic, base acute-obtuse, apex acute, margins revolute, 4–5 cm. long, 2–2.3 cm. wide, coriaceous, rugose, yellowish brown on both surfaces, obscurely papillate beneath, lateral veins 6–8, obscure, midrib ascending beneath. Staminate inflorescences racemiform, flat, 2.5–4 cm. long, 1 mm. wide, pedicels angulate, 5–7mm. long, 0.1 mm. wide; calyx 4–5-lobes, lobes linear-ovate, entire, 4/5 long as androecium, caducous, articulate; stamens 8–9, filaments flat-oblong, 2–4 mm. long, 2–3 mm. wide, anthers oblong to oblong-ovate, 1.2–1.6 mm. long, 0.3–0.5 mm. wide, apiculate. Pistillate inflorescences racemiform, angulate, ca. 2 cm. long, 0.5 mm. wide, pedicels angulate, 2–4 mm. long, 0.1 mm. wide; calyx caducous, articulate; ovary elliptic-globose, staminodia several, prominent, style as long as ovary, stigma divaricate. Fruiting axes terete, 2–3 cm. long, 1 mm. wide, pedicels terete, 5–6 mm. long, 1 mm. wide; calyx caducous; drupes elliptic-globose, round on both ends, sometimes suddenly constrictly stalked as that of *D. longistylum*, 11 mm. long, 7 mm. in diam., smooth or rugose, brown, style divaricate, staminodia caducous.

INDONESIA. Moluccas: Ceram, Mt. Moerkele *Eyma 2046* (BO, K, L, paratypes), 2047 (BO, holotype, K, L, isotypes).

Subspecies *ceramense* is similar to subsp. *borneense* except for having obscure leaf

Fig. 33. *D. glaucescens* subsp. *borneense* (Stapf) Huang. A: Twigs with fruits (*Haviland 1070*, BM); B: Ovaries, their cross and longitudinal sections (*Haviland 1070*, BM); C: Fruit, longitudinal section, and seed (*Chew et al., 761*, K); and D: Staminate flower, stamen, and anther in cross section (*Haviland 1070*, BM).



venation and caducous calyces on staminate flowers. The character of caducous calyx of subsp. *ceramense* is common to *D. gracile*. One collection of *D. gracile* from New Guinea (*Royen & Sleumer 7279*) is very similar to subsp. *ceramense*.

5n. DAPHNIPHYLLUM GLAUCESCENS subsp. **borneense** (Stapf) Huang, stat. nov.—**Fig. 33.**

Daphniphyllum borneense Stapf, Trans. Linn. Soc., Ser. 2. 4: 22. 1894. (Named for the island of Borneo.)

MALAYSIA. N. Borneo: Ranau, Mt. Kinabalu *Meijer 21051* (BO, K, L, PNH), *21965* (K), *22003* (L), *29263* (L), *Clemens 10656* (A, BO, K, PNH, UC), *27821* (BO, K, L, NY), *28903* (A, BO, L, NY, US), *28908* (BM), *30322* (A, BO, L, NY, UC), *30323* (A, BO, L, NY, UC), *30324* (A, BO, K, L, NY, UC), *51109* (A, L, UC), *Chew, Corner & Stainton 761* (BO, K), *853* (K), *Gibbs 4170* (BM), *Haviland 1070* (K, lectotype, BM isolectotype, BM, K, L, UC, syntypes), *Smythies 10645* (K, L), *Sinclair, Tassim & Sisiron 9130* (L), *Endert 4397* (BO).

Subspecies *borneense* is a common shrub growing on mountain ridges or slopes of mossy forest, usually associated with *Talauma* and *Symplocos*, and in subalpine situations among shrubby vegetation at altitudes of from 1500 to 4000 m. The blooming period is from February to July, staminate flowers are purple, unripe drupes are green becoming blackish-purple when ripe. Petioles are tinged purple.

5o. DAPHNIPHYLLUM GLAUCESCENS subsp. **timorianum** Huang, nom. et stat. nov. (Named for the island of Timor).

Daphniphyllum gracile sensu Rosenth. in Engl., Pflanzenreich 68 (IV. 147a): 14. 1919, non Gage, 1917.

INDONESIA. Timor: *Forbes 3807* (BM, BO, L, syntypes), *3809* (BM, lectotype, BO, GH, L, isolectotypes), *3882A* (BM); central Port. Timor, *van Steenis 18263* (L), *18279* (BO, CANB, L), *de Voogd 2304* (BO).

Subspecies *timorianum* is similar to subsp. *borneense* except that the former differs from the latter by having narrower elliptic leaves with acuminate apices. Subspecies *timorianum* is also very similar to some collections of subsp. *glaucescens* var. *blumeanum*.

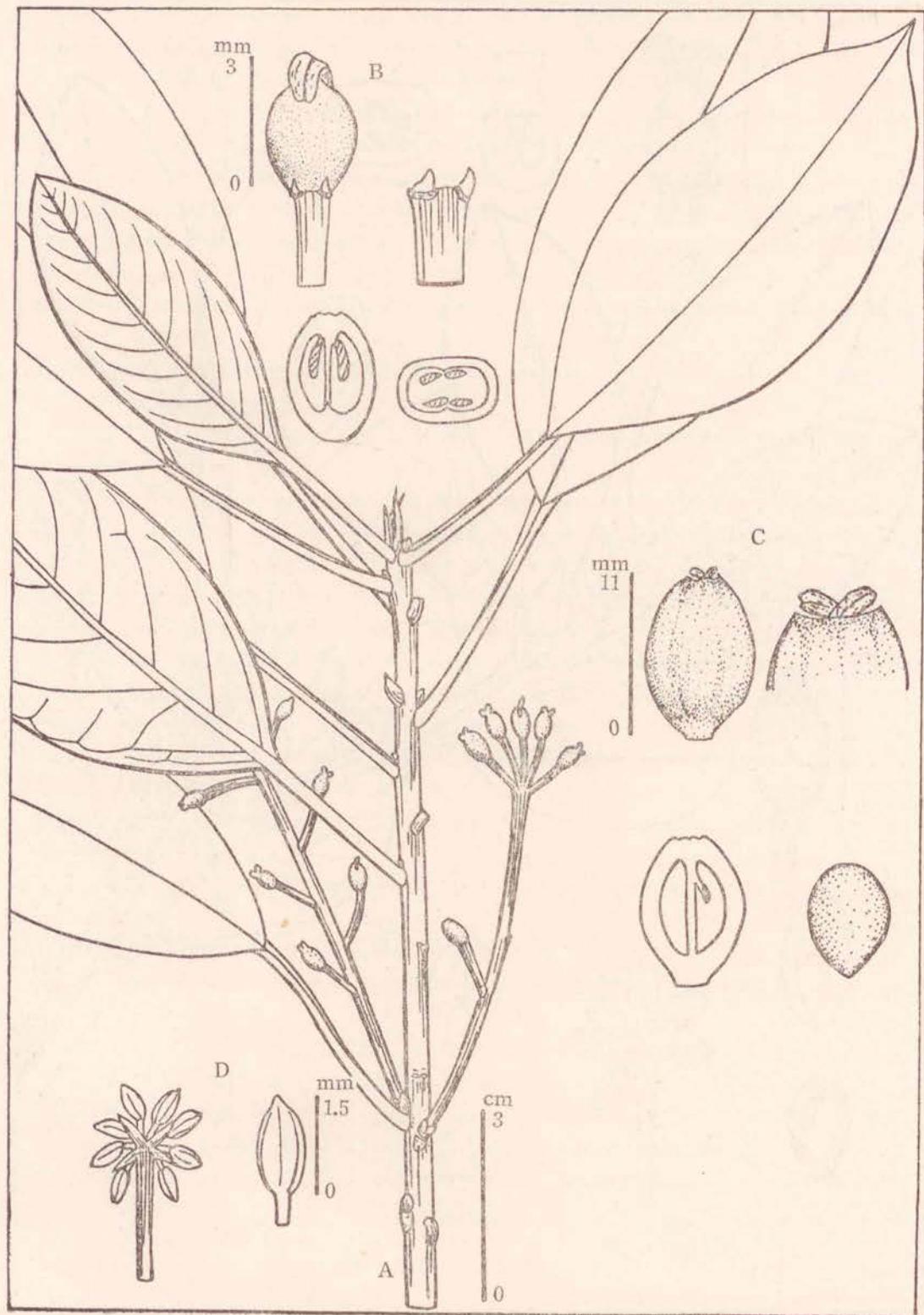
5p. DAPHNIPHYLLUM GLAUCESCENS subsp. **buchananiiifolium** (Hallier f.) Huang, stat. nov.—**Fig. 34.**

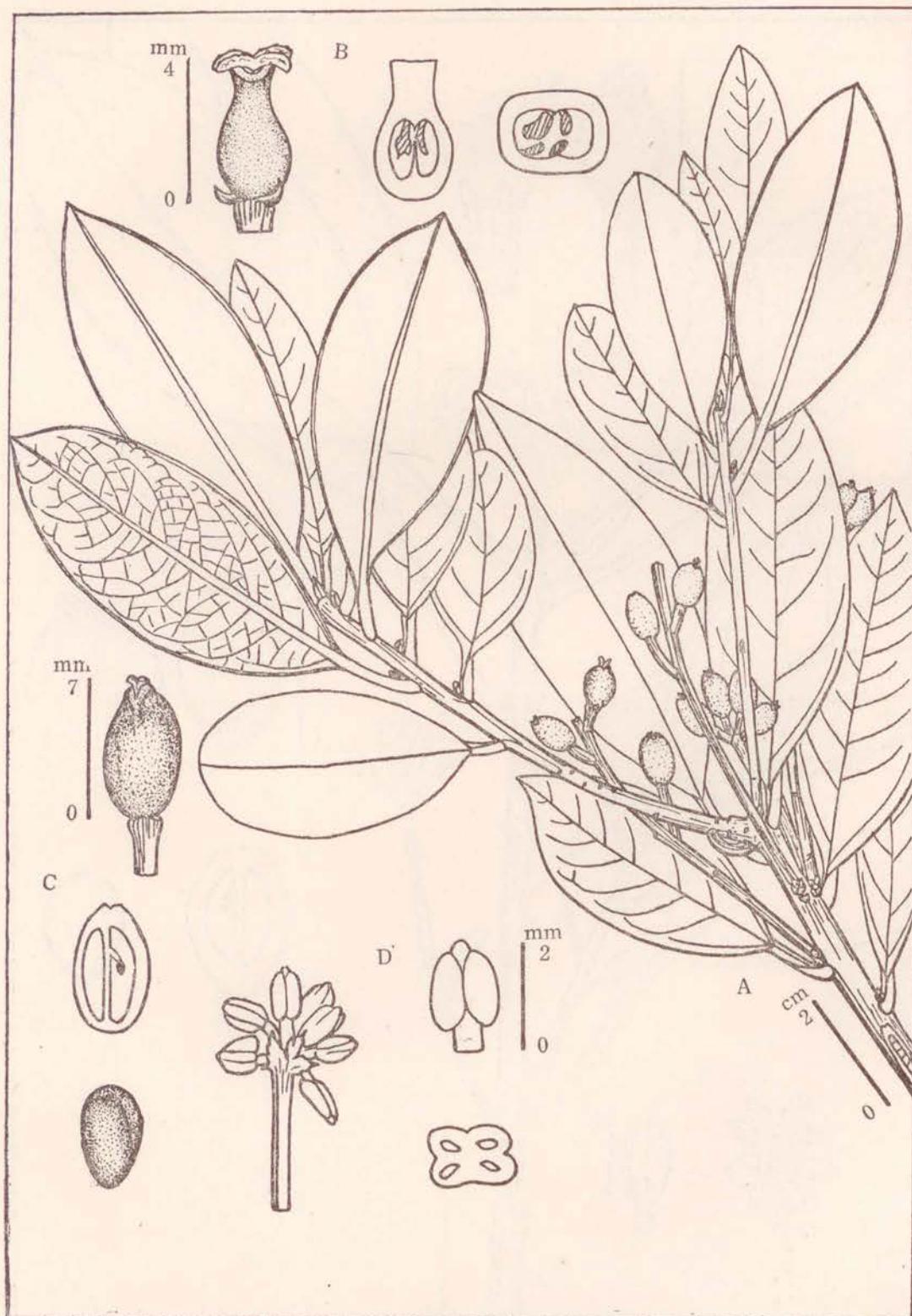
Daphniphyllum buchananiifolium Hallier f., Meded. Herb. Leid. 37: 13. 1918 (Named for its leaves resembling to *Buchanania*.)

Daphniphyllum obtusifolium Merr., Philipp. Jour. Sci. 16: 552. 1920.

PHILIPPINES. Luzon: Benguet Prov., Baguio, *Elmer 8538* (A, lectotype, BO, E, L, UC, isolectotypes); Tayabas, Binuang, *Ramos & Edano 28662* (A, BM, US, par-

Fig. 34. *D. glaucescens* subsp. *buchananiiifolium* (Hallier f.) Huang. A: Twig with fruits (*Elmer 8538*, A); B: Ovary, longitudinal and cross sections (*Elmer 8538*, A); C: Fruit, top view, longitudinal section, and seed (*Ramos & Edano 28662*, US), and D: Staminate flower and stamen (*Mendoza & Convocar 10814*, PNH).





atypes of *D. obtusifolium* Merr.), 28705 (A, K, types of *D. obtusifolium* Merr.); **Mindanao:** Agusan, Diuata Mt., *Ramos & Convocar* 21703 (L, PNH), 83733 (K, NY, TAF); Mt. Hilong, *Mendoza & Convocar* 10814 (PNH); Todaya, Mt. Apo, *Elmer* 11344 (A, BO, E, F, K, L, MO, NY, US). **Biliran:** Mt. Suiro, *Elmer* 11671 (A, BM, BO, E, F, L, MO, NY, US). **Davao:** Mt. McKinley, *Edano* 1570 (A, PNH).

The reduced pistillate calyx suggests that this subspecies is transitional between the taxa grouped in the sections Staminodia and Daphniphyllum. Some specimens (*Edano* 1570) of this subspecies are similar to those of subsp. *luzonense*, and perhaps those two subspecies can be readily separated only by the type collections.

5q. DAPHNIPHYLLUM GLAUCESCENS subsp. *scortechinii* (Hook. f.) Huang, stat. nov. —Fig. 35.

Daphniphyllum scortechinii Hook. f. Fl. Brit. Ind. 5: 354. 1887. (Named for Revd. Father Scortechini.)

The subspecies has been reported from Perak among dense pine at altitudes of from 900 to 1590 m.

MALAYSIA. **Perak:** Gunong Buhu, *Yapp* 523 (K); Pahang, Gunong Tapis, Kuantan, *Symington & Kiah* 28850 (BO); Selangor, Gunong Mengkuang, *Robinson* s.n. (BM); Precise locality unknown, *Scortechini* s.n. (K, holotype, BM, BO, L, isotypes), s.n. (US), *King* 830 (K, paratype), 1347 (K, paratype), 7326 (BM, L), 8054 (K, paratype), *Wray* 3847 (BM), 3926 (BM).

It is very similar to *D. woodsonianum* by its lustrous, oblong-obovate leaves with lateral veinlets evenly reticulate, but differs from the latter by the presence of a calyx on staminate flowers and long petiolate leaves.

5r. DAPHNIPHYLLUM GLAUCESCENS subsp. *neilgherrense* (Wight) Huang, stat. nov.—Fig. 36.

Gouphia neilgherrensis Wight. Ic. Pl. Ind. Or. 5: 22. t. 1878-9. 1852. (Named for the Nilgherris mountains.)

Daphniphyllum glaucescens sensu Muell.-Arg. in DC., Prodr. 16(1): 3. 1869, ex parte, non Blume 1826.

Daphniphyllum glaucescens var. *concolor* Muell.-Arg., loc. cit. 4.

Daphniphyllum inermis sensu Hohenacker in Sched., Handb. Laubholzk. 2: 135. 1912, non Roxburgh 1832.

Daphniphyllum nilgherrense (Wight) Rosenth. in Engl., Pflanzenreich 68 (IV. 147a): 8. 1919 (*nilgherrense* is mis-spelled for *neilgherrense*).

Daphniphyllum nilgherrense var. *concolor* (Muell.-Arg.) Rosenth., loc. cit.

CEYLON. Ceylon: *Thwaites* s.n. (GH, this sheet may be identical to no. 491), 491 (A, BM, BO, F, L, NY, type specimens for *D. neilgherrense* var. *concolor* (Muell.-

Fig. 35. **D. glaucescens** subsp. *scortechinii* (Hook. f.) Huang. A: Twig with fruits (*Scortechini* s.n., K); B: Ovary, longitudinal and cross sections (*King's collector* 1347, K); C: Fruit, longitudinal section, and seed (*King's collector* 830, K); and D: Staminate flower, stamen and anther in cross section (*Robinson* s.n., BM).



Arg.) Rosenth.), 2119 (K), Walker s.n. (K); Kandy, Moon 74 (BM); Thwaites 7133 (BM); Tonacowbe, Namanakula, Worthington 5423 (BM), 6181 (BM).

INDIA. South India: Malabar coast; Kodaikanal, Palni, Saldanhe 5198 (K); Madras, Beddome 288 (E), Bourne 1896 (K), Cleghorn 1859 (E), Schmidt s.n. (E), Wight 2649 (K, lectotype, A, GH, K, L, NY, UC, isolectotypes), 3156 (E), 3576 (E), Stocks & Law s.n. (BM, L); Mutebu Kalibagal, Bourdillon s.n. (K); Nilgherries, Clarke 10752 (BM), Gamble 11970 (K), 14449 (K), Hohenacker 1453 (BM, L), Meebold 6737 (E), Perrottet 29 (K, P), 74 (P); Travancore, s. coll. s.n., Jan. 20, 1890 (K); Pulney hills at 7,000 ft., s. coll. 457 (BO). Precise locality unknown: Arnott 1850 (NY), Beddome 7171 (BM).

This species is very similar to *D. glaucescens* subsp. *scortechinii* and the subsp. *dichotomum*, but differs from them by the development of the style and shape of leaves, respectively.

Rosenthal (1919) and some earlier taxonomists separated this species into var. *neilgherrense* and var. *concolor*. According to Rosenthal's description, they are distinguished by the size of their petioles, blades, and fruit. These two varieties can be easily separated as illustrated in the following key when referring only to the specimens cited by Rosenthal (Hohenacker 1453, Wight 2649, Thwaites 491). However, such a key is useless when the many specimens listed above are examined.

KEY TO VARIETIES

- a. Leaves glaucous beneath, petioles 3.5 cm. long; anthers elliptic, 0.7 mm. long, 0.5 mm. wide, filaments 0.6 mm. long; fruiting axes 4–5.5 mm. long; drupes narrowly obovoid, 1.1–1.4 cm. long, 0.7 cm. in diam., Thwaites 491var. *concolor*
- aa. Leaves yellowish-green beneath, petioles 1.2–2 cm. long; anthers oblong-elliptic, 1–1.2 mm. long, 0.7–1 mm. wide, filaments 0.2 mm. long; fruiting axes 1.5–2 mm. long; drupes ellipsoid, 0.7–1 cm. long, 0.5–0.7 mm. in diam., Hohenacker 1453 & Wight 2649var. *neilgherrense*

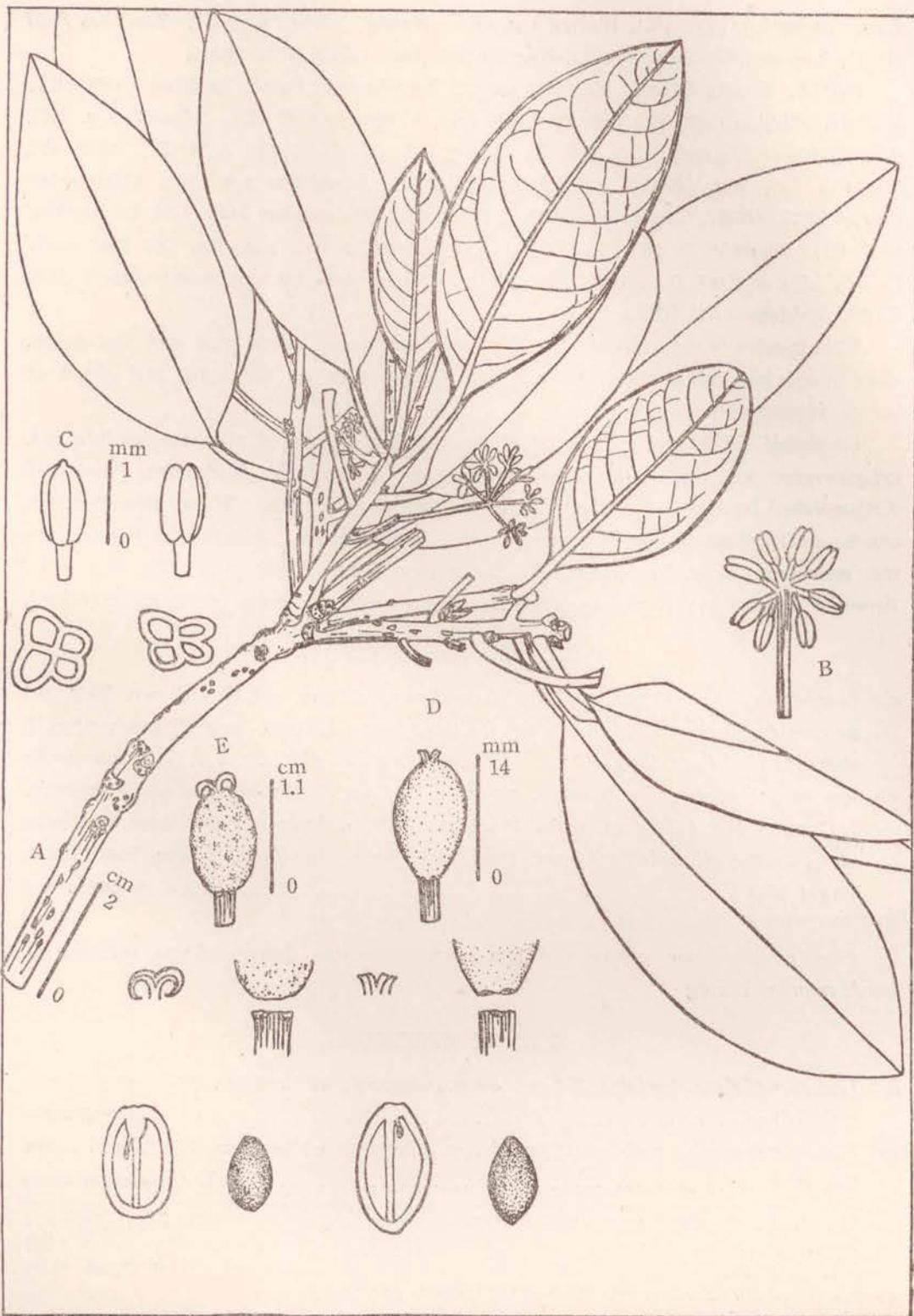
SUBSECTIO 3. Unicalycifera Huang, subsect. nov.

Flos femineus cum calyce sed flos masculinus sine calyce. Type species: *D. woodsonianum* Huang

KEY TO SPECIES

- a. Leaves petiolate, petioles 2–4 cm. long; filaments of anthers 0.7–0.8 mm. long; Philippines.....6. *D. philippinense*
- aa. Leaves subsessile, petioles 0.2 cm. long; filaments of anthers 1.2–2.3 mm. long; Sumatra7. *D. woodsonianum*

Fig. 36. *D. glaucescens* subsp. *neilgherrense* Huang. A: Twig with fruits (Wight 2649, K); B: Ovary, longitudinal and cross sections (Wight 2649, K); C: Fruit, longitudinal section, and seed (Wight 2649, K); D: Staminate flower with staminodium, stamen and anther in cross section (Clark 10752, BM); and E: Seedling (Gamble 14449, K),



6. DAPHNIPHYLLUM PHILIPPINENSE Huang, Annals of the Missouri Botanical Garden 53(1): 30–31. 1966. (Named for the Philippine Islands)—**Fig. 37.**

Shrubs or trees, branchlets terete, gray-brown, lenticels elliptic, rather large, prominent. *Leaves* fasciculate, petioles triangular, sulcate above, 2–4 cm. long, 1.5 mm. wide; blades narrowly angular-ovate, base attenuate, apex acute or obtuse, margins revolute, 9–13 cm. long, 3–4.5 cm. wide, coriaceous, shining, pale green on both surfaces, lateral veins 7–9, thin, slightly prominent on both surfaces. *Staminate inflorescences* racemiform, flat, ca. 3 cm. long, 0.1 mm. wide, pedicels 4–7 mm. long, 0.1 mm. wide, calyx absent; stamens 5–7(–11), filaments 0.2–0.4 mm. long, 0.1 mm. wide, anthers oblong or oblong-elliptic, 0.7–0.8 mm. long, 0.5 mm. wide, apiculate. *Fruiting axes* racemiform, angulate, 3–8.5 cm. long, 1 mm. wide, pedicels angulate, 1–2.5 cm. long, 1 mm. wide, calyx absent or caducous, staminodial scars and calyx scars (?) prominent, in 1–2 whorls; drupes ellipsoid, elliptic-globose, 10–15 mm. long, 6–8 mm. in diam., smooth or tuberculate, black, the stigma divaricate. *Seeds* elliptic-globose, smooth, 7 mm. long, 5 mm. in diam.

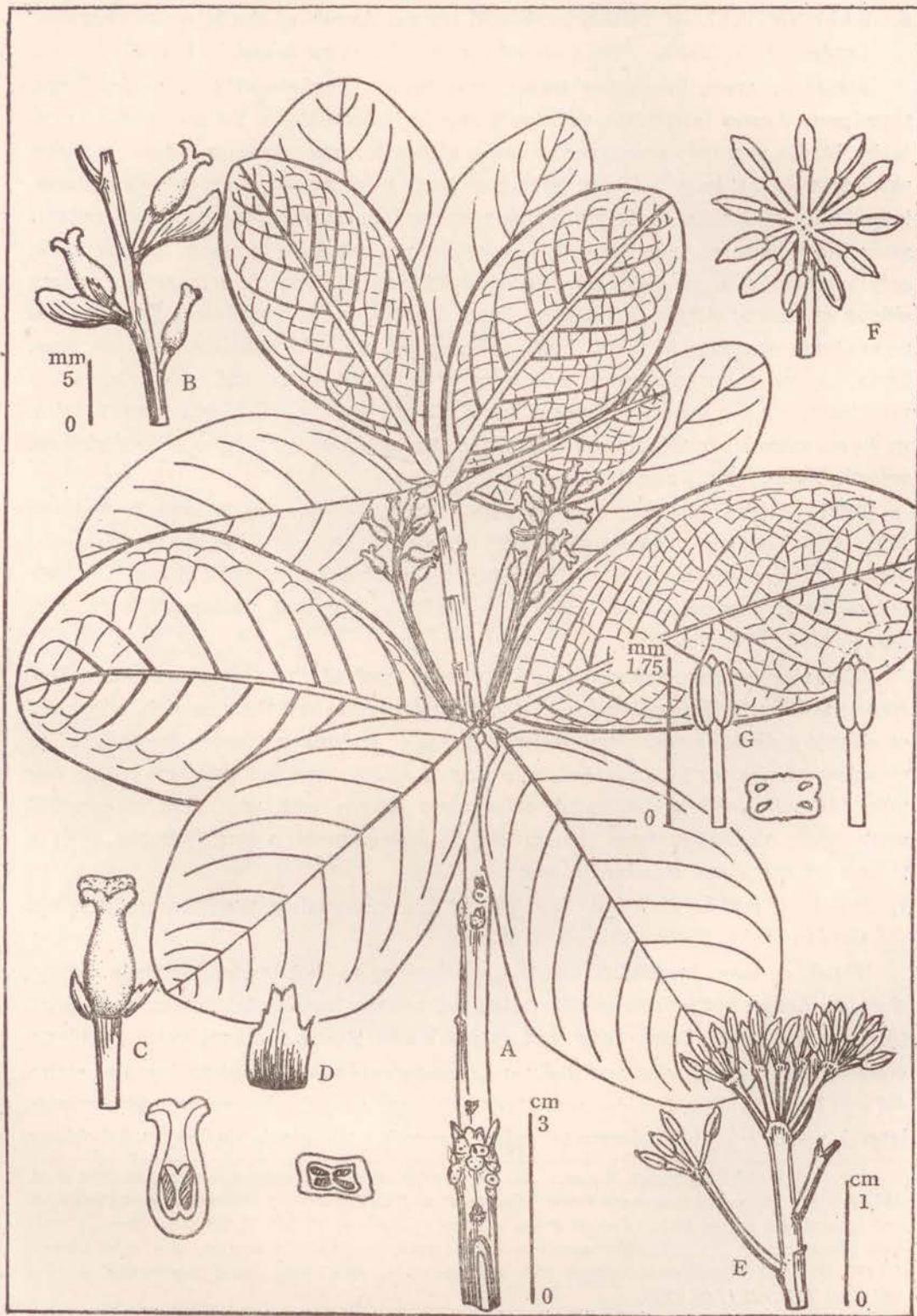
PHILIPPINES. Luzon: Benguet Prov. Mt. Pulog, Curran, Merritt & Zschokke 18357 (US, holotype), Merrill 1748 (BM, BO, GH, L, MO, NY); Mancayan to Gaguio, Ramos & Edano 40478 (A, K, L, US); Camarines, Ramos 1503 (BM, BO, GH, L, MO, NY); Leyte, Dagami, Ramos 15235 (BM, K, US); Sorsogon, Ramos 23478 (A, BM, BO, F, K, L, MO, NY, US).

This new species is related to and perhaps evolved from *D. glaucescens* subsp. *borneense* (Stapf) Huang, because of their similar leaves and their smooth, ellipsoidal or elliptic-globose drupes. Two different types of fruiting specimens are assigned to this new species for it is not definitely known which type belongs here. The one type (*Merrill 1748*) has ellipsoid, tuberculate drupes with prominent staminodial scars while the other type (*Ramos 23478*) has ellipsoid, smooth, drupes with a prominent calyx and staminodial scars.

7. DAPHNIPHYLLUM WOODSONIANUM Huang, Annals of the Missouri Botanical Garden 53(1): 28–29. 1966—**Fig. 38.**

Shrubs or trees branchlets terete, canaliculate, reddish-brown, lenticels elliptic, elevate. *Leaves* verticillate or subverticillate, petioles broadly triangular, very short, thickened at base, 2 mm. long and wide; blades obovate, oblong-ovate to oblong-obovate, base obtuse, apex rounded, rarely emarginate to mucronulate, margins entire, 4–7 cm. long, 2.5–4.5 cm. wide, coriaceous, shining, smooth, brown on both surfaces, lateral veins 7–9, thin, elevate-reticulate beneath. *Staminate inflorescences* oblong,

Fig. 37. **D. philippinense** Huang. A: Twig with naked staminate flowers (*Curran et al. 18357, US*); B: Naked staminate flower (*Curran et al. 18357, US*); C: Stamens showing apiculate and emarginate apices and anther in cross sections (*Curran et al. 18357, US*); D: Smooth fruit with divaricate style, staminodia scars and calyx scars, longitudinal section, and seed (*Ramos 23478, F*); and E: Tuberculate fruit with revolute style, staminodia scars, longitudinal section and seed (*Merrill 1748, GH*).



1.5–3 cm. long, 0.2 mm. wide, pedicels oblong, 4–7 mm. long, 0.1 mm. wide; calyx absent or very shallowly cupuliform; stamens 8–11, filaments oblong, 1.3–2.3 mm. long, 0.1 mm. wide, anthers elliptic-ovate, 0.6–0.8 mm. long, 0.4–0.5 mm. wide, the triangular apex 0.2 mm. long and wide. *Pistillate inflorescences* angulate, ca. 2.5 cm. long, 0.8 mm. wide, pedicels flat, 2–3 mm. long, 0.1 mm. wide; calyx oblong or obovate-oblong, subentire or with an irregularly divided apex, caducous, 0.4 mm. long, 0.3 mm. wide; ovary ovoid stigma short, radiate or revolute.

INDONESIA. N. Sumatra: Gaju & Alas lands, Poetjoeh Angasan, ridge forest alt. 2500 m., *van Steenis* 8362 (L, holotype; BO, K, topotypes), mountain shrubs, alt. 2950–3500 m., *van Steenis* 8654 (BO, L).

Since both staminate (Kew & Bogor specimens) and pistillate (Leiden specimen) plants were collected by van Steenis under the same number (8362), obviously more than one tree was involved.

The texture and shape of leaves of *D. woodsonianum* is very similar to that of *D. glaucescens* subsp. *scortechinii* (Hook. f.) Huang, except for the subsessile and subverticillate arrangement of leaves. In addition, the former differs from the latter by the absence of a calyx in staminate flowers.

The new species is named after the late Dr. R. E. Woodson, Jr.

SECTION 3. STAMINODIA Hurusawa

Section *Staminodia* Hurusawa, Jour. Jap. Bot. 18: 157. 1942.

Series *Staminodia* (Hurusawa) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 216. 1954.

Calyx absent or 1(–2) lobes affixed to base of the stamens; pistillate flowers without calyx lobes but staminodia frequently present; styles various, short-divaricate, radiate to discoid; drupes usually tuberculate; bracts of both pedicels and inflorescences longer or as long as flowers, caducous; leaves membranous or firmly chartaceous, rarely coriaceous, usually epapillate, with delicate or obscure lateral veins, often impressed above; fruiting pedicels rarely articulate.

Type species: *D. macropodum* Miq. (= *D. himalaense* subsp. *macropodum* (Miq.) Huang)

KEY TO SPECIES

- a. Blades oblong-obovate, obtuse to mucronate at apex; Philippines
.....8. *D. parvifolium*
- aa. Blades narrowly obovate or narrowly elliptic, acuminate to mucronate at apex;

Fig. 38. *D. woodsonianum* Huang. A: Twig with pistillate flowers (*van Steenis* 8362, L); B: Portion of a pistillate inflorescence (*van Steenis* 8362, L); C: Ovary, and longitudinal and cross sections of the ovary (*van Steenis* 8362, L); D: Calyx (*van Steenis* 8362, L); E: Staminate inflorescence (*van Steenis* 8362, K); F: Naked staminate flower (*van Steenis* 8362, K); G: Stamen, dorsal and ventral views, and anther in cross section (*van Steenis* 8362, K).

Philippines, India, Burma, Pakistan, Sikkim, Bhutan, Nepal, Vietnam, China, Korea, Japan, and Taiwan..... 9. *D. himalaense*

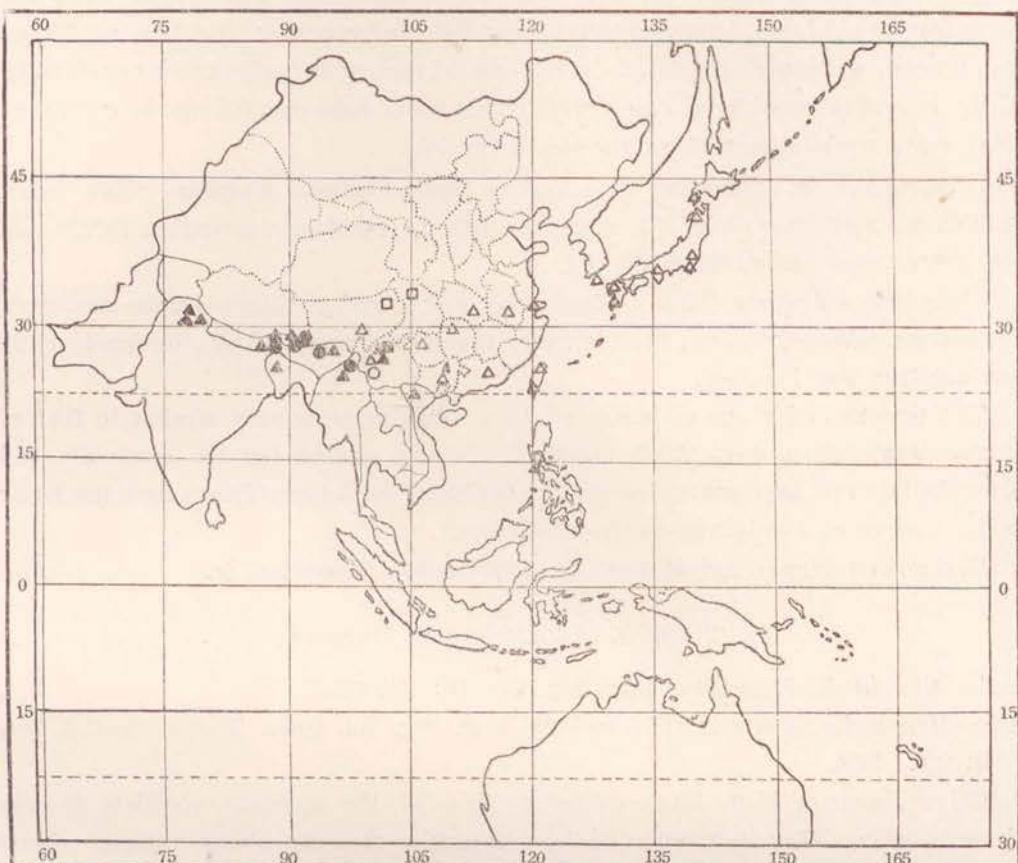
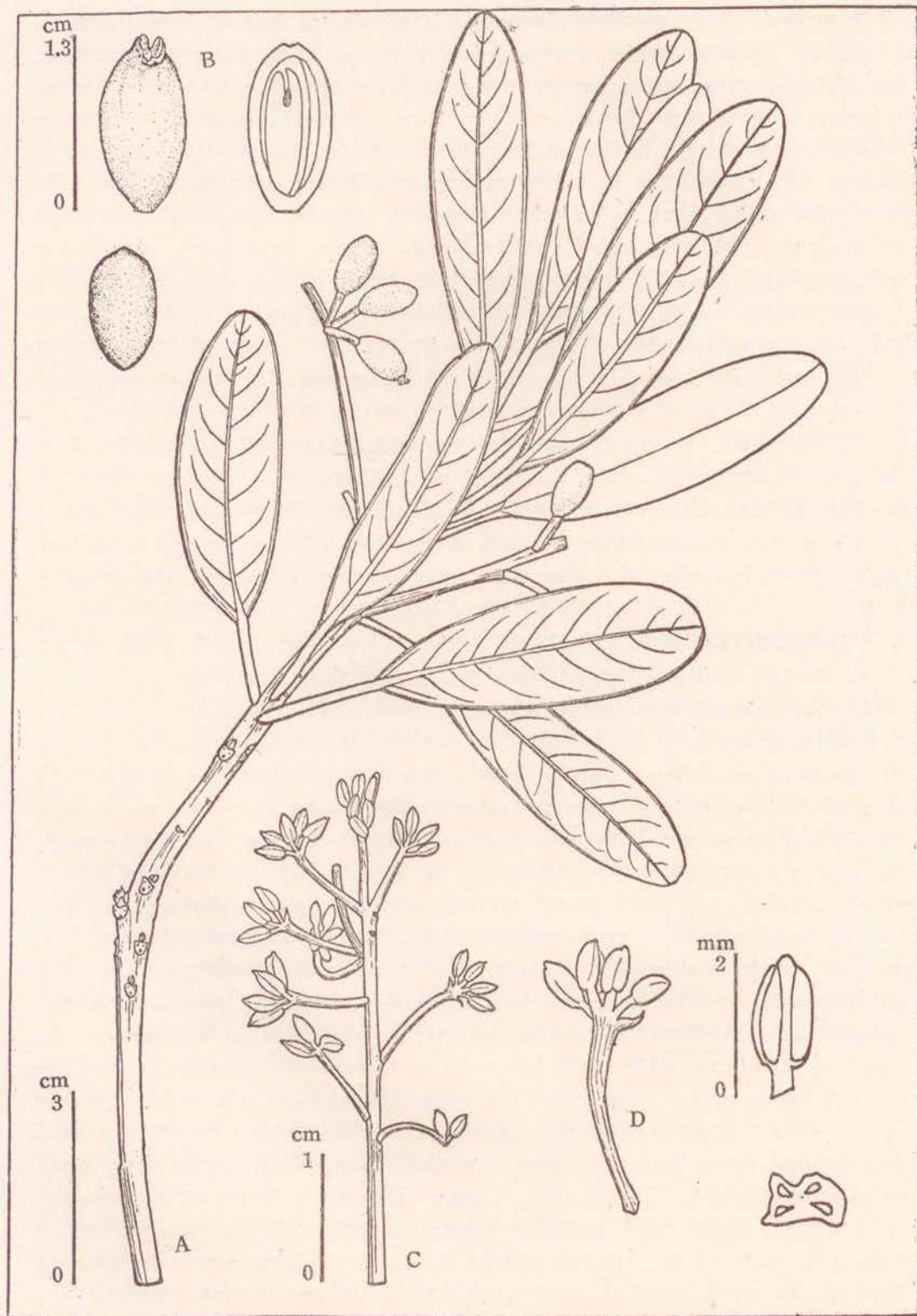


Fig. 14. Distributions of *D. parvifolium* (\triangle), *D. himalaense* subsp. *himalaense* var. *himalaense* (●), var. *triangulatum* (○), var. *divaricatum* (■), var. *chartaceum* (\blacktriangle), var. *longeracemosum* (\wedge), subsp. *angustifolium* (□), and subsp. *macropodium* (Δ).

8. DAPHNIPHYLLOM PARVIFOLIUM Quis. & Merr., Philipp. Jour. Sci. Manila 37: 161. 1928. (Named for its small leaves.)—Fig. 40.

Shrubs 1-2 m. high, trunk ca. 4 cm. in diam., branchlets terete, canaliculate, rugose, brownish gray, petiole scars triangular, 3 bundles nearly in a horizontal line, lenticels elliptic, minute. Leaves small, fasciculate, petioles triangular, sulcate above, 7-25 cm. long, 1.5 mm. wide, brown; blades narrowly oblong-obovate, base attenuate-cuneate, apex round, obtuse or mucronate, margins revolute, 4-9 cm. long, 1-2 cm. wide, coriaceous, yellowish-green above, brown and papillate beneath, lateral veins

Fig. 40. *D. parvifolium* Merr. A: Twig with fruits (Ramos & Edano 45725, A); B: Fruit, longitudinal section, and seed (Ramos & Edano 45725, A); C: Staminate inflorescences (Ramos & Edano 45708, A); and D: Staminate flower, stamen and anther in cross section (Ramos & Edano 45708, A).



6-9, impressed above, prominent beneath. *Staminate inflorescences* racemiform, 1-2.5 cm. long, axes flat, slightly flexuous, slender, 0.5 mm. wide, pedicels flat, 4-8 mm. long, 0.2 mm. wide, bracts broadly ovate, entire, longer than immature flowers, caducous; calyx absent or of 2 lobes, lobes short triangular, entire, free; stamens 5-10, filaments oblong, 0.4-0.6 mm. long, 0.2 mm. wide, anthers usually oblong to broadly elliptic, apiculate to obtuse at apex, 0.5-0.9 mm. long, 0.3-0.5 mm. wide, staminodia (called glands by Hayata 1911) present. *Fruiting axes* racemiform, terete, 2-6 cm. long, 1 mm. wide, pedicels quadriangular, 3-7 mm. long, 1 mm. wide, bracts caducous; calyx absent; drupes oblong-ellipsoid, obtuse on both ends, 9-12 mm. long, 4-5 mm. in diam., smooth, obscurely wrinkled, black, style divaricate or discoid; staminodia scars persistent. *Seed* elliptic globose, smooth, 8 mm. long and 4 mm. in diam.

The species has been collected only in the Philippines. It grows on slopes near the top or on the top of mountains in mossy forests at an altitude of 1800 m.

PHILIPPINES. Luzon: Tayabas province, Mt. Alzapan, Ramos & Edano 45687 (BM, K, UC, paratypes), 45708 (A, holotype, BM, NY, UC, isotypes), 45725 (A, holotype, BM, NY, UC, isotypes), 45725 (A, BM, BO, K, NY, UC, US, paratypes).

The species is characterized by small, oblong-obovate leaves. In leaf morphology, *D. parvifolium* is similar to *D. glaucescens* subsp. *buchananiiifolium* and subsp. *neilgherrense*.

9. DAPHNIPHYLLUM HIMALAENSE (Benth.) Mull.-Arg. in DC., Prodr. 16(1):

4. 1869, as *D. himalayense*. (Named for the Himalaya mountain.)

Gouphia himalaensis Benth. in Hook. Jour. Bot. 6: 9. 1854.

Daphniphyllum benthamii Baill., Étud. Gén. Euphorb. 565. 1858, nomen.

Shrubs or small trees, 4-10 m. high, branchlets robust, terete, longitudinally canaliculate, blackish brown, lenticels elliptic, slightly elevate, petiole scars transversely semilunate, with 3 bundles nearly in a horizontal line. Leaves compactly alternate to fasciculate, petioles triangular, flat, sulcate above, 1-5 cm. long, 2-3 mm. wide, blackish brown; blades usually narrowly obovate, slightly oblique with cuneate base and mucronate apex, rarely narrowly elliptic with obtuse and acuminate apex, margins slightly revolute, 8-18 cm. long, 1.5-6 cm. wide, membranous, green above, glaucous and papillate beneath, lateral veins 7-13, impressed above. *Staminate inflorescences* racemiform, flat, 3-5 cm. long, 2 mm. wide, pedicels flat, pendent, 4-8 mm. long, 0.2-0.5 mm. wide, black, bracts larger than flowers, caducous; calyx lobes 0 or 1-2, linear, entire; stamens 6-9, filaments oblong, 0.1-0.7 mm. wide, triangular at apex. *Pistillate inflorescences* racemiform, flat, slightly flexuous, spreading upward, then reflexed down from the terminal portion, 4-6 cm. long, 1 mm. wide, black, pedicels flat, pendent, 7-13 mm. long, 0.2 mm. wide, black; bracts large, caducous; calyx absent; ovary ovoid, scale-like staminodia rarely present, usually numerous staminodia scars present, stigma shortly radiate or 2-4 lobes, sessile or subsessile. *Fruiting axes* angulate, 4-7 cm. long, 1.5 mm. wide, pedicels angulate, pendent, 1-1.6

cm. long, 1 mm. wide, black; drupes elliptic-globose, 6–9 mm. long, 5 mm. in diam., smooth, glaucous, grayish-black, staminodia obscure, style discoid or with short divaricate to trilobes stigma, subsessile. Seed elliptic-globose, smooth, 7 mm. long and 4 mm. in diam.

This species complex provides excellent evidence to support the concept of infraspecific geographical displacement.

KEY TO SUBSPECIES

- a. Blades usually chartaceous; papillate when membranous; drupes (9–)13 mm. long, (6–)8 m. in diameter; Bhutan, Burma, India, Sikkim, Nepal, Pakistan, Vietnam and China 9a. subsp. *himalaense*
 - aa. Blades usually membranous, epapillate; drupes 7(–12) mm. long, 5(–8) mm. in diameter.
 - b. Fruiting pedicels 0.5–0.7 cm. long; styles discoid; blades 1.5–3 cm. wide; China 9b. subsp. *angustifolium*
 - bb. Fruiting pedicels usually more than 1 cm. long; styles usually divaricate or radiate; blades usually more than 3 cm. wide; China, Taiwan, Korea and Japan 9c. subsp. *macropodum*
- 9a. *DAPHNIPHYLLUM HIMALAENSE* subsp. *HIMALAENSE*.**

KEY TO VARIETIES

- a. Anthers triangular at apex; drupes on pendent pedicels; blades membranous, papillose and glaucous beneath.
 - b. Blades narrowly obovate; anthers 2–5 mm. long 9a(a). var. *himalaense*
 - bb. Blades narrowly elliptic; anthers 1.3–2 mm. long 9a(b). var. *triangulatum*
- aa. Anthers usually apiculate or emarginate at apex; drupes on ascending pedicels; blades chartaceous usually epapillate and eglaucous beneath.
 - c. Styles long divaricate 9a(c). var. *divaricatum*
 - cc. Styles short divaricate, radiate or discoid.
 - d. Fruiting axes more than 9 cm. long 9a(d). var. *longeracemosum*
 - dd. Fruiting axes less than 9 cm. long 9a(e). var. *chartaceum*

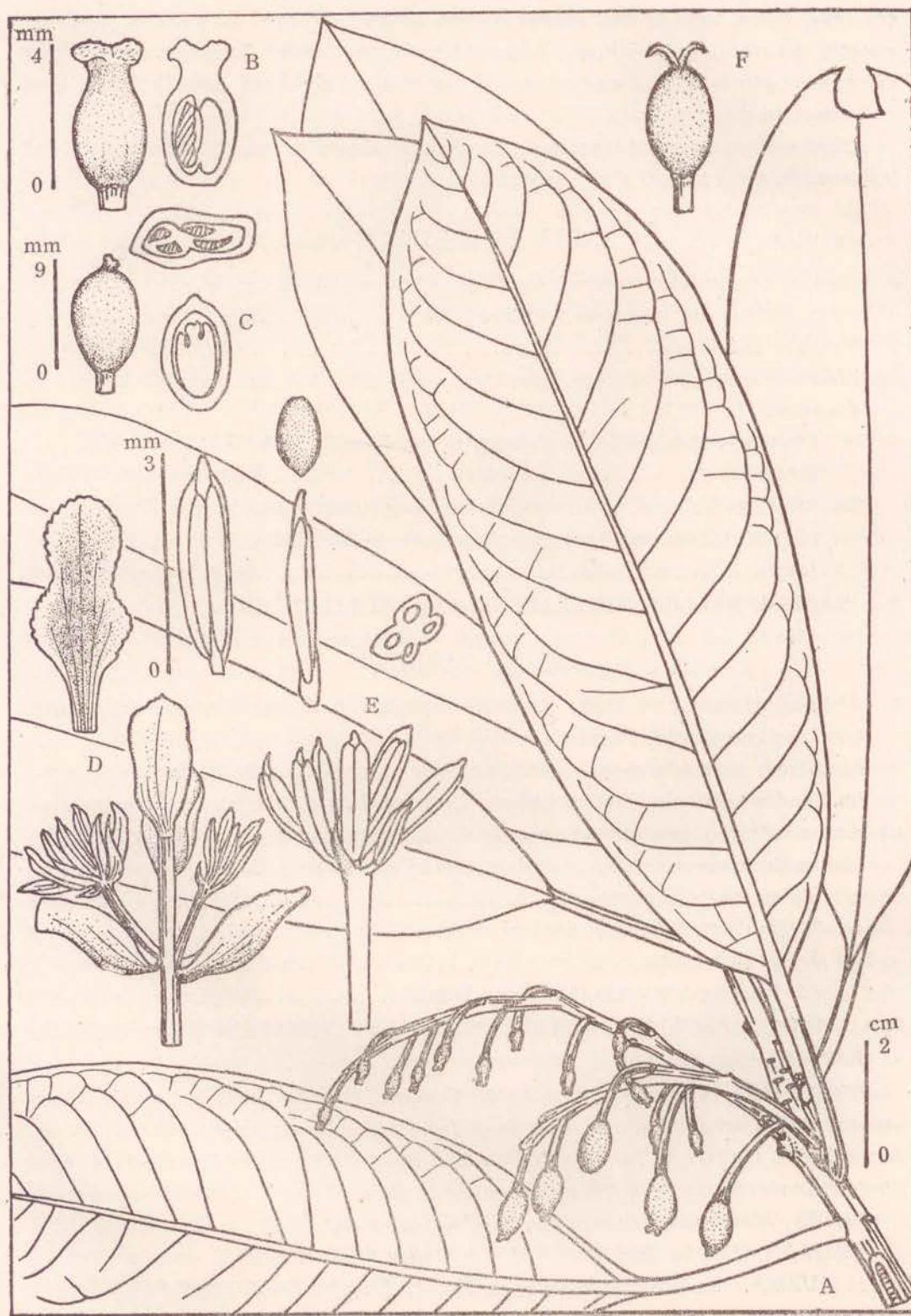
9a(a). *DAPHNIPHYLLUM HIMALAENSE* subsp. *HIMALAENSE* var. *HIMALAENSE*—Fig. 41.

This variety is found commonly in thickets, shrubby belts or woods along exposed ridges or at the tops of ridges from altitudes of from 1500 to 3000 m. According to Captain F. Kingdon-Ward's field notes, this variety has the habit of a *Rhododendron* with pendent flowers blooming in May.

CHINA. Chumbi: Pey-go-ang-la, *King's collector 489 (K)*.

BHUTAN. Gichha Punakha: *Cooper & Bulley 2763 (BM, E)*.

N. BURMA. Kachin State: Mungku Hhyet, *Kingdon-Ward 13055 (BM)*; north



triangle Wring Bum, above Ahkail, *Kingdon-Ward* 20862 (A), ridge above Laktang, *Kingdon-Ward* 3109 (E). Nainital: Kumaon, *Strachey & Winterbottom* 804 (BM). Tsang Po gorge, *Kingdon-Ward* 6305 (BM, E).

INDIA. Khasia: *Hooker & Thomson s.n.* (A, E, P, syntypes).

SIKKIM. Darjeeling: *Cowan s.n.* (E). Lachen: *Biswas* 6641 (A). Lachung: *Gammie* 351 (A). Kalapokin: Behacen Sandahphu r'Tonghu, *Lacaita s.n.* (BM). Rungpo: *Clarke* 27746A (BM). Zemu Chu: Zemu and Lhonakh valley, *Cave* 95147 (E). Precise locality unknown: *Clarke* 46328a (BM), *Hooker s.n.* (K, lectotype, A, E, isolectotypes, A, BM, E, K, L, NY, syntypes).

LOCALITY UNKNOWN: *Jenkins s.n.* (P).

The color appearing in the inflorescences, young leaves, and young branchlets after drying is black. The pendent inflorescences differ from most other taxa of *Daphniphyllum*. The discoid styles on smooth, blackish drupes and the long oblong anthers distinguish this variety from other related varieties.

9a(b). DAPHNIPHYLLUM HIMALAENSE subsp. *HIMALAENSE* var. *triangulatum*

Huang, var. nov.

A varietate typico antheris brevibus 1.3–2 mm. longis differt.

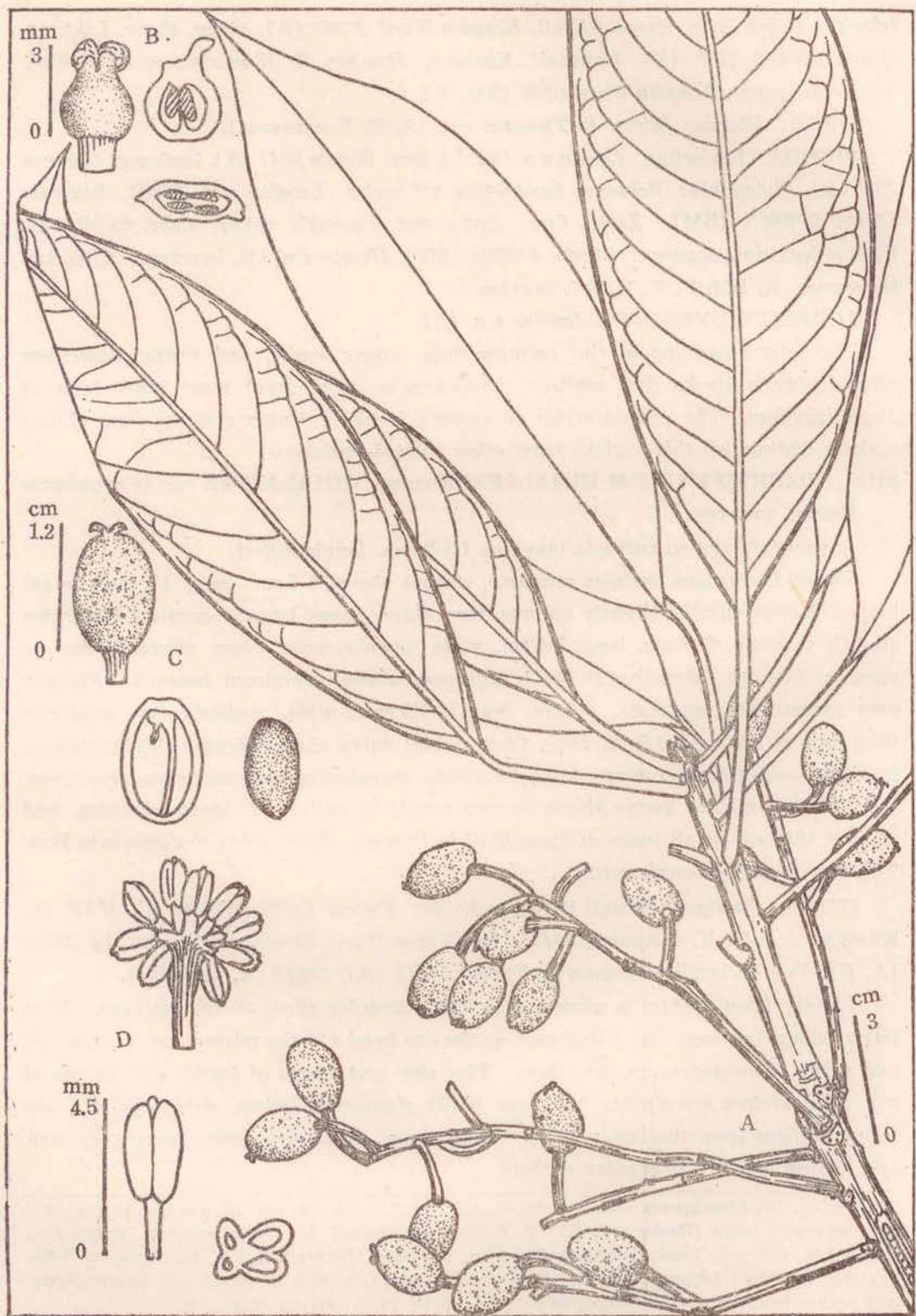
Leaves fasciculate, petioles angulate, sulcate above, 2–5 cm. long, 1–2 mm. wide; blades obovate-elliptic, slightly oblique, base obtuse, apex broadly cuspidate, margins slightly revolute, 8–15 cm. long, 3–6 cm. wide, membranous, green above, brown to glaucous beneath, lateral veins 10–12, impressed above, prominent beneath. Fruiting axes racemiform, angulate, 4–6 cm. long, 1–1.5 mm. wide, pedicels flat, gradually thickened at apex, 1.2–1.5 cm. long, 1 mm. wide; calyx absent; drupes elliptic-globose, immature, style comparatively long divaricate, staminodia scars numerous, prominent.

The new variety grows chiefly among woods in valley, at forest margins, and in open thickets at altitudes of from 2100 to 2400 m. Presumably anthesis is in June. The flowers are greenish-purple.

CHINA. YUNNAN: Shweli Salween divide: *Forrest* 17673 (BM, E, K), 17948 (E, holotype, A, BM, K, isotypes), 24418 (E); Taron Taru divide, Ahtehmai, *Yu* 20048 (A, E); Precise locality unknown: *Forrest* 14643 (A), 29848 (E, paratype).

Variety *triangulatum* is named after the triangular apex of the anthers. It is intermediate between var. *himalaense* on the one hand and the related var. *chartaceum* and subsp. *macropodum* on the other. The size and shape of leaves and drupes of var. *triangulatum* are similar to those of *D. glaucescens* subsp. *paxianum*, but the former differs from the latter by having glaucous papillate leaves, lacking calyces, and having apically triangular anthers.

Fig. 41. *D. himalaense* (Benth.) Muell.-Arg. (A-E) and the var. *divaricatum* Huang (F). A: Twig with fruits (*Hooker s.n.*, K); B: Ovary, longitudinal and cross sections (*Hooker s.n.*, 8–10,000 ft., GH); C: Fruit, longitudinal section, and seed (*Hooker s.n.*, K); D: Staminate inflorescence and bract (*Biswas* 6641, A); E: Staminate flower, stamen in dorsal and lateral views, and anther in cross section (*Biswas* 6641, A); and F: Fruit (*Forrest* 8587, A).



9a(c). *DAPHNIPHYLLUM HIMALAENSE* subsp. *HIMALAENSE* var. *divaricatum*

Huang, var. nov. (Named for its long divaricate style.)—**Fig. 41.**

A varietate typico floribus femineis erectis stylibusque longioribus differt.

Leaves fasciculate; petioles angulate, sulcate above, 2–5 cm. long, 1–2 mm. wide; blades-elliptic, slightly oblique, base obtuse, apex broadly cuspidate, margins more or less revolute, 8–15 cm. long, 3–6 mm. wide, membranous, green above, brown or glaucous beneath, lateral veins 10–12, impressed above, prominent beneath. Fruiting axes racemiform, angulate, 4–6 cm. long, 1–1.5 mm. wide, pedicels flat, dilated at apex, 1.2–1.5 cm. long, 1–1.5 mm. wide; drupes immature, elliptic-globose, style long divaricate, staminodia scars prominent, numerous.

This variety was collected in thickets on the flanks of the Mingkwong valley at altitudes of from 1800 to 2100 m.

CHINA. Yunnan: Forrest 8587 (A, holotype, E, K, isotypes).

Leaves of this variety are very similar to those of *D. glaucescens* subsp. *beddomei*, but differ from the latter by the absence of a calyx. The new variety differs from the type variety by the long, divaricate styles and the strongly cuspidate leaf apices.

9a(d). *DAPHNIPHYLLUM HIMALAENSE* subsp. *HIMALAENSE* var. *longeracemosum* (Rosenth.) Huang, stat. nov.

Daphniphyllum longeracemosum Rosenth. in Engl., Pflanzenreich 68(IV. 147a): 14. 1919.
(Named for its long fruiting axes.)

CHINA. Kwangsi: Yao Shan, Wang 40330 (A); Tsin Hung Shan, Ching 6917 (A, NY, UC, US). Yunnan: Menqtse, Henry 9652 (MO, lectotype, A, isolectotype), 9652a (A, K, MO, NY, topotypes), 12374 (K, NY, paratypes); Pin-pien Hsien, Tsai 60281 (A), 62678 (A).

This variety is distinct from all other varieties by having long fruiting axes and large leaves. Its bark is gray and its green drupes are covered with a white bloom.

9a(e). *DAPHNIPHYLLUM HIMALAENSE* subsp. *HIMALAENSE* var. *chartaceum* (Rosenth.) Huang, stat. nov.—Fig. 42.****

Gouphia himalaensis Benth. in Hook., Jour. Bot. 6: 9. 1854, ex parte.

Daphniphyllum himalaense (Benth.) Muell.-Arg. in DC., Prodr. 16(1): 4. 1869, ex parte.

Daphniphyllum bengalense Rosenth. in Engl., Pflanzenreich 68(IV. 147a): 8. 1919.

Daphniphyllum chartaceum Rosenth., loc. cit. 11. (Named for its chartaceous leaves.)

Daphniphyllum chapense Merr., nomen.

This widely distributed variety grows in jungles, broad-leaf forests, midland streams, deep ravines, and above mossy falls at altitudes of from 600 to 2250 m.

Fig. 42. *D. himalaense* subsp. *himalaense* var. *chartaceum* (Rosenth.) Huang. A: Twig with fruits (Griffith 4917, K); B: Ovary, longitudinal and cross sections (Stainton et al. 4842, BM); D: Fruit, longitudinal section, and seed (Griffith 4917, K); and E: Staminate flower, stamen and anther in cross section (Datta 91, US).



The colors of living plants are gray for bark, red for petioles, black-green for leaves, greenish yellow for stamens, green for ovaries covered with a white bloom, grayish-yellow for seeds, and orange for stigmas. Anthesis is during April and May with fruit formation by June.

The vernacular names are *Ratendu* for the Himalayan languages and *Lal Chandan* for the Kangra language.

The wood is used for timber in China.

CHINA. Yunnan: Shweli Salween divide, *Forest* 14505 (BM), 15679 (E), 16081 (A, BM, E), 17505 (BM, E), 18853 (E), 24108 (E), 30409 (E); Kiukiang valley, Srowthu, *Yu* 21052 (A); Ping Pien Hsien, *Tsai* 61736 (A). Tibet: Chumbi Tal, *Falconer* 931 (L, NY, syntypes).

BHUTAN. Kandiaur: Pueakha, *Cooper, Bulley & Cheshue* 3054 (BM, E).

BURMA. Maymyo district: *English s. n.* (E); north triangle, *Kingdon-Ward* 20745 (A). Nainee Tal: Kumon, *Thomson* 1004 (A, GH, syntypes); *Blinkworth* 9048 (GH); *Strachey & Winterbottom s. n.* (GH, P).

INDIA. Dehra Dun district: vicinity of Mussoorie, *Gamble* 22794 (K), *Fleming* 518 (A), *Beli* 112 (A), *Punj* 111 (NY), *Tripathi* 100 (E), *Rawat* 99 (A), *Stewart* 14203 (A, NY, UC), 416 (MICH); Chakrata, *Mohammad* 109 (UC); *Datta* 91 (US), *Kar s. n.* (NY); Landour, *Stewart* 10971 (A, NY), 13016 (MO, NY), 15793 (US). Siwalk & Janunsan division: Matkangra, *Kauanke* 131 (US). Pungtung, *Clarke* 15149 (BM). *King's collector s. n.* (A, BM, US, type of *D. chartaceum* Rosenth.). Kangra: *Hartesp* 581 (E); *Start s. n.* (E). Khasia: *Hooker & Thomson* 59 (A), *s. n.* (K), *s. n.* (BM, E, GH, NY, syntypes of *D. chartaceum* Rosenth.).

NEPAL. Near Bhalari: *Stainton, Sykes & Williams* 2500 (BM). Rikbar: Danti district, *Ram* 402 (A, BM). Chabung Yohola: *Stainton, Sykes & Williams* 5315 (BM); near Lumsum, *Stainton, Sykes, & Williams* 9141 (BM, E); near Parkhapani, *Stainton, Sykes & Williams* 2810 (L); Bakhri Kharka, north of Pokhara, *Stainton, Sykes & Williams* 4820 (BM), 4842 (A, BM, E), 5086 (E, K); Pondland forest, *Stainton* 3665 (E).

PAKISTAN. E. Bengal: *Griffith* 4917 (A, GH, K, syntypes of *D. bengalense* Rosenth.).

SIKKIM. Dikchu: *Biswas* 6722 (A); *Clarke* 43452 (BM).

VIETNAM. Tonkin: Chapa and Cho-bo, *Poilane* 12590 (A); Chapa, *Pételot* 2602 (A); 3783 (NY, type of *D. chapaense* Merr.).

LOCALITY UNKNOWN. *Arnott s. n.* (NY); Mauda valley, *Edgeworth* 51 (K); Gagur pass, *Madden* 678 (E).

9b. **DAPHNIPHYLLUM HIMALAENSE** subsp. **angustifolium** (Hutch.) Huang, stat. nov.—Fig. 43.

Fig. 43. *D. himalaense* subsp. **angustifolium** (Hutch.) Huang. A: Twig with fruits (*Wilson* 2959, MO); B: Ovary, longitudinal and cross sections (*Chun* 4195, A); C: Fruit, top view, and seed (*Fang* 957, A); and D: Staminate flower, stamen and anther in cross section (*Fang* 958, E).

Daphniphyllum angustifolium Hutch. in Sarg., Pl. Wils. 2: 521. 1916. (Named for its narrow blade.)

Daphniphyllum longistylum sensu Croizat & Metcalf, Ling. Sci. Jour. 20: 114. 1941, pro parte, non Chien 1933.

This variety is found in thickets at altitudes of from 1800 to 2250 m. and is endemic to central China.

CHINA. Hupeh: Giache Yuan, *Chun* 4195 (A); Fang Hsien, *Wilson* 2959 (K, holotype, BM, E, K, MO, isotypes); Changyang Hsien, *Wilson* 3727a (A, paratype); Wushan, *Wilson* 670 (A). Szechuan: Nanchuan Hsien, *Fang* 957 (A, E, P), 958 (A, E, NY); Tchen Keou Ting, *Farges* 1168 (A).

Perhaps the subsp. *angustifolium* evolved from the subsp. *macropodium* which would require a reduction in the size of leaves, stigmas, and inflorescences. Some members of the latter taxon cannot be separated from the former by their staminate flowers, e. g. *Farges* 1187 (UC) possibly belongs to this subspecies while the same collecting number found in other herbaria (A, BM, E, P, US) is rather close to the subsp. *macropodium*. The subspecies *angustifolium* differs from all other related taxa by its short pistillate inflorescences, stout pedicels, glaucous and smooth drupes with short discoid styles, and small, oblong anthers often with prominently apiculate apices.

9c. DAPHNIPHYLLUM HIMALAENSE subsp. *macropodium* (Miq.) Huang, stat. nov.—Fig. 44.

Daphniphyllum macropodium Miq., Ann. Mus. Bot. Lugd. Bat. 3: 129. 1867.

Daphniphyllum glaucescens sensu Fr. & Sav., Enum. Pl. Jap. 2: 488. n. 1534. 1879, non Blume 1826.

"*Daphniphyllum* sp. (*D. macropodi* affinis)" Fr. & Sav. loc. cit. n. 1535.

Daphniphyllum macropodium subsp. *macropodium* f. *macropodium* Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 216. 1954.

Daphniphyllum humile Maxim. ex Fr. & Sav., Enum. Pl. Jap. 2: 488. n. 1533. 1879.

"*Daphniphyllum* sp. (*D. humile* affinis)" Maxim. ex Fr. & Sav., loc. cit.

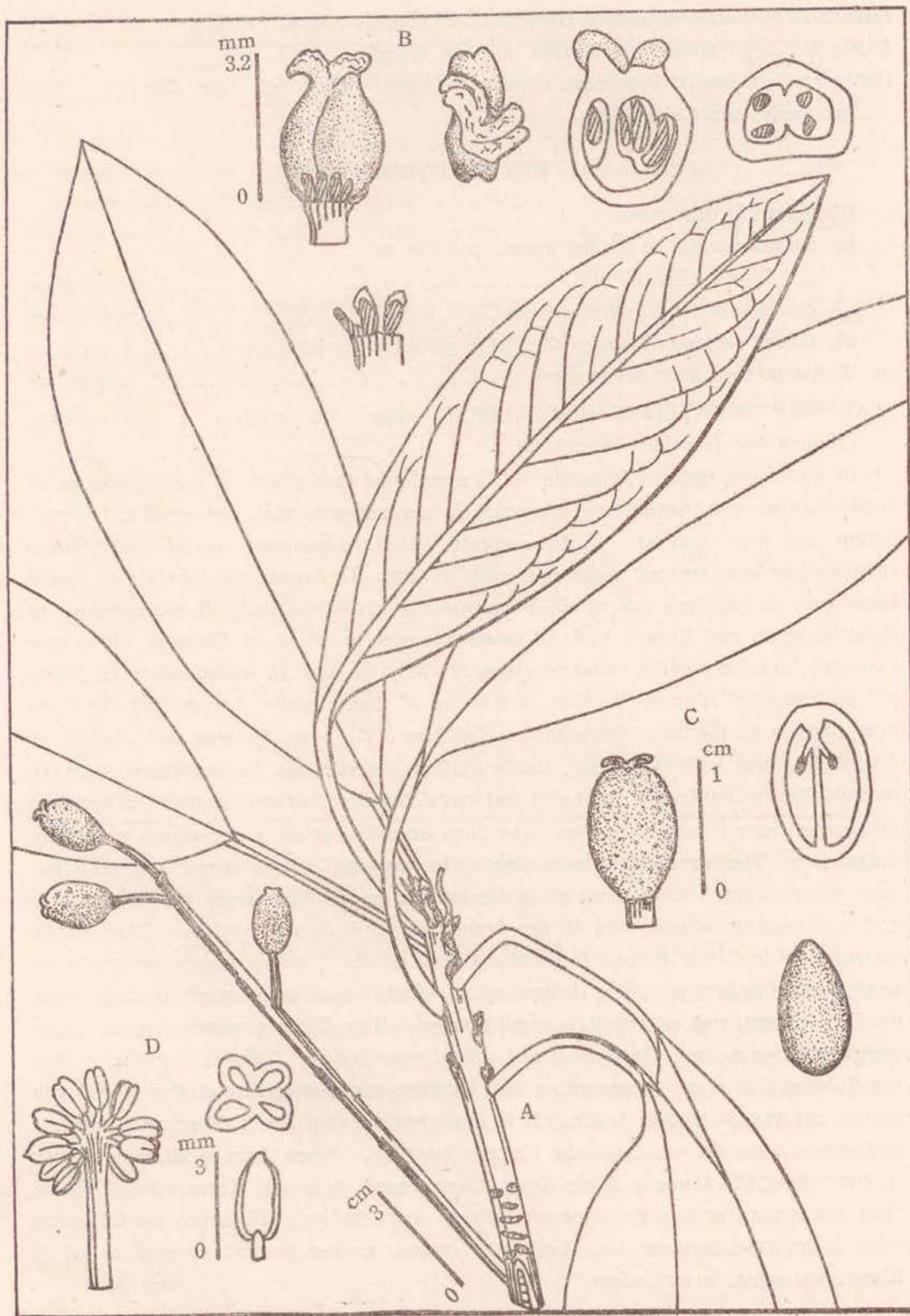
Daphniphyllum macropodium var. *humile* (Maxim.) Rosenth. in Engl., Pflanzenreich 68 (IV. 147a): 11. 1919.

Daphniphyllum macropodium subsp. *humile* (Maxim.) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 217. 1954.

Daphniphyllum macropodium subsp. *humile* f. *humile* Hurusawa, loc. cit.

Daphniphyllum macropodium subsp. *humile* f. *intermedium* Hurusawa, loc. cit.

Fig. 44. **D. himalaense** subsp. *macropodium* (Miq.) Huang. A: Twig with fruits (*Keiskei* 91, L); B: Ovary, longitudinal and cross sections (*s. coll.*, *s. n.*, June 1910, US); C: Fruit, longitudinal section, and seed (*Keiskei* 91, L); and D: Staminate flower, stamen and anther in cross section (*Kanehira* *s. n.*, US).



Daphniphyllum membranaceum Hayata, Ic. Pl. Formos. 4: 41. 1916.

Daphniphyllum leptophyllum Hayata, MSS. in Sched.

Daphniphyllum longistylum sensu Croizat & Metcalf, Ling. Sci. Jour. 20: 114. 1941,
pro parte, non Chien 1933.

KEY TO FORMS

- a. Blades uniformly green
 - b. Lower surface of blades green; petioles red
 - c. Blades thin, elliptic.....f. *macropodium*
 - cc. Blades thick, elliptic-ovatef. *crassifolium*
 - bb. Lower surface of blades distinctly glaucate; petioles greenf. *viridipes*
 - aa. Blades mixing with white spots.....f. *variegatum*
- 9c(a). **DAPHNIPHYLLUM HIMALAENSE** subsp. *macropodium* f. *macropodium*.
(Named for its robust branchlets).

In a previous paper (Taiwania 11), I mentioned that plants of certain species of *Daphniphyllum* tend to differentiate racially according to their geographical distribution and local habitat. In this regard the *D. himalaense* subsp. *macropodium* complex has been treated under four specific taxa: *D. humile* was applied to plants found only in northern Japan; *D. longistylum* to those in China; *D. macropodium* to those in Japan and Korea; and *D. membranaceum* to those in Taiwan. It is true that most members of *D. membranaceum* in Taiwan and *D. macropodium* in Japan can be separated from each other by the size of their mature drupes, but there are exceptions, e. g., fruiting specimens of *Kanehira* 3073 from Taiwan are similar to *Dorsett & Morse* 1035 of Japan. *Daphniphyllum humile* can be separated from *D. macropodium* by its decumbent habit and restricted distributional pattern in northern Japan, yet there is no way to separate them on a herbarium sheet when geography is ignored. The leaves of Chinese plants are variable in both shape and size, but most closely approximate those of *D. himalaense* subsp. *himalaense* var. *chartaceum* and var. *longeracemosum*, and *D. membranaceum* and *D. macropodium*. Thus subsp. *macropodium* in China differs from the Japanese and Taiwan plants generally by having more or less narrower leaves with acuminate apices, longer fruiting axes, smaller anthers, and intermediate sized drupes. The Chinese plants appear intermediate between var. *chartaceum* and subsp. *macropodium*. Thus it is probable that the Chinese plants are a connecting link between var. *himalaense* of the Himalayan region and var. *humile* of Japan. It is also possible that the Taiwan and Japanese aggregates were derived from the Chinese complex. Since there is no obvious way to distinguish the Chinese plants from those found in Japan, Korea, and Taiwan, they are treated as a single subspecies (subsp. *macropodium*). However, the following table is designed to show the dominant features among several populations of *D. himalaense* subsp. *macropodium*.

Table 8. Inter- and infra-subspecific characters of *D. himalaense* subsp. *macropodum*.

Characters \ Taxa	subsp. 1		subsp. 2	subsp. 3	subsp. 4	
	var. 1	var. 2			var. 1	var. 2
Stamens						
number	(8-)9-11	9-10	7-8	9-11	8-12	8-12
length (mm.)	0.8-1.3	1.4-1.6	0.7-0.8	1	0.9-1	0.9-1
wide (mm.)	0.5-0.7	0.5-0.6	0.5	0.5	0.6-0.7	0.6-0.7
Fruits						
shape	elliptic-globose	ovoid	ovoid	ellipsoid	ellipsoid	elliptic-globose
length (mm.)	7-9(-11)	7	8(-10)	10-12	9-11	7-10
diameter (mm.)	5-7(-10)	7	6(-8)	5-6	5-6	5-8
l/d	1.1-1.6	1	1.5	1.66-2.4	1.66-2.2	1.2-1.6
Fruiting axes (cm.)	5-7	7-9	3-6	5-11	4-13	5-12
Pedicels (mm.)						
staminate	3-6	—	2-4	4-10	3-4	3-4
pistillate	4-10	—	3-9	10-15	5-20	5-12
Fruiting	4-14	6-11	5-10	10-15	5-22	5-22
Blades						
length (cm.)	9-20	11-16	6-19	10-17	10-18	11-25
wide (cm.)	3-6	4-5	2-6	3.5-6	3-6	3-6.5
veins	11-16	13	8-14	11-15	10-15	11-16
Petioles (cm.)	2-5	3-6	1-4.5	2-6.5	2-4.5	2-6

The distinction among populations of *D. himalaense* subsp. *macropodum* complex, mentioned above, is summarized as the following key:

KEY TO POSSIBLE SUBSPECIES AND VARIETIES

- a. Blades usually obovoid-lanceolate, mucronate apex; staminodia usually persistent
- b. Anthers usually oblong-elliptic, 0.8-1.6 mm. long, usually apiculate apex; trees.....subsp. 1. *macropodum*
- c. Anthers 0.8-1.3 mm. long, 0.5-0.7 mm. wide; drupes more or less elliptic-globose, S. Japan, Korea, Taiwan (*Kanehira 3073*), Chekiang, China (*Ching 1382, 2543*).....var. 1. *macropodum*
- cc. Anthers 1.4-1.6 mm. long, 0.4-0.6 mm. wide; drupes ovoid, Korea
-var. 2. *Wilson 8541, Taquet 4937*
- bb. Anthers usually broadly elliptic, 0.7-0.8 mm. long, emarginate apex; shrubs, N. Japan
-subsp. 2. *humile*

- aa. Blades usually narrowly elliptic, acuminate apex; staminodia caducous
- d. Blades broader, usually less than 1/3 times longer than wide; drupes more or less ellipsoid, 1.66–2.4 times longer than diameter, Taiwan
..... subsp. 3. *membranaceum*
- dd. Blades narrower, usually more than 1/3 times longer than wide; drupes more elliptic-globose, 1.2–2.2 times longer than diameter, Continental China
..... subsp. 4
- e. Drupes 9–11 mm. long, 5–6 mm. in diam., 1.66–2.2 times longer than diameter..... var. 1. (*Chiao* 1252, *Chiao & Fan* 268, *Chien* 5626, *Chow* 1091, 7123, *Chung* 81598, 83346, 83550, *Fan* 134, *Fang* 2030, 3352, 7800, 7892, 12197, *Farges* 1187, *Henry* 5673, *Hu* 1652, *Hwa* 18, *Lee* 4555, *Liu* 1434, *Sun* 2068, *Tang & Hsia* 141, *Wang* 12104, 20606, 23149, *Wilson* 20, 5774, *Yu* 423, 506, 507)
- ee. Drupes 7–10 mm. long, 5–8 mm. in diam., 1.2–1.6 times longer than diameter..... var. 2. (*Chien* 5753, *Ching* 2982, 3221, *Fan & Li* 616, *Fang* 3196, 13059, *Feng* 3351, *Henry* 7102, *Ko* 52872, *Lee* 2935, *Liu* 1530, *Steward* 1299, *Steward*, *Chiao & Cheo* 525, 714, *Tsang* 28497, *Tsiang* 7632, 7880, *Tso* 21129, *Yu* 18175)

Some of the fruiting Chinese specimens (*Ching* 3221, *Steward* 1299, *Lee* 3686, *Wilson* 3552) are similar to the subsp. *angustifolium* except that they have larger drupes, long fruiting pedicels, and divaricate styles. Croizat and Metcalf (1941) erroneously considered subsp. *macropodium* found on the Chinese mainland to be representative of *D. longistylum*; this taxon, however, belongs to the section *Daphiphyllum* and not to the section *Staminodia*.

The vernacular names are: Taiwan Hupinan 臺灣虎皮楠 and Poye Hupinan 薄葉虎皮楠 in Taiwan, and Usuba Yuzuriha in Japan.

JAPAN. **Hokkaido:** Yeso, near Hakodate, *Nowatari* s. n. (BM, BO, GH, L, NY, types of *D. humile* Maxim. ex Fr. & Sav.), *Faurie* 6804 (A, BM); Rebunshiri, *Faurie* 3269 (A), 9695 (MO); Aomoris, *Faurie* 5500 (A, BM), 5501 (BM); Mt. Hokkaido, near Aomori, *Sargent* s. n. (A); Utishini, *Sargent* s. n. (A); Nopooro, *Isikawa* s. n. 1923 (TAI); *Kudo* 1229 (TAI), *Wilson* s. n. (A), *Tanaka* 182 (A, NY, TAIF), *Dorsett & Morse* 1035 (A, US); Iwater, Mt. Yakeishi, *Suzuki* 55 (UC), 81 (A); Tokaya, *Faurie* 5889 (A, BM); Tanba, Ashiu in Chiimura, *Nakai* 5601 (MICH); Richuchu, *Okada* 2040 (A), near Aomori, *Wilson* s. n. (A); Hokkaido, *Takabachi* s. n. (A), *Brooks* 513 (UC), *Wilson* 7407 (US). **Honsyu:** Shiano, Mt. Togakushi, *Makino* 14621 (TAIF); Kami-minochigun, Kinsasamura, *Furuse* s. n. (A); Mt. Bamdai-san, Yamagun, *Furuse* s. n. (UC); Okinajima Omura, Yamagun, *Furuse* s. n. (UC); Gumma, Mt. Tanigawa dake, Tonegun, *Furuse* s. n. (A), 262 (A); Mt. Tanigawa, *Mizushima* 282 (A), 296 (A), 2963 (A, L); Mitsu, Shimokitagun, *Hosoi* 2650 (A); Kodomarimura, Kitatsugarugun,

Hosoi 2695 (A); near lake Tagawa, Minamiakita Ugo, *Kato* 2969 (A); Ohshimizu, Kozuke, *Mizushima* 1139 (A), 1142 (A); Shinano, Shimominodigun, *Mizushima* 2913 (A); Mino Province, *Shiota* 2037 (A), 2041 (A), 5065 (A), 5512 (A), 6618 (A); Mt. Zaozan in Echigo, *Togasi* 1352 (E, UC), *Wilson* 7196 (US), *s. n.* (A); Yokohama nursery *s. coll. s. n.* (E); Yamagata, Mt. Azuma, *Uno* *s. n.* (A); Okayamaken, Kurashikishi, *Uno* *s. n.* (A); Fujiyama, *Tschonoski* *s. n.* (GH); Aichi, Mt. Hooraiji, Minamishitaragun, Mikawa, *Furuse* *s. n.* (A); Taitoomisaki, Taitoomura, Chyooseigun, Kadzusa, *Furuse* *s. n.* (UC); Yokosaka, *Savatier* *s. n.* (P), 1100 (P); Tokyo, *Terakawa* 150 (US); Yokohama, National Forest, *Charette* 1579 (MO, UC, US); Kanagawaken, in the wood between Kamakura and Tushi, *s. coll.* 19439 (US); Prov. Tajima, Mt. Hyonosen, *Hiroe* 7407 (UC); Amagisan, *s. coll.* 419 (US); Daisen Tottorikan, *Kume* *s. n.* (A); Hygo, Nishiwaki, *Muroi* 686 (A); Paguri, *Sakurai* *s. n.* (A); Kii, Yuasa, *s. coll. s. n.* (US); Giosookuyama, *Goto* 1900 (TAI), 1901 (TAI); Watarisima, Kuni, *Kudo* 3669 (TAI); Prov. Teshio, *Kudo* 4532 (TAI); Okusisima, *Kudo* 2236 (TAI), 2625 (TAI); Yamaguchi Ken, *Simizu* 1143 (TAI); Tikuzen, *Konishi* *s. n.*, Apr. 1895 (TAI); Prov. Rikuzan, *Kuwanuma* *s. n.*, Apr. 1912 (TAI); Gunma: *Simizutoge*, *Faurie* 2377 (MO), *s. coll. s. n.* (US). Mino: Tosagun, Inazumura, *Mizuno* 9236 (A); Nono kawa, *s. coll. s. n.* (GH, K); Nambu, *Tschonoski* 1865 (BM, K). Kyushu: Nagasaki, *Tagusake* *s. n.* (BM); hills near Nakstusugawa, *Sargent* *s. n.* (A); Higosan, *Maximowicz* *s. n.* (A, BM, BO, GH, K, L, NY, US); Mt. Kirishima, *Kanehira* *s. n.* (US), *Kudo* 113 (TAI); Yakushima, *Wilson* 6015 (A, US); Osmi Kuromidake, *Moran & Reid* 5328 (UC, US); Satsuma, *Siebold* *s. n.* (L903, 157-123, L903, 157-124, paratypes), *Keiskei* 91 (L903, 157-126, holotype, L903, 157-125, isotype).

Cultivated in Java: Hort. Borgo. (L908, 352-274); Hort. Bot. Amstelad (L).

KOREA. Quelpaert Island (Cheju-Do); *Chung* 1205 (F, MICH), *Faurie* 883 (A, BM, K); Hallaisan, *Faurie* 1988 (E, P), 2025 (E), *Taquet* 9998 (E); Hong-Do or Maega-Do, Cholla-Mando, *Yongsock* 7871 (MICH), 8154 (MICH); Ullung-Do, Kyongsang-Pukto, *Chung* 3199 (MICH); Dagelet Island, *Wilson* 8541 (A) Hainan Jung, *Chun* 54 (TAI). Precise locality unknown: *Wilson* 9449 (A, BM, US).

CHINA. Anhwei: Wang Shan, *Steward* 1299 (UC), *Ching* 2982 (A, E, NY, UC); Chang Gen Shan, Wuyan, *Ching* 2543 (K), 3221 (A, E). Chekiang: west Tienmu, *Hu* 1652 (A, UC), *Tang & Hsia* 141 (A), *Law* 861 (TAI). Hupeh: *Henry* 5673a (A, BM, E, GH, US); Chienshih Hsien, *Chow* 1091 (A, E, NY), *Hwa* 18 (US), *Wilson* 20 (A, E, NY, US). Hunan: Malingtung, Shinning Hsien, *Fan & Li* 616 (A, BM, L); Yunschan toward Wukang, *Wang* 12104 (A, E). Kwangsi: Hsichang village, Chifeng Shan, Kweiling district, *Tsang* 28497 (A, US); Tzuyuen district, *Chung* 83550 (A); Chuenyuen, *Chung* 81598 (A), 83346 (A). Kweichow: *Wilson* 20 (NY); Chiu Lung Tze, Fan Ching Shan, *Steward*, *Chiao & Cheo* 525 (A, BM, E, F, L, NY, US); Yinkiang, *Tsiang* 7880 (NY); Feng Hsiang Ping, Fang Sching Shan, *Steward*, *Chiao & Cheo* 714 (A, BM, E, F, K, L, NY, US); Van Ching Shan, Yin Kiang, *Tsiang* 7632 (NY, UC).

Kwangtung: Leehong, Tse 21129 (NY), Yuyuen, Ko 52872 (NY, UC) Juyrian, Wang 2081 (TAI). **Sikong:** Moon Ting Shan, Chiao 1252 (A). **Szechuan:** Mt. Omei, Liu 1530 (A, PNH), Lee 2935 (US), 3686 (US), Chow 7123 (E), Fang 3196 (A, E), 3352 (A, E), 7800 (A, K), 7892 (A, E), 13059 (A), Lee 4555 (E), Liu 1434 (A, PNH), Sun 2068 (US), Wang 23149 (A), Wilson 5774 (A, BM), Yu 423 (A), 506 (A), 507 (A), Fan 134 (A); Chengtu, Fang 12197 (A); Kuan Hsien, Fang 2030 (A, E, NY), Chien 5626 (A, BM, E); 5753 (E); Mupin, Wilson 3552 (A, E, GH, K, MO, US); Precise locality unknown, Henry 91 (NY), 5673 (BM, E, GH, US), 7102 (BM, E, GH, K, US), Farges 1187 (A, BM, E, P, US), Wang 20606 (A, TAI), Wilson 20 (A, K, NY). **Yunnan:** Mienning, Yu 18175 (A); S. Chungtien, Wutze on Yangtze bank, Feng 3351 (A). **Taiwan:** Ilan Hsien, Giran, Mt. Tayen Shan, Kao 3204 (TAI), Mt. Taihei, Suzuki S. s. n. (A, TAI, UC, US), 1070 (TAI), 2891 (TAI), Suzuki S. & Tamoto s. n., Nov. 1932 (TAI), Suzuki T. 2061 (TAI), 8666 (TAI), Chuang & Kao 4824 (TAI), Kanehira 368 (UC), 1463 (TAIF), Wilson 10171 (A, US), Sasaki 14622 (TAIF), Kanehira s. n. (US, photo of the type of *D. leptophyllum* Hayata), Chuang, Chao & Kao 4817b (MO), 4720 (MO), 4824 (MO), Rankanzan, Hayata s. n. (TI, TAIF), Chi Lan Shan, Kao 4203 (MO), Gan s. n., Oct. 7, 1962 (TAI); Ratogun, Nankotaizan, Simada 17694 (TAI), Soo, Mt. Oobi, Masamune s. n., Apr. 1938 (TAI); Taipei Hsien, Suzuki T. 8806 (TAI), 16923 (TAI); between Piyanan & Saukan, Suzuki T. 7098 (TAI), Agyoku, Simizu 2752 (TAI), Suzuki T. 15564 (TAI); Taoyuan Hsien, Toyen, Sasaki 218 (A), 14624 (TAIF), 14625 (TAIF); Hsinchu Hsien, Mt. Rokuzo, Fukuyama 3440 (TAI), Tabaho, Nakai & Tanaka 4626 (TAIF); Chayi Hsien, Arisan, Sasaki 38033 (TAI), Kanehira 3073 (NY, US), Wilson 9755 (A, K), Keng 1118 (A, US); Rokurizan, Jan & Kao s. n., July 1957 (TAI); Taitung Hsien, Taito, Yamamoto 791 (TAI); Kaohsiung Hsien, Takao, Yamamoto & Mori 608 (TAI), 647 (TAI); Hualien Hsien, Kirai Kei, Suzuki S. 1905 (TAI), Taroko, Liu & al. 78 (TAI), Tentyozan, s. coll. s. n., April 1919 (TI, type), Tencyotoge, Sasaki 380566 (A, MO, PNH, TAI).

Hurusawa (1954) established six forms for *D. macropodium*. The forms *crassifolium*, *macropodium* and *viridipes* are well established, f. *humile* and f. *intermedium* are synonymous of f. *macropodium* and until the type of f. *insulare* is examined, no conclusion is made. Additional forms can be proposed for Japanese and Chinese plants, but the describing of new taxa at this rank is intentionally avoided by the author.

9c(b). DAPHNIPHYLLUM HIMALAENSE subsp. *macropodium* f. *crassifolium* (Hurusawa) Huang, comb. nov.

Daphniphyllum macropodium var. *crassifolium* Hurusawa, Jour. Jap. Bot. 18: 160. 1942.

Daphniphyllum macropodium subsp. *macropodium* f. *crassifolium* (Hurusawa) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 217. 1954.

KOREA. Cheju-Do: Chung 1204 (MICH); Taehuksan Do, Cholla Namdo, Yongsok 7964 (MICH).

9c(c). *DAPHNIPHYLLUM HIMALAENSE* subsp. *macropodum* f. *viridipes* (Hurusawa) Huang, comb. nov.

Daphniphyllum macropodum var. *viridipes* Nakai, Bot. Mag. Tokyo 36: 63. 1922.

Daphniphyllum macropodum subsp. *macropodum* f. *viridipes* (Nakai) Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6: 217. 1954.

JAPAN. Miyazakiken: Mt. Takisan, *Hurusawa* 105-1 (US); Mino Province, Kamogun, Hatiokumura, Cult. *Shiota* 2042 (A), 3832 (A).

9c(d). *DAPHNIPHYLLUM HIMALAENSE* subsp. *macropodum* f. *variegatum* (Bean) Huang, comb. nov.

Daphniphyllum macropodum var. *variegatum* Bean, Trees and Shrubs 1: 475. 1914; Ohwi, Fl. of Japan 588. 1965.

Daphniphyllum macropodum f. *variegatum* (Bean) Rehd., Bibliography of Cultivated Trees and Shrubs, Arnold Arboretum 1949; Hurusawa, Jour. Fac. Sci. Univ. Tokyo, Ser. 3, Bot. 6: 217. 1954; Ohwi, Fl. of Japan 716. 1956.

Tetranthera ihuysii Carriere, Rev. Hort. 1869: 368. f. 78. 1869.

Daphniphyllum macropodum var. *ihuysii* (Carr.) Nakai, Jour. Arn. Arb. 5: 68. 1924.

This plant is a cultivated form and no specimen has been examined.

XIV. EXCLUDED SPECIES

Daphniphyllum africanum Muell.-Arg., Flora 67: 536. 1864.

=*PLAGIOSTYLIS AFRICANA* (Muell.-Arg.) Prain ex De Wildeman, Ann. Mus. Congo, Ser. 5. 3: 424. 1912.

Daphniphyllum cavaleriei Léveillé, Fedde Rep. 9: 460. 1911.

=*EUPHORBIACEAE* St.-Hil., Expos. Famil. 2: 276. 1805.

Daphniphyllum conglutinosum Hemsl., Kew Bull. 1895: 137. 1895.

=*PIMELEODENDRON* Hassk., Versl. & Med. Akad. Amsterdam 4: 140. 1855.

Daphniphyllum kingii Hook. f., Fl. Brit. Ind. 5: 354. 1887.

=*APOROSA ARBOREA* Muell.-Arg. in DC., Prodr. 15(2): 470. 1862.

Daphniphyllum roxburghii Baill., Étud. Gen. Euph. 565. 1858.

=*FLACOURTIA INERMIS* Roxb., Fl. Ind. 833. 1832.

Couphia griffithiana Wight, Ic. 5: 22, f. 1878-9. 1852.

=*ANTIDESMINAE* Pax & Hoffmann in Engl., Das Pflanzenreich 81 (IV. 147): 3. 1922.

XV. SYSTEMATIC INDEX

Roman type indicates accepted, pre-existing names; italics indicate synonyms; and bold face indicates new taxa.

<i>Aporosa arborea</i> Muell.-Arg.	219
<i>Calycifera</i> Hurusawa	138, 153
<i>Daphniphyllum</i> Blume	138, 153, 161
<i>acutifolium</i> Muell.-Arg.	165
<i>africanum</i> Muell.-Arg.	219
<i>amamiense</i> Hurusawa	172

<i>angustifolium</i> Hutch.	212
<i>atrobadium</i> Croizat & Metcalf	176
<i>bancanum</i> Kurz	139
<i>beddomei</i> Craib	186
<i>bengalense</i> Rosenth.	209
<i>benthamii</i> Baill.	204
<i>blumeatum</i> Baill.	165
<i>blumeatum</i> Baill. ex Muell.-Arg.	165
<i>borneense</i> Stapf	192
<i>buchananiiifolium</i> Hallier f.	192
<i>buergeri</i> Muell.-Arg.	173
<i>calleryanum</i> Baill.	144
<i>calycinum</i> Benth.	144
<i>cambodianum</i> Gagnep.	186
<i>candelabrum</i> Croizat & Metcalf	149
<i>cavaleriei</i> Léveillé	219
<i>celebense</i> Rosenth.	186
<i>chapense</i> Merr.	209
<i>chartaceum</i> Rosenth.	209
<i>conglutinosum</i> Hemsl.	219
<i>crispifolium</i> Keng	177
<i>formosanum</i> Keng	182
<i>formosanum</i> Rosenth.	176
<i>gaudichaudianum</i> Baill.	144
<i>glaucescens</i> Blume	161
subsp. atrobadium (Croizat & Metcalf) Huang	176
subsp. beddomei (Craib) Huang	186
var. <i>blumeatum</i> (Baill. ex Muell.-Arg.) Smith	165
subsp. borneense (Stapf) Huang	192
subsp. buchananiiifolium (Hallier f.) Huang	192
subsp. celebense (Rosenth.) Huang	186
subsp. ceramense Huang	190
var. <i>concolor</i> Muell.-Arg.	195
subsp. dichotomum Huang	190
subsp. <i>glaucescens</i> .	163
var. <i>blumeatum</i> (Baill. ex Muell.-Arg.) Smith	165
var. <i>glaucescens</i> .	163
subsp. lancifolium (Hook. f.) Huang	165
subsp. luzonense (Elmer) Huang	188
subsp. neilgherrense (Wight) Huang	195

var. <i>oldhamii</i> Hemsl.	177
subsp. <i>oldhamii</i> (Hemsl.) Huang	176
var. <i>longistylum</i> (Chien) Huang	182
var. <i>oldhamii</i> .	177
var. <i>salicifolium</i> (Chien) Huang	182
subsp. <i>paxianum</i> (Rosenth.) Huang	174
subsp. <i>scortechinii</i> (Hook. f.) Huang	195
subsp. <i>subverticillatum</i> (Merr.) Huang	168
subsp. <i>sumatraense</i> Huang	166
subsp. <i>teijsmannii</i> (Zoll. ex Teysm. & Binn.) Huang	170
var. <i>amamiense</i> (Hurusawa) Huang	172
var. <i>buergeri</i> (Muell.-Arg.) Huang	173
var. <i>hisautii</i> (Hurusawa) Huang	174
var. <i>iriomotense</i> (Hurusawa) Huang	172
var. <i>teijsmannii</i> .	170
subsp. <i>timorianum</i> Huang	192
<i>gracile</i> Gage	153
var. <i>gracile</i> .	155
var. <i>tuberculatum</i> Huang	159
<i>gracile</i> Rosenth.	192
<i>himalaense</i> (Rosenth.) Muell.-Arg.	204
subsp. <i>angustifolium</i> (Hutch.) Huang	211
subsp. <i>himalaense</i> .	205
var. <i>divaricatum</i> Huang	209
var. <i>himalaense</i> .	205
var. <i>longeracemosum</i> (Rosenth.) Huang	209
var. <i>triangulatum</i> Huang	207
var. <i>chartaceum</i> (Rosenth.) Huang	209
subsp. <i>macropodum</i> (Miq.) Huang	212
f. <i>crassifolium</i> (Hurusawa) Huang	218
f. <i>macropodium</i>	214
f. <i>viridipes</i> (Hurusawa) Huang	219
f. <i>variegatum</i> (Bean) Huang	219
<i>humile</i> Maxim. ex Fr. & Sav.	212
<i>kengii</i> Hurusawa	182
<i>kingii</i> Hook. f.	219
<i>lancifolium</i> Hook. f.	165
<i>latifolium</i> Rosenth.	149
<i>laurinum</i> (Benth.) Baill.	139
<i>leptophyllum</i> Hayata	214
<i>longeracemosum</i> Rosenth.	209

<i>longipes</i> Craib	149
<i>longistylum</i> Chien	182
<i>luzonense</i> Elmer	188
<i>macropodum</i> Miq.	212
var. <i>crassifolium</i> Hurusawa	218
subsp. <i>humile</i> (Maxim.) Hurusawa	212
subsp. <i>humile</i> f. <i>humile</i> Hurusawa	212
f. <i>intermedium</i> Hurusawa	212
var. <i>humile</i> (Maxim.) Hurusawa	212
var. <i>ihuysii</i> (carr.) Nakai	219
subsp. <i>macropodum</i> .	
f. <i>crassifolium</i> (Hurusawa) Hurusawa	218
f. <i>insulare</i> Hurusawa	218
f. <i>macropodum</i> .	212
f. <i>variegatum</i> (Bean) Rehd.	219
var. <i>variegatum</i> Bean	219
var. <i>viridipes</i> Nakai	219
sp. (<i>D. humilis</i> affinis) Maxim. ex Fr. & Sav	212
sp. (<i>D. macropodi</i> affinis) Fr. & Sav.	212
<i>majus</i> Muell.-Arg.	148
var. <i>deciduum</i> Huang	151
var. <i>majus</i> .	149
var. <i>phanrangense</i> (Gagnep.) Huang	151
var. <i>pierrei</i> (Hance) Huang	151
<i>marchandii</i> (Léveillé) Croizat & Metcalf	177
<i>membranaceum</i> Hayata	214
var. <i>crispifolium</i> (Keng) Hurusawa	177
<i>nilgherrense</i> (Wight) Rosenth.	195
var. <i>concolor</i> (Muell.-Arg.) Rosenth.	195
<i>oblongum</i> Chien	182
<i>obtusifolium</i> Merr.	193
<i>oldhamii</i> (Hemsl.) Rosenth.	177
<i>papuanum</i> Hallier f.	155
<i>parvifolium</i> Quis. & Merr.	202
<i>paxianum</i> Rosenth.	174
<i>pendulum</i> Hurusawa ex Hisauti	174
<i>pentandrum</i> Hayata	176
var. <i>iriomotense</i> (Hurusawa) Hurusawa	172
var. <i>okinawaense</i> (Hurusawa) Hurusawa	173
var. <i>oldhamii</i> (Hemsl.) Hurusawa	177
var. <i>reticulatum</i> (Keng) Hurusawa	177

<i>phanrangense</i> Gagnep.	151
<i>philippinense</i> Huang	199
<i>pierrei</i> Hance	151
<i>platyphyllum</i> Merr.	139
<i>reticulatum</i> Keng	177
<i>reticulatum</i> Heine	190
<i>roxburghii</i> Baill.	219
<i>roxburghii</i> Rosenth.	173
<i>salicifolium</i> Chien	182
<i>scortechinii</i> Hook. f.	195
<i>subverticillatum</i> Merr.	168
<i>teijsmanni</i> Zoll. ex Teijsm. & Binn.	170
<i>teijsmanni</i> Zoll. ex Kurz	
var. <i>amamiense</i> (Hurusawa) Hurusawa	172
var. <i>hisautii</i> Hurusawa	174
var. <i>iriomotense</i> Hurusawa	172
var. <i>okinawaense</i> Hurusawa	173
subsp. <i>oldhamii</i> var. <i>pentandrum</i> (Hayata) Hurusawa	177
var. <i>oldhamii</i> (Hemsl.) Hurusawa	177
var. <i>pentandrum</i> (Hayata) Hurusawa	177
var. <i>teijsmanni</i> f. <i>brevipes</i> Hurusawa	173
<i>woodsonianum</i> Huang	199
<i>zollingeri</i> Muell.-Arg.	165
<i>Flacourtia inermis</i> Roxb.	219
<i>Gouphia griffithiana</i> Wight	219
<i>himalaense</i> Benth.	204
<i>laurina</i> Benth.	139
<i>nilgherrensis</i> Wight	138, 195
<i>Cyrandra laurina</i> Wall.	139
<i>Longicalycifera</i> Huang	153
<i>Lunata</i> Huang	138
<i>Plagiostylis africana</i> (Muell.-Arg.) Prain ex DeWilld.	219
<i>Staminodia</i> Hurusawa	138, 201
<i>Tetranthera ihuysii</i> Carriere.	219
<i>Unicalycifera</i> Huang	153, 197
<i>Webera marchandii</i> Leveille	177

XVI. INDEX TO EXSICCATAE

Italicized numerals refer to collectors' numbers, s. n. (sine numero) to unnumbered collections; parenthetical numerals refer to the number assigned to the species conserved in this monograph.

- Abuw 3344 (1).
Adiw 346 (2).
Alleizette *s. n.* (2).
Amano 6055, 6960, 7275 (5ed); *s. n.* (5eb).
Amdjah 437 (51).
Anderson 15286 (1).
Aoki 5 (5ed).
Arnott *s. n.* (9ae); 1850 (5r).
Backer 26011 (1); 11191, 12202, 13616, 22544 (5aa).
Bakhuizen 582 (5aa).
Bakhuizen van den Brink 3010 (1).
Balansa 4429, 4583, 4679 (2); *s. n.* (5ha).
Beattie & Kurihara 10439 (5ed).
Beccari 2119 (51).
Beddome 72, 7175 (5j); 288, 7171, 7172 (5r).
Beguin 1478 (5i).
Beli 112 (9ae).
Berkhout *s. n.* (1).
Beyer 6852 (5k).
Biswas 6641 (9aa); 6722 (9ae).
Blinkworth 9048 (9ae).
Blume 235, 1908 (5aa); *s. n.* (5ab).
Bodinier 604 (2); 1053 (5ha).
Boehmer 54A (5ec); *s. n.* (5ed).
Boerlage *s. n.* (1).
Bourdillon *s. n.* (5r).
Bourne *s. n.*, 1896 (5r).
Brand 30945 (1).
Brass 4374, 9525, 12188, 12632, 22602, 30139, 30190, 30254, 30260, 31468, 31469 (4a);
11530, 13705, 31360 (4b).
Brass & Collins 32157 (4a).
Brass & Versteegh 13193 (4b).
Brinkman 748 (5ab).
Brooks 513 (9c).
Bruggeman 3720, 3740 (5ab).
Buerger *s. n.* (5ed).
Bünnemeijer 1463a, 1481, 1829, 1863 (1).
Burkill *s. n.*, 799, 2523 (1).
Burkill & Haniff 16804 (1).
Buwalda 3637 (5a).
Buwaya 79562 (5k).

- Cabiling 3923 (1).
Callery 77 (2).
Carow 9 (5ed).
Carr 13390, 13857, 14433, 15094, 15234, 15235, 73390 (4).
Cavalére 1040 (3a).
Cave 95147 (9aa).
Champion 184 (2).
Chan 14070 (2).
Chang, C. E. 2106 (5ha).
Chang L. M. s. n. May 9, 1961, 2 (5ha).
Chao 529, 615a, 615b (5ha).
Charette 1579 (9c).
Cheflo 1093 (5ha).
Cheng 1515, 1516, 1581 (5ha); 1577 (5hc).
Chew, Corner & Stainton 761, 853 (5n).
Chiao 1252 (9c).
Chiao & Fan 442 (5hc); 268 (9c).
Chien 5626, 5753 (9c).
Ching 3244, 5244, 5366, 7801 (2); 1720, 1978, 2473, 2610, 7840, 8001, 8208 (5ha); 6234 (5hb); 2273, 7938 (5hc); 6917 (9ad); 2543, 2982, 3221 (9c).
Chow, C. L. 4790 (5f); 1091, 7123 (9c).
Chow, H. C. 1786 (5ha).
Chuang & Lin 4789 (5ha).
Chuang & al. 4720 4817b, (9ca).
Chuang, Chao & Kao 4824 (9ca).
Chun, L. C. 1199 (5ed).
Chun, N. K. 40267 (5ha); 40236 (5hc).
Chun, T. C. 54 (9ca).
Chun, W. Y. 4800, 4889, 4933, 6104, 6428, 6850 (2); 5201, 5217, 5671, 5739, 5854, 6571, 6657 (5ha); 2053 (5g); 4195 (9c).
Chun & Tso 43750, 44308 (5g).
Chung, H. H. 1070 (2); 2273, 6722, 7918, 8475 (5ha); 6785 (5hc).
Chung, I. C. 1204, 1205, 3199 (9c).
Chung (Tsoong), T. S. 83701 (5ha); 81724 (2).
Chung, Z. S. 82023 (5ha); 81598, 83346, 83550 (9c).
Clarke 10752 (5r); s. n., 27746A, 46328A (9aa); 15149, 43452 (9ae).
Cleghorn s. n. (5r).
Clemens s. n. (1); 12352 (4); 10046, 30912, 32385 (51); 10656, 27821, 28908, 30322, 30323, 30324, 51109 (5n).
Clemens, J. & M. 26819, 26822, 30674, 35035, 40553 (1); suppl. (51).

- Conklin & Buwaya 78704, 79562 (5k).
Conklin & Rosario 42703, 72617 (5k).
Contest-Lacour 126 (3d).
Cooper & Bulley 2763 (9aa).
Cooper, Bulley & Cheshue 3054 (9ae).
Corner & Gray 12947 (4b).
Coulter 320 (2).
Cowan *s. n.* (9aa).
Creagh *s. n.* (1).
Curran, Merritt & Zschokke 18357 (6).
Darbyshire 354 (4).
Datta 91 (9ae).
de Voogd 2698 (5ab); 2304 (5c).
Djamhari 243 (5ab).
Docters van Leeuwen-Reynvaan 10866, 10917 (4a); 12479 (5ab).
Dorsett & Morse 1035 (9c).
Drake 1110 (5ed).
Edano 1570 (5p).
Edgeworth 51 (9ad).
Elbert 2225, 2277, 2302, 2330, 2740 (5ab).
Elmer 6290, 8615, 13194, 13752 (5k); 8538, 11344, 11671 (5p).
EmWeip 2770, 3441 (2).
Endert 1576 (1); 4397 (5n).
English *s. n.* (9ae).
Esq *s. n.* (5ed).
Evrard 2001 (3b); 1999 (5j).
Eyma 1353, 4821, 5202, 5289 (4a); 2046, 2047 (5m).
Faber 263 (5ha).
Falconer 931 (9ae).
Fan & Class 134 (9c).
Fan & Li 144 (5ha); 616 (9c)
Fang 2306, 2332, 3874 (5f); 957, 958 (9b); 2030, 3196, 3352, 7800, 7892, 12197, 13059 (9c).
Farges 1168, 1187 (9c).
Faurie 1986, 1987, 4185 (5ed); 3270 (5eb); 193, 425, 1881 (5ha); 1039, 1040 (5hc);
883, 1988, 2025, 2377, 3269, 5500, 5501, 5889, 6804, 9695 (9c).
Feng 3351 (9c).
Feuzel 26 (5ha).
Fleming 416, 518 (9ae).
Floyd & Womersley 6765, 6781 (4a).
Forbes 81, 3132a (1); *s. n.* (2); 3807, 3809, 3882 (5o).

- Conklin & Buwaya 78704, 79562 (5k).
Conklin & Rosario 42703, 72617 (5k).
Contest-Lacour 126 (3d).
Cooper & Bulley 2763 (9aa).
Cooper, Bulley & Cheshue 3054 (9ae).
Corner & Gray 12947 (4b).
Coulter 320 (2).
Cowan *s. n.* (9aa).
Creagh *s. n.* (1).
Curran, Merritt & Zschokke 18357 (6).
Derbyshire 354 (4).
Datta 91 (9ae).
de Voogd 2698 (5ab); 2304 (5c).
Djamhari 243 (5ab).
Docters van Leeuwen-Reynvaan 10866, 10917 (4a); 12479 (5ab).
Dorsett & Morse 1035 (9c).
Drake 1110 (5ed).
Edano 1570 (5p).
Edgeworth 51 (9ad).
Elbert 2225, 2277, 2302, 2330, 2740 (5ab).
Elmer 6290, 8615, 13194, 13752 (5k); 8538, 11344, 11671 (5p).
EmWeip 2770, 3441 (2).
Endert 1576 (1); 4397 (5n).
English *s. n.* (9ae).
Esq *s. n.* (5ed).
Evrard 2001 (3b); 1999 (5j).
Eyma 1353, 4821, 5202, 5289 (4a); 2046, 2047 (5m).
Faber 263 (5ha).
Falconer 931 (9ae).
Fan & Class 134 (9c).
Fan & Li 144 (5ha); 616 (9c)
Fang 2306, 2332, 3874 (5f); 957, 958 (9b); 2030, 3196, 3352, 7800, 7892, 12197, 13059 (9c).
Farges 1168, 1187 (9c).
Faurie 1986, 1987, 4185 (5ed); 3270 (5eb); 193, 425, 1881 (5ha); 1039, 1040 (5hc);
883, 1988, 2025, 2377, 3269, 5500, 5501, 5889, 6804, 9695 (9c).
Feng 3351 (9c).
Feuzel 26 (5ha).
Fleming 416, 518 (9ae).
Floyd & Womersley 6765, 6781 (4a).
Forbes 81, 3132a (1); *s. n.* (2); 3807, 3809, 3882 (5o).

- Ford *s. n.* (2).
- Forrest 7600, 7697, 8243, 8494, 9326, 9381, 9786, 11903, 12323, 13669, 17217, 24089, 24186, 25260, 25339, 26060, 26087, 26265, 30427 (5f); 14643, 17673, 17948, 24418, 29848 (9ab); 8587 (9ac); 14505, 15679, 16081, 17505, 18853, 24108, 30409 (9ae).
- Fosberg 37178, 38047 (5ed); 38010 (5ec).
- Foxworthy *s. n.*, 212 (51).
- FRI. bb. 3000, 3600 (5ab).
- Fukuyama 3440 (9ca).
- Furuse *s. n.* (9c); 19998, 20085 (5ed).
- Gamble 11970, 14449 (5r); 22794 (9ae).
- Gammie 351 (9aa).
- Gan *s. n.* Oct. 7, 1962 (9ca).
- Gaudichaud 245, 275 (2).
- Gibbs 4170 (5n).
- Goto 1900, 1901 (9ca).
- Grashoff, W. 81 (1).
- Gressitt 1169, 1310, 1421, 1633, 38169 (2); 217, 528 (5ec).
- Griffith *s. n.*, 4915, 4916 (1); 4917 (9ae).
- Gusdorf 38 (1).
- Hallier f. 691 (1).
- Handel-Mazzetti 1094 (5f); 2182 (5ha).
- Hance 1523 (2); 22309 (5ed).
- Harmand 329 (3c).
- Hartesp 581 (9ae).
- Harvey *s. n.* (1).
- Hasan 1 (5ab).
- Hatusima 17696 (5ed); 23992 (5eb); 18802 (5ec).
- Haviland 1070 (5n).
- Hayata *s. n.* (9c).
- Hayata & Tanaka 14597 (5ha).
- Henderson 20323, 21653 (1).
- Henry *s. n.* (2); 12793 (3a); 518 (5ha); 668, 996, 1290, 1399 (5hc); 12064, 12657, 12657A (5f); 9652, 9652A, 12374 (9ad); 91, 5673, 5673A, 7102 (9c).
- Hervey *s. n.*
- Hiroe 7407, (9c).
- Hisauti 2706 2707 (5ee).
- Hohenacker 1453 (5r).
- Holmberg 667, 716, 719, 10116 (1).
- Hoogland & Pullen 5484, 5521, 5730, 6112, 6113 (4a).
- Hooker *s. n.*, 7612 (1); *s. n.* (9aa).

- Hooker & Thomson *s. n.* (9aa); *s. n.* (9ae).
Hosoi 2650, 2695 (9c).
Hosokawa 9910 (5k); 10003, 10474 (2).
How 71894, 72897, 73028 (2); 73071 (5g).
Hsiung 5449 (5ha).
Hsu & Kao 3296 (5ha).
Hu, H. H. 885 (2); 740, 1253 (5ha); 1652 (9c).
Hu, H. S. 51912 (2).
Hu, W. K. 9197 (5f).
Huang 136, 2307, 2310, 2312, 2313, 2318, 2401, 2403, 3303, 3314 (5ha).
Hurukawa 14601, 14602 (5ha).
Hurusawa *s. n.* (5eb); *s. n.*, 207 (5ed); 105-1 (9c); *s. n.* (5ec).
Hwa 155 (5ha); 18 (9c).
Ishikawa *s. n.* (5ed); *s. n.* 1923 (9ca).
Jaag 2692, 2698 (5ha).
Jacobs 4621 (1).
Jan & Kao *s. n.* (9ca).
Jenkins *s. n.* (9aa).
Jones 28 (5ed).
Joseph *s. n.* (5j).
Jong 2665 (1).
Junghuhn *s. n.* (1); *s. n.*, 1850 (5a).
Kamiya 14605 (5ed).
Kanehira 3285, 3432 (5ed); 367, 14592 (5ha); 14603, 14612, 21333 (5hc); *s. n.*, 368, 3073, 14623 (9c).
Kanehira & Sasaki *s. n.*, 14595 (5ha).
Kao 6571 (2); 4228 (5ha); 5919 (5hc).
Kao & Kou *s. n.*, 001314, 001315, 001309 (5ha).
Kato 2969 (9c).
Kawakami 14586 (5ha).
Kawakami & Sasaki 14617 (5ha).
Kawakami & al. 7632 (5ha).
Kar *s. n.* (9ae).
Kauankei 131 (9ae).
Keiskei 91 (9c).
Keng, H. *s. n.*, 1142 (5ha); 1118 (9c).
Keng, Y. C. 1128 (5ha).
Keng & Kao 1314 (5ha); 2610 (5hc).
Kerr 1816, 1824, 3592 (3a); 3101 (5j).
Kiah & Strugnell 23935 (1).

- King's collector 4323, 5707, 6127, 10116 (1); 7007 (5b); 830, 1347, 7326, 8054 (5q.); 489 (9aa); *s. n.* (9ae).
- Kingdon-Ward 3109, 6305, 13055, 20862 (9aa); 20745 (9ae).
- Kimura & Hurusawa *s. n.* (5ec).
- Kloss *s. n.* (4).
- Ko 55596, 55994 (5f); 50253 (5ha); 52872 (9c).
- Kobus *s. n.* (1).
- Konishi 21983 (2); 1907 (5ha); *s. n.* (9ca).
- Koorders 2102, 2122, 2126, 2127, 2129, 2130, 2131, 2132, 2136, 2201, 3466, 7670, 9970, 11746, 13833, 13850, 13890, 13947, 14088, 24359, 24362, 24365, 26523, 26557, 27900, 27988, 27996, 32166, 33228, 33319, 36025, 37930, 39027, 39031 (5aa); 2123, 2124, 2125, 3103, 12484, 12650, 15548, 26021, 32166, 41927, 42061 (5ab); 168403 (5i).
- Korthals *s. n.* (1); *s. n.*, 27990, 27991 (5aa); *s. n.*, 406 (5ab).
- Kostermans 2184, 2202, 2522 (4); 1217, 1218, 1229, 1329 (5i).
- Kostermans & Anta 661, 1059, 1079 (1).
- Kudo *s. n.* (5ha); 113, 1229, 2236, 2625, 3669, 4532 (9ca).
- Kudo & Mori *s. n.*, 2793 (5ha); *s. n.* (5hc).
- Kudo & Sasaki 3290, 15115, 15336a, 15336b (5ha).
- Kudo & Suzuki 3290, 15947 (5ha); 1615 (5hc).
- Kudo, Suzuki & Mori *s. n.* (5ha).
- Kuhl & van Hasselt *s. n.* (5aa).
- Kume *s. n.* (5ed); *s. n.* (9c).
- Kuruiwa *s. n.* (5ed).
- Kuwanuma *s. n.* Apr. 1912 (9ca).
- Lacaita *s. n.* (9aa).
- Lace 5607 (5j).
- Lam, H. L. 3702, 3782 (5aa); 3706 (5i).
- Lament 674 (2).
- Lanjouw, L. R. 75 (5aa).
- Larsen & Hansen 3090 (3a).
- Lau 618, 2170, 4002, 4492, 24123, 24472, 28120 (2); 2263, 3950, 4677 (5ha); 4476 (5hc); 3718, 5264, 5488, 5503, 25449, 26569, 28158 (5g).
- Law 517, 24085 (5ha); 861 (9ca).
- Lee 3334, 4521 (5f); 4550 (5ha); 3127 (5hc); 2935, 3686, 4555 (9c).
- Lei 61 (2).
- Levine *s. n.*, 361, 669, 1624, 2080, 2342, 3367 (2).
- Levine & McClure 57005A (2).
- Liang 62698 (2); 63112, 63155, 63401, 63416, 63420 65264 (5g).
- Liao 6, 7 *s. n.* Sept. 10, 1962 (5ha).
- Liao & al. 001312 (5ha).

- Liu 001313 (5ha).
Liu & Keng 2806 (5ha).
Liu & al. 0092 (5hc); 001310, 001311 (5ha); 78 (9ca).
Liu, Y. S. 1434, 1530 (9c).
LKH & al. 5, 377, 500, 598 (5k).
Lu 11-19, s. n. Sept. 1962, Oct. 1962, Nov. 1962, March 1963, Apr. 1963, June 1963, Nov. 1964 (5ha).
Madden 678 (9ae).
Maingay 1419 (1).
Makino 14604 (5ed); 14621 (9c).
Mangold 2257 (4).
Maradjo 206 (1).
Marsden s. n. (1).
Masamune s. n., 295, 2252 (5ha); 3867, 3873 (5k); s. n. (9ca).
Masamune & Nakamura 2252 (5ha); 2460 (5hc).
Masamune & Sinabukuro s. n. (5ed).
Masamune & Suzuki s. n. (5ec).
Matsuda 919, 14627 (5ha) 1155, 14587, 14600, 14614, 14618, 14620 (5hc).
Maximomicz s. n. (9c).
McClure 13609, 147.4377 (2).
McGregor 19962 (5k).
Meebold 6737 (5r).
Meijer 5273, 6719 (1); 3994, 7199, 7587 (5c); 21051, 21965, 22063, 29263 (5n).
Mendoza & Convocar 861 (5k); 10814 (5p).
Merrill 10225, 10946 (2); 5658, 9494 (5k); 1748 (6).
Metely 870 (1).
Mipred s. n. (2).
Miyasaki s. n. (5ec).
Mizuno 9236 (9c).
Mizushima 869 (5ed); 282, 296, 1139, 1142 2913, 2936 (9c).
Mohammad 109 (9ae).
Moon 74, 549 (5r).
Moran 4985, 4986 (5ed); 5328 (9c).
Mori 4529, 14598, 14599 (5ha).
Mories 453 (9c).
Murakami 109, 110, 148 (5ha).
Murata 13862 (5ed).
Muroi 305, 866 (5ed); 688 (9c).
Nagata s. n. (5ed).
Nakai 5601 (9c).

- Nakai & Tanaka 4626 (9c).
Nakamura 1986 (5ha).
Nishi 77 (5eb).
Nowatari *s.n.* (9c).
Odashima 17828 (5hc).
Okada 2040 (9c).
Oldham 740 (5eb); 497 (5ha).
Owatari *s.n.* (5ha).
Paie 13614 (51).
Perrottet 29, 74 (5r).
Petelot 6811 (2); 4683 (3b); 7947, 8878 (5ha); 2602, 3783 (9ae).
Pierre *s.n.* (1); *s.n.*, 858, 19067 (3c); *s.n.*, 860 (5j).
Ploem *s.n.* (1).
Poilane 21747 (2); 14703, 14767, 21021 (3c); 10008, 10009, 21927 (3b); 14640, 17636 (3d); 217, 10296, 10334, 10357, 12724 (5ha); 12590 (9ae).
Poole *s.n.* (4a).
Posthumus 2140, 2213 (1).
Price *s.n.* (5ed).
Pulle 1029, 2439 (4a).
Punj 111 (9ae).
Raap 374 (1).
Rabor 20481 (5k).
Rahmat si Boeea 6891, 7377, 7381, 7669 (1).
Rahmat si Toroes 3284, 4125 (1).
Ram 402 (9ad).
Ramos 14623, 32838, 45660 (5k); 1503, 15235, 23478 (6).
Ramos & Convocar 21703, 83733 (5p).
Ramos & Edano 38507, 38516, 38552, 38743 (5k); 28662, 28705 (5p); 40478 (6); 45687, 45708, 45725 (8).
Rawat 99 (9ae).
Reeves 57-151 (2).
Reinwardt 13, 848 (5ab).
Ridley *s.n.*, 1816, 1893, 14963, 3436a (1).
Robbins 425, 538, 721, 1082, 1116 (4aa); 661, 799, 880, 906 (4ab).
Robinson *s.n.* (5q).
Rock 6737, 7939 (5f).
Royen & Sleumer 7279, 7867 (4a).
Sakurai *s.n.* (9c).
Saldanhe 5198 (5r).
Sapei *s.n.* (5a).

- Sargent *s. n.* (9c).
Sarip 395 (5ab).
Sasaki *s. n.* (5ed); 217, 10200, 14589, 14591, 14593, 14606, 14610, 14619 (5ha); 218, 14622, 14624, 14625, 38033, 380566 (9ca).
Saunders 715 (4).
Savatier *s. n.*, 1100 (9c).
Sayers *s. n.* (4a).
Schmidt *s. n.* (5r).
Schodde 1487, 1598, 1712, 1895, 1900, 2057 (4a).
Scortechini *s. n.*, 225b (1); *s. n.* (5q).
Seemann 2448 (2).
Setchell & McClure *s. n.* (2).
Shiota 2037, 2041, 2042, 3832, 5065, 5512, 6618 (9c).
Simada, H. 1063, 1201 (5ha); 17694 (9ca).
Simada, Y. 14606 (5ed); 366, 1730B, 1731C, 13881, 13906, 14590, 14594, 14609, 14611 (5ha).
Simizu 2971, (5ha); 1143, 2759 (9ca).
Siebold *s. n.* (5eb); *s. n.* (5ed); *s. n.* (9ca).
Sin 9866, 11749 (2); 1182, 9708, 9752 (5ha).
Sinclair, Tassim & Sisiron 9130 (5n).
Smith *s. n.* (5ab).
Smithinand & Abbe 6439 (5j).
Smythies 10645 (5n).
Sonohara 27 (5ed).
Sörensen & al. 3090 (2).
Stainton 3665 (9ae).
Stainton, Sykes & Williams 2500, 2810, 4820, 4842, 5086, 5315, 9141 (9ae).
Start *s. n.* (9ae).
Steward A. N. 1299 (9ca).
Steward & Cheo 769 (2); 181, 633 (5f).
Stewart 10971, 13016, 14203, 15793 (9ac).
Stocks & Law *s. n.* (5r).
Strachey & Winterbottom 804 (9aa); *s. n.* (9ae).
Sulit 10138, 21554 (5k).
Sun 138 (5f); 1982, 2066 (5ha); 2068 (9ca).
Suzuki S. 7511, 9880, 9987, 10200 (5ha); *s. n.* (5hc); *s. n.*, 55, 81, 1070, 1905, 2891 (9ca).
Suzuki S. & Tamoto *s. n.* (9ca).
Suzuki T. 6809, 7414, 14738, 17906 (5ha); 4814 (5hc); 2061, 7098, 8666, 8806, 15564, 16923 (9ca),

- Sweklie 524, 594 (1).
- Symington & Kiah 28850 (5q).
- Taam 168, 615, 1066, 2204 (2); 119, 523, 536, 543 (5d); 137, 189, 316, 496, 597 (5ha).
- Tagusake s. n. (9ca).
- Tak 11805 (2).
- Takabachi s. n. (9ca).
- Tanaka 342 (5ha); 182 (9ca).
- Tanaka & Simada 617, 13531, 13532 (5ha); 17827 (5hc).
- Tang & Hsia 141 (9ca).
- Taquet 744, 3176, 5956, 5957 (5ed); 4937, 9998 (9ca).
- Tayo 27641 (5ed).
- Terakawa 150 (9ca).
- Teysmann s. n., 1006, 3316, 3453, 3831, 17560, 71867 (1); 14126 (4a); s. n. (5aa), 14064 (5ab); 13664, 14088 (5i).
- Thomson 1004 (9ae).
- Thwaites s. n., 491, 2119, 7133 (5r).
- Tjepena 3390 (1).
- Tak et al. 14660 (5ha).
- To 6273 (5ha).
- To, Tsang & Tsang 12443 (2); 12121 (5ha).
- Togasi 1362 (9c).
- Tripathi 100 (9ae).
- Tsai 55595, 55680, 55769 (5f); 60281, 62678 (9ad); 61736 (9ae).
- Tsang 16518, 20879, 21556, 22143, 23343, 24217, 24798, 25418, 25925, 26869, 28724 (2); 13597, 20204, 20795, 21031, 21509, 22013, 23521, 23624, 24152, 24754, 25005, 25299, 25764, 26294, 26881, 27387, 27924, 28228, 30270 (5ha); 22588 (5hb); 27717, 29517, 30381 (5hc); 28497 (9c); 20255, 20324, 20483, 21221, 25101, 25188, 25251, 25310, 25316 (5d).
- Tsang & Wong 14248 (2).
- Tschonoski s. n., 1865 (9c).
- Tse 10, 20095 (2); 21129 (9c).
- Tsiang 159, 300, 933, 1461, 1596, 1687, 1983, 2241 (2); 65, 1314, 10463 (5ha); 6659 (5hc); 7632, 7880 (9c).
- Tso 20409, 20490, 20554, 21556, 21610, 25418 (2); 20673, 20769, 20920, 21063, 21171 (5ha).
- Tsoong 3711 (2); 81513 (5ha).
- Tsui 79, 117, 353, 431, 635 (2).
- Tutcher 10756 (2).
- Unknown collectors s. n. (5ab); 457 (5r); s. n., 419, 19439 (9c); 848 (5ab); 142, 216 (5ha); 350 (5a).

- Uno *s. n.* (9c).
Valera 4831, 4836 (1).
Van Harreveld 3000 (5ab).
Van Steenis 3020, 11700 (5a); 4133, 5023, 5027 (5ab); 18263, 18279 (5o); 6362, 8654 (7).
Waitz *s. n.* (5aa).
Walker 5920 (5eb).
Walker, Sonohara, Tawada 6215 (5ed).
Walker & Tawada 6776 (5ee).
Wallich 1836 (DC. 8020) (1).
Wang, C. 37503, 38169, 40657, 40932 (2); 39128, 39368, 40187 (5ha); 40330 (9ad); 2081 (9ca).
Wang, C. W. 74475 (3a); 41250 (5f); 35708, 36591 (5g).
Wang, F. T. 20678, 23225 (5ha); 20606, 23149 (9ca).
Wang, T. H. 12104 (9c).
Wang, R. I. *s. n.* Sept. 30, 1962, March 24, 1963, 3, 9 (5ha).
Wang, Y. K. 3050 (5ha).
Warburg 1887 (5eb); 5868 (5ha).
Wight *s. n.*, 2649, 3516, 3576 (5r).
Wilford *s. n.* (2); *s. n.* (5ed).
Williams 1337 (5k).
Wilson *s. n.*, 8056, 8146, 8406 (5ed); 2960, 3727, 9995a, 10207, 11178 (5ha); 9995 (5hc); 670, 2959, 3727a (9b); *s. n.*, 20, 3552, 5774, 6015, 7196, 7407, 8541, 9449, 9755, 10171 (9c).
Womersley 4487, 9451, 11236, 11719, 14102, 17942 (4a).
Wood 1724, 1767 (1).
Worthington 5423, 6181 (5r).
Wray 3847, 3926 (5q).
Wright *s. n.*, 275 (5ed); 421 (5ha).
Yamada 14615, 14616 (5ha).
Yamagihara 313 (5ed).
Yamamoto *s. n.* 1929, 9291 (5ha); 608 (9c).
Yamasaki *s. n.* (5ed).
Yapp 523 (5q).
Yasukawa 001316, 14613 (5ha).
Yongsook 7871, 7964, 8154 (9c).
Yu, T. 20048 (9ab); 21052 (9ae); 423, 506, 507, 18175 (9c).
Yu & al. *s. n.* (5ha).
Zippelius *s. n.* (1).
Zollinger 228, 2140 (5ha); 1029, 2611 (5ea).