Materials for a Monograph of Freycinetia Gaud. (Pandanaceae) V. Singapore, Malaya and Thailand

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Abstract

Eight species of Freycinetia Gaud. are reported from the Malayan Peninsula and adjacent Thailand and Singapore. This number is not any Peninsula and adjacent Thailand and Singapore. This number is hardly different from that given by Ridley (8) in his Flora of the Malay Peninsula; however he considered 7 of these as endemic species, while after considerable comparative study, it now appears that only one of his species is endemic, and that rather doubtfully. Hence, most of the binomial species names used in Ridley's Flora have had to be changed. In this paper keys, description, and synonymy are indicated; and one new species, and two new varietal taxa are proposed.

Introduction

There are only eight species of Freycinetia Gaud. (1824) in the Malayan peninsula, Singapore, and the narrow Kra Peninsula of Thailand; thus the area stands in considerable contrast to regions to the east. Borneo has at least 24 species, the Philippines at least as many, and New Guinea more than 40 species. Furthermore, only one of the Malayan species is endemic, and that only tentatively. This is also in marked contrast to the three regions just mentioned, each of which has a concentration of endemic species. The Malayan species show the following distribution:

F. javanica — Malaya and the Kra Peninsula of Thailand; Sumatra; Borneo; Java.

F. angustifolia — Malaya, Sumatra, Borneo, Java, Philippines.

F. corneri — South Malaya (Johore), Singapore, Borneo.

F. sumatrana — Malaya and the Kra Peninsula of Thailand; Cambodia; Vietnam; Andaman Islands; Sumatra; Borneo; Java; Philippines.

F. confusa — Malaya; tentatively considered endemic, but extremely similar to F. distigmata of Sumatra; to be further studied.

F. imbricata — Malaya, Sumatra, Borneo, Java.

F. rigidifolia — Malaya, Andaman Islands, Borneo.

F. kamiana — Malaya, Sumatra.

The names used above, it will be seen, are nearly all different from those used by Ridley in the "Flora of the Malaya Peninsula" (Vol. 5, 1925). Ridley credited Malaya with eight species of Freycinetia, seven of which he considered endemic. But this
optimistic conclusion has not fared well, and in the light of monographic studies all but one of these species has turned out to be previously known and described from different regions. The synonymy in brief is as follows:

*F. javanica* Bl. (F. lucens Ridl.; F. montana Ridl.).

*F. angustifolia* Bl. (F. angustifolia Bl. sensu Ridl.; F. malaccensis Ridl.).

*F. corneri* Stone (not known to Ridley).

*F. sumatrana* Hemsl. ((F. valida Ridl.).

*F. confusa* Ridl. (endemic).

*F. imbricata* Bl. (F. kingiana Ridl.).

*F. rigidifolia* Hemsl. (F. acuminata Ridl.).

*F. kamiana* Stone (not known to Ridley).

In this paper a revision of the Malayan species, including those of adjacent Thailand and Singapore, is presented, with keys, brief descriptions, citations of specimens, field notes, and illustrations. Based upon three years of field work in Malaya and a tour of several European and American herbaria, it forms the fifth in a series antecedent to a monograph of the genus. I would like to express my thanks to the curators and directors of the museums and herbaria mentioned below for their cordial assistance.

A The Arnold Arboretum, Harvard University, Cambridge, Mass., U.S.A.

BISH B.P. Bishop Museum, Honolulu, Hawaii.

BM British Museum (Natural History), London.

CAL Indian Botanic Gardens’ Herbarium, Howrah, Calcutta, India.

E Royal Botanic Gardens, Edinburgh, Scotland.

FI Istituto Botanica, University of Florence, Florence, Italy.


KLU University of Malaya Herbarium, Kuala Lumpur, Malaysia.

KEP Herbarium, Forest Research Institute, Kepong, Malaysia.

L Rijksherbarium, Leiden, Netherlands.

SING Botanic Gardens, Singapore.

U University of Utrecht Herbarium, Utrecht, Netherlands.

I should also like to express my thanks to the Chairman of the School of Biological Sciences, University of Malaya for much assistance, and to a former student, Miss Tan Poey Keng, who undertook a very useful preliminary study of Malayan Freycinetiae.
Systematic Treatment

*Freycinetia* Gaudichaud


Lectotype species: *Freycinetia arborea* Gaud. 1824 (see Stone 1967).

Woody climbers with clasping adventitious roots. Leaves simple, arranged in 3 spiralled ranks, linear, oblong, elliptic, lanceolate or oblanceolate, commonly serrate-dentate along the margins and on the midrib dorsally. Leaf-base sheathing the stem, usually with membranous and caducous, or sometimes more or less permanent but fragile auricles. Inflorescence terminal on a main or a lateral branch, bracteate, and pedunculate, of 1 or more cephalia arranged umbellately or sometimes racemously, often ternate, sometimes with up to 7 (very rarely more) unisexual cephalia; plants dioecious. Staminate spadix of crowded simple stamens, pistillodia sometimes present; anthers subglobose. Pistillate spadix of crowded gynoecia, baccate when ripe, with usually a rigid or coriaceous pileus; stigma single or up to 12 (rarely more) per berry, minute, microscopically papillate, often within a low rim. Seeds numerous on vertical placentae corresponding to each stigma, usually elliptic or hemi-elliptic to falcate, with a noticeable translucent raphe with some silvery raphidophorous cells, and sometimes a similar and opposite strophiole. Embryo minute, within endosperm.

Distribution: Asiatic and Pacific Tropics; west to Ceylon (not in India proper); Andaman Islands; Malayan Peninsula and Singapore; Sumatra; Borneo; Java; the Philippine Islands; Vietnam; Formosa (Taiwan); Ryukyu Islands; Bonin Islands; Micronesia; Melanesia; New Guinea; Australia (north Queensland); Norfolk Island; New Caledonia; New Zealand; Polynesia, including Hawaii, but not Easter Island.

The greatest concentration of species is in the regions of Borneo, Philippines, and New Guinea (including the Solomon Islands).

A genus of perhaps 150 species (estimated; there are far more binomials). The name commemorates Captain Louis de Freycinet, commander of the vessels "L’Uranie" and "Physicienne" of the French Exploring Expedition of 1816–1818.
Fig. 1. Auricles of Malayan Freycinetiae. a–b : F. javanica. c — F. sumatrana. d — F. sumatrana var. penangiana. e — F. rigidifolia. f — F. confusa. (All from cited specimens). To same scale.
KEYS TO MALAYAN SPECIES OF FREYCINETIA

I. Field Key for Sterile or Staminate Plants Based Principally on Vegetative Characters

(1) Auricles caducous, relatively short and broad, not or rarely more than 6 cm long, tapered or rounded at apex, without a free apical lobe, entire or minutely and sparsely weakly denticulate; leaves to about 30 cm long.

(2) Leaves elliptic, to oblong or oblanceolate, definitely narrowed at base, acute-acuminate, not drawn out to a filiform-flagellate tip, to 30–40 cm long and 3–5–8 cm wide, though usually smaller; spadices umbellate.

(3) Pedicels ¼–½ as thick as long; leaves elliptic, hardly or not caudate ........................................... 1. F. javanica

(3) Pedicels much more slender; leaves oblong, caudate ........................................... 8 F. kamiana

(2) Leaves narrowly linear, up to 30 cm long but rarely more than 1 cm wide, apex gradually attenuate-filiform, base not or scarcely narrowed; spadices racemose ...... 2 F. angustifolia

(1) Auricles subpersistent but fragmenting and eventually lost, usually more than 3 cm long, sometimes much more (18 cm), sometimes with a free apical lobe, otherwise with a truncate apex, usually slightly to manifestly denticate on the margins and/or apex; leaves sometimes over 1 m long.

(4) Robust plants, stems (adults) often exceeding 15 mm diameter, leaves commonly over 50 cm long, up to 1 m (or more); auricles mostly more than 5 cm long, up to 15–18 cm long, with a distinct apical lobe to 1 cm long (in F. sumatrania) or a blunt truncate apex.

(5) Leaf apex acute, not drawn out; auricles to 9 cm long and 1–2 cm wide, truncate or slightly rounded at apex. Teeth of basal leaf-margin broadly deltoid (to 2 mm long and 2 mm wide), rather distinct (c. 1 mm apart). Pistillate cephalia sub-globose, on glabrous pedicels, berry with 3–8 stigmas ...........
.................................................................................................................. 3 F. corneri

(5) Leaf apex gradually attenuate, subflagellate; auricles to 10 (or to 18) cm long, 1–1.5 cm wide, apex with a narrow free ascending lobe, usually denticulate on margin; teeth of basal leaf margin slender, antorse, usually less than 2 mm long and 1 mm wide. Pistillate cephalia cylindric, on minutely scabrid pedicels; berry with 2 (rarely 1 or 3) stigmas ............
.................................................................................................................. 4 F. sumatrania

(4) Small to medium plants, stems (adults) rarely over 11 mm diameter, leaves rarely over 40 cm long; auricles rarely over 5 cm long, usually less than 1 cm wide, truncate, and denticulate or spinulose at apex but never with a free apical lobe.
(6) Median portion of leaf margin denticulate; leaves narrowly linear, commonly about 30 cm × 5 mm. Auricles narrow, truncate, denticulate at apex; blade not narrowed at base .............................. 5 F. confusa

(6) Median portion of leaf margin unarmed; leaves mostly over 6 mm (and up to 15 mm or more) in width. Auricles entire or spinulose-fimbriate. Leaf blade slightly narrowed at base.

(7) Auricles entire or with few, small inconspicuous teeth. Leaves commonly about 30 × 1 - 1.5 cm, mostly flat, rather lax. Pedicels of pistillate cephalia smooth or very slightly scabrid. Berry with 2-5 stigmas ............... 6 F. imbricata

(7) Auricles deeply fimbriate-spinulose at apex (spinules to 5 mm long), margins denticulate; leaves commonly about 20 cm × 9 mm, stiff, the margins often revolute; abruptly narrowed at base. Pedicels of pistillate cephalia hispidulous. Berry with 1-2 stigmas. ....................... 7 F. rigidifolia

II. Key to Fertile Specimens

Based on Pistillate Inflorescences and Fruits

(1) Inflorescences (both ♂ and ♀) racemose, the 3-5 spadices clearly distinct, well-separated, pedicellate ...................... 2 F. angustifolia

(1) Inflorescences umbellate, usually of 3 crowded pedicellate spadices.

(2) Stigmas usually 2 per berry, sometimes 1 or 3.

(3) Pedicels stout, minutely roughened (like sandpaper to touch) commonly 50 × 5-6 mm. Cephalia to 15 cm long; bracts white. Robust plants ....................... 4 F. sumatrana

(3) Pedicels slender, 10-40 × 3-4 mm, scabridulous chiefly on the angles. Cephalia 14-35 mm long. Rather small plants.

(4) Auricles deeply fimbriate-spinulose at apex, with spinules to 5 mm long. Bracts red-orange. Leaves stoutly denticulate on basal margins, and abruptly narrowed at top of sheath; up to 8-10 mm wide ...................... 7 F. rigidifolia

(4) Auricles slightly denticulate; spinules not over 2 mm long. Bracts purplish. Leaves with small teeth; blades about 4-6 mm wide ...................... 5 F. confusa

(2) Stigmas usually 3-5 (8) per berry, very rarely 2.

(5) Pistillate cephalia oblong. Auricles caducous, sparsely and weakly denticulate or entire.

(6) Leaves oblong, caudate; pedicels slender, 12-16 × 2-3 mm .................................................. 8 F. kamiana

(6) Leaves elliptic-oblong, commonly 10-30 cm long and 12-30 mm wide, nearly entire, only at apex with weakly serrulate-denticulate margins and midribs. Pedicels short and stocky 10 × 3.5-4.5 mm .................. 1 F. javanica
(5) Pistillate cephalia subglobose or short-oblong. Auricles subpersistent but fragmenting, entire to weakly or strongly denticulate. Leaves not as above.

(7) Robust plants: stems to 2 cm diameter, leaves to 1 m long and 3.5 cm wide; auricles denticulate, truncate-rounded at apex. Stigmas 4–8 ........................................ 3 F. cornieri

(7) Smallish plants, stems to 12 mm diameter, leaves less than 40 cm long, usually 10–15 mm wide: auricles tapered and entire to weakly denticulate. Stigmas 3–5 ............

................................................................. 6 F. imbricata

Enumeration of Species

(1) Freycinetia javanica Blume in Rumphia 1: 156. t. 41 (1835).
Figure 1, a–b.


Distribution: Malaya (including lower Kra Peninsula), Singapore, Sumatra, Java, Borneo.

Stems to 11 mm diameter. Leaves elliptic or somewhat lanceolate to oblanceolate, abruptly acute, not or scarcely acuminate, narrowed at base, slightly thick-coriaceous, nearly unarmed (only the apex and rarely a short part of the basal margin denticulate); auricles membranous, when fresh colorless and translucent, caducous, tapered or rounded to the apex, entire or weakly and sparsely denticulate, mostly 3–6.5 cm long, and 1 cm wide. Inflorescence terminal, umbellate, usually ternate; pistillate pedicels slightly scabridulous on the angles, about 1 cm long, 3.5–4.5 mm thick. Cephalia oblong, mostly 2.5–5 cm long. Berry 1–1.5 mm long. Stigmas 4–8, usually 4–6. Bracts orange-salmon color or “Flesh-color” often yellowish. Staminate cephalia with whitish stamens, filaments 0.35 mm long, anthers 0.30 mm long.

Habitat: in humid forests, commonly montane, ascending to 6,000 ft., but also lower, to 1,000 ft. or even lower especially in the south, as in Singapore (similarly in Sarawak) in well-protected forested humid valleys and along waterfalls. (Low-altitude plants often have unusually wide leaves, while mountain populations mostly show rather short and narrow leaves. Two widely different auricle forms are found, extremes of a continuous series, which correspond to the situations men’#ed; see illustrations).
Ridley’s distinction between *F. lucens* and *F. montana* appears to be purely imaginary; and he did not distinguish either of these from *F. javanica*. Perhaps Ridley was unfamiliar with Blume’s work, although he admitted one of Blume’s species of *Freycinetia* (*F. angustifolia*) in the Malayan flora, despite the clear occurrence of three of them (originally described from Java) in the Malayan peninsula.

Malayan specimens:


PENANG: Sungei Telek Bahang, Feb. 1919 (or 1929) *Burkill 4555* (CALC).


MALACCA: no location, 1867–8, *Maingay 3274* (K).

SINGAPORE: Kranji, Ridley in 1890 (SING); Bukit Mandai, 1890, Ridley 4618 (FI, K, SING). Bukit Timah, 1892, Ridley 3703 (lectotype of F. lucens) FI, K, SING. Seletar, May 1953, Sinclair SFN. 39616 (SING, K).

MALAYA, without locality: Griffith 6374 (FI); Maingay 1537 (K).

(2) Freycinetia angustifolia Blume in Rumphia 1: 157. t. 40 (1835).

Ridley, Fl. Malay Penin. 5: 82 (1925).


Type localities and typification: F. angustifolia: Java (Blume, L). F. malaccensis: Malacca (lectotype, Derry 406, SING). F. debreegeasiana: not stated, but possibly Singapore (Gaudichaud in. 1837; P? fragment in FI).

Distribution: Malaya, Sumatra, Java, Borneo, Philippines.

Vernacular name: “selingseng akar” (Malay; Johore, Corner 28074).

Stems 6–12 mm diameter. Leaves linear, slender, thin, 17–20 cm long, 5–12 mm wide, gradually attenuate, very slightly acuminate, unarmed except at extreme apex. Auricles 15–20 mm long, caducous, entire, fragile. Inflorescences racemose, rachis sometimes somewhat zig-zag, pedicels well-separated; bracts dark to pale yellow or yellow-range, sometimes flecked with red on inner surfaces, innermost bracts creamy, outermost with green tips; pistillate cephalia on pedicels 9–11 × 1.5–2 mm, glabrous, whitish; cephalia shortly cylindric, 23–33 mm long, at first cream-colored; berry 1 mm long. Stigmas 1–3, rarely 4, very rarely 5. Staminate spadix 1–2 cm long, white. Seed with broad raphe and no strophiole.

Habitat: low hill forest, chiefly in the southern and western parts of the peninsula; also in lowland swamp forest; also on offshore islands.

Ridley’s F. malaccensis was characterised by its relatively broad leaves, but examination of numerous specimens shows that continuous variation, within the limits given above, occurs; and there are no other distinguishing features.


SELANGOR: Klang, Telok Reserve, June 1921, Burkill 6518 (SING).

MALACCA: Mt. Ophir, 1892, *Ridley* 3895 (FI, K, SING). Bukit Bruang, Feb. 1890, *Derry* 406 (lectotype of _F. malaccensis_ Ridley; miscited by Ridley as “Ridley 406”, FI, SING); March 1893, *Derry* 1197 (FI, SING; det. by Ridley as _F. angustifolia_). Merlimau, 1892, *Derry* 1046 (FI — as “Ridley 1046”; SING).


MALAYA, without definite locality, *Maingay* 1537/2 (FI, K, L).


Type locality: Singapore (*Corner*).

Distribution: Malaya (Johore, Selangor), Singapore, and Borneo.

Robust climber, stems to 20 mm diameter; leaves to more than 1 m long, 2–3.5 cm wide, linear, apex acute, sheathing base 9–10 cm long, blades coriaceous; auricles to 9 cm long (at least), 1–2 cm wide, the apex abruptly truncate-rounded (rarely almost lobate), the sides usually entire but the apex ciliate-spinulose. Leaf-margin stoutly and rather remote dentate, the teeth deltoid and spreading at right angles to the margin, the lowermost ones nearly 2 mm long, up to 1.9 mm wide, about 1 cm apart, distally the teeth smaller. Midrib denticulate from the middle beyond, the teeth at most up to 1.9 mm wide, about 1 cm apart, distally the teeth smaller. 2 mm long, smaller toward the apex. Inflorescence terminal, ternate, umbellate, the pedicels (♀) about 60 × 5–7 mm, plano-convex,
Plate I. *Freycinetia sumatrana* in the Ginting Highlands, Pahang.
subtrigonal, smooth. Bracts deltoid, to 6 cm wide or more, probably reddish. Pistillate cephalia about 45 × 40 mm, subglobose. Berry oblong, about 14 × 3 mm, the pileus 4 mm long, narrowly pyramidal, apex truncate. Stigmas usually 4–8 (very rarely 3), minute, hippocrepiform. Staminate spadix on pedicels to 60 mm long. spikes ternate or quaternate, cylindric, the floriferous part about 30 × 8 mm, filaments 1.5 mm long, anthers 0.75 mm long.

Habitat: lowland forests. A species of restricted range, only discovered among Bornean specimens after being described from the Singaporean material (see citation of Borneo specimen below).


SELANGOR: Sungei Lallang F. R., Y. K. Kam s.n. in 1967 (KLU).

SINGAPORE: Seletar forest, behind vegetable gardens, Nee Soon, Jan. 1949, Sinclair (K). Seletar Reservoir, Feb. 1943, Corner (SING, type!).


To date the species is known only from the specimens cited.


Plate I: figures 1, c-d; 2, 3, a-b.


Type localities and typification: F. sumatrana: Sumatra (Beccari, K). F. valida: Singapore (lectotype: Ridley 3937, SING).

Distribution: Sumatra, Malaya, Borneo, Philippines, Andaman Is.

Robust climbers with stems to 18 mm diameter (or more); leaves linear, gradually attenuate, commonly 45–110 cm long, 1–3 cm wide, margins denticulate nearly all along their length with relatively slender usually antrorse teeth. Auricles purplish, subpersistent but fragmenting, 4–8 (–18) cm long, 1–2 cm wide, with a distinct erect-spreadving denticulate apical lobe to 1 cm long; auricle margins entire to denticulate. Inflorescence terminal, umbellate, ternate; bracts creamy to pure white, outermost ones sometimes tinged pinkish dorsally; pistillate cephalia cylindric, up to 15 × 4 cm, more often 5–10 × 2–3 cm, dull red when ripe, on pedicels about 40–55 × 4–6 mm, costulate, finely roughened-scabridulous. Berry very slender, to 20 mm long. Stigmas as a rule 2 per berry, very rarely 1 or 3. Staminate spadix creamy-white, spikes 6–7.5 cm long, 1.35 cm wide.
Fig. 2. Leaf spectrum of Freycinetia sumatrana var. penangiana. Prophylls and leaves in numbered sequence: 1st prophyll, no. 1; prophylls 2 through 8 all unarmed; intermediate prophylls 9-11 with denticulate apex; foliage leaves 12-et seq. Leaf bases of leaves 13, 14, 15, and 45, and leaf apex of leaf 45, shown. (All from Stone 6040).
Fig. 3. a–b, Freycinetia sumatrana. a — detail of apex of staminate spadix. b — details of berry and seed. c — Freycinetia kamiana (from holotype). Left, leaf with enlarged inset of marginal teeth. Right, above: segment of fruiting pedicel; profile of immature carpels; top view of same. Below, pistillate inflorescence, with one cephalium in longisection.
Habitat: In Malaya, in forests from the lowlands to about 6,000 ft., the high montane forms are smaller, and often have leading shoots of a deep purplish color throughout. Younger plants and lowlands plants are often sterile for long periods. Montane plants may produce fruit of a normal color but devoid of seed.


PERAK: Thaiping Hill, Feb. 1904, Ridley 11891 (SING); Wray 2170 (FI). Batu Togoh, 300 ft., Wray (7108?) (SING). Birch's Hill, March 1924, Burkill & Haniff SFN 12674 (SING).

PENANG: Penang Hill, 2,400 ft., 1901, Curtis 3538 (SING); Feb. 1892, Ridley (SING).


MALACCA: Gunong Ledang, 1892, Ridley (SING).


F. sumatrana Hemsl. var. penangiana B. C. Stone, var. nov. Figures 1b; 2.

Ab var. typica in auriculis angustioribus attenuatis minute truncatis nec lobatis differt.


Type locality: Stone 6040 (KLU).


KEDAH: Turton, Nov. 1889, Curtis (SING, in part).

ANDAMAN ISLANDS: 1875, Kurz (FI).

This variety may be a local form, or merely a state of growth. The narrow auricles, commonly 8–10 cm long, but sometimes to 18 cm long, with a long taper but an abrupt though very brief truncation at the apex, without a lobe, and with minutely denticulate margins and a purplish color, seem to be very characteristic.
(5) **Frey cinetia confusa** Ridley in Mat. Fl. Malay Penin. 2: 234 (1907); in Fl. Malay Penin. 5: 82 (1925). Figure 1, f.

*Not* F. confusa Elmer 1907 (renamed by Elmer as F. villarii 1908).

Type locality: Singapore (lectotype, *Ridley 4757*, SING).

Distribution: Singapore and Malaya, apparently endemic, but very similar to and possibly not distinct from *F. distigmata* Stone of Sumatra, which is however a later name than *F. confusa*.

Slender climber with *stems* to about 5 mm diameter, *leaves* linear, gradually attenuate, 30–33 cm long, 4–5 mm wide, the margins denticulate. Auricles 25–32 mm long, 4 mm wide, slightly tapered, the apex briefly truncate, minutely spinulose-ciliate; sides entire. *Inflorescence* terminal, umbellate, usually ternate; pedicels of pistillate cephala scabridulous, 11 × 4 mm; pistillate cephala (immature) 14 mm long. Berry (immature) 1 mm long; stigmas 1 or 2 per berry. Staminate inflorescence unknown.

Habitat: Lowland forests.

In his original description, Ridley cited *Wray 2151* as a syntype of *F. confusa*, but this specimen is actually *F. rigidifolia* (see under that species). Because of this Martelli confused the species and in Fl almost all specimens of *F. rigidifolia* were marked *F. confusa*. Ridley cited *Wray 2151* as 2157, by mistake.


(6) **Frey cinetia imbricata** Blume in Rumphia 1: 157, t. 40 (1835).


Distribution: Malaya, Sumatra, Java, Borneo.

Smallish to medium climbers, *stems* to 12 mm diameter, *leaves* mostly 20–35 cm long, 6–15 (–17) mm wide, rarely to 24 mm wide, narrowly elliptic-oblong to nearly linear-lanceolate, usually slightly narrowed at base, acuminate-acute at apex; margin denticulate near base and apex, otherwise entire. Auricles more or less persistent and clasping the stem, tapered-rounded at apex, membranous, entire or weakly and sparsely denticulate, usually 2–5 (–7) cm long, 4–6 (–9) mm wide. *Inflorescence* terminal or pseudolateral (i.e. on short side branches with a few reduced leaves intercalated.
below the bracts). Bracts yellow to creamy. Pistillate cephalia globose or broadly short-ellipsoid, 25-45 mm long or rarely more, bright orange when ripe; on pedicels 9-10 × 3.5 mm, glabrous or (in var. hispidula) minutely hispidulous. Berry to 10 mm long, pileus 1.5-2 mm long, dome-shaped or low-conic, briefly or not rostrate, areola less than 1 mm wide; stigmas 1-5, usually 3 or 4. Seeds about 1.3 mm long, falcate-ellipsoid, raphe with shining raphidophorous cells, usually broader than the narrow strophiole. Stamine spadix ...

Habitat: lowland forests, sometimes on rocks.


F. imbricata var. hispidula B. C. Stone, var. nov.
Ab var. typica in pedicellis foemineis hispidulis differt.

Holotype: MALAYA: SELANGOR: Genting Sempah, 1,500 ft., on rock, July 1966, Stone 5847-a (KLU).


PAHANG: Fraser's Hill, 4,000 ft., Nov. 1965, Stone 6078 (KLU).


I believe that this variety with hispidulous pedicels and perhaps mostly somewhat broader leaves, is the same as F. schefferi Solms. It is not possible to keep the taxa as distinct species however.


Figure 1, e.


Type localities and typification: F. rigidifolia: Borneo (Hawaii, K). F. acuminata: Malaya, Selangor (Ridley 7656, SING).

Distribution: Borneo, Malaya, Andaman Islands; cult. in Hort. Bogor.

Slender climber, with stems "to 80 ft. long" (fide Kunstler), to 6 mm diameter or more; leaves stiff, 16-24 cm long, 8-10 mm wide (Malayan specimens), elliptic-lanceolate, acute-acuminate, narrowed rather abruptly at base just at apex of auricles, margins often revolute, blades rather stiffly erect. Auricles abruptly rounded-truncate, deeply fimbriate with spinules 5 mm long or more at apex,
the sides with shorter teeth; auricles 25 × 5 mm. Blade margin at base stoutly denticulate; median part unarmed; apex finely denticulate. Dorsal surface somewhat glaucous. Inflorescence terminal, umbellate, ternate; bracts red or red-orange. Pistillate cephalia greenish-yellow (immature), cylindric, to 35 mm long; pedicels scabridulous on the angles, about 30–40 × 4 mm. Berry (immature) 1 mm long; stigmas 1 or 2.

Habitat: lowland or hill forest (in Borneo on Mt. Kinabalu to 5,000 ft. or higher).

A very distinct and easily recognised species.

ANDAMAN ISLANDS: South Andaman, 1909, Rogers (Fl). Same locality, Kurz (in part; mixed with some specimens of F. sumatrana; Fl).


TRENGGANU: Bukit Kajang, Kemaman, Nov. 1935, Corner SFN 30406 (SING).

PAHANG: Fraser’s Hill, Aug. 1937, Corner (SING).


JOHORE: Mawai-Jemaluang Road 13.5 miles, May 1935, Corner SFN 29738 (SING).

(8) Freycinetia kamiana B. C. Stone, sp. nov. Figure 3, c; plate II.


Stipite erecta ad 2–2.5 m alta et 18 mm diametro, internodiis ad 4 cm longis, simplex vel sparse ramificata, ramis horizontalibus vel laxe subpendulis vel decumbentis, ad 5–8 mm diametro, internodiis 5–20 mm longis, nodis vetustioribus cicatricosis. Folia juvenilia magna ad 40 cm longa et 6 cm lata, oblonga vel oblongovexicata, basi 3 cm lato, apice abrupte rotundata caudato, caudo 15–28 mm longo; auriculis ad 35 mm longis et 10 mm latis, rotundato-attenuatis margine minute distaliter denticulato, membranaceis. Folia vetustiora simillima sed parviiora ad 18–30 cm longa et 2–4 cm lata, marginibus (apicem versus in caudo excepta) inermis. Inflorescentia foeminea terminalis, ternatis, pedicellis 3, ad 12–16 mm longis et 2–3 mm crassis, supra minute sparseque hispidulis. Cephalia oblonga vel cylindrica ad 5 cm longa, 1 cm lata, curvata, baccis immaturis congestis 5–6–angulosis, circiter 5–6 mm longis, 1–1.5 mm crassis, pilo depresso-pyramidato coronatis: stigmatibus 3–5–(7). Cetera ignota.
Stems erect and un- or few-branched (at least at first), later with longish rambling branches; finally (?) perhaps) climbing; stems reddish to yellowish-brown, up to 18 mm diam. with internodes as much as 4 cm long, or on younger branch-tips much shorter (5–20 mm); nodes with conspicuous leaf-scars. Leaves oblong or oblanceolate-oblong; vigorous young shoots with large leaves up to 40 × 6 cm, at base narrowed to 3 cm (just above the sheath-auricles), at apex abruptly rounded-caudate, cauda 15–28 mm long, denticulate on margins and midrib with minute prickles, the leaf otherwise quite unarmed. Auricles up to 35 × 10 mm, rounded or rounded-attenuate to almost deltoid, pale to translucent (in life), with about 5–6 well-spaced slender nerves; margins thin membranous, minutely and weakly serrulate-denticulate toward the distal end with tiny prickles less than 0.5 mm long. Blade with about 48 prominent longitudinal nerves, when dry with numerous manifest tertiary reticulations (forming rectangles); midrib entire and slightly carinate beneath. Older branches (or plants) with considerably smaller leaves mostly 18–30 cm long and 2–4 cm wide, of the same shape etc. but with smaller auricles 12–22 mm long. Pistillate inflorescence terminal, ternate, pedicels about 12–16 mm long, 2–3 mm thick, smooth below but towards apex sparsely and minutely hispidulous. Young cephalia oblong to cylindric, more or less curved, up to 5 cm long, about 1 cm thick, with (immature) berries rather crowded, about 2.5 mm long, only the extreme apex free; pileus polygonal, about 1–1.5 mm wide, shallow, bearing 3–7, usually 4–6 stigmas. Spathes and staminate plants unknown.

Habitat: known so far only from lowland hills in forest.

Distribution: Malaya and Sumatra.

Specimens examined:

MALAYA: SELANGOR: Bukit Lagong, behind Kepong, hillside forest, 13 April 1969, Yee Kiew Kam s.n. (Type; KLU, and distrib.). — Same locality and same group of plants, Jan. 1967, J. Dransfield s.n. (KLU, and distrib.).

SUMATRA: Cultivated plant from Sumatra, said to be from “Bukit Tinggi”, now in the Hortus Bogoriensis, Java, no. XII-B-V-128.

This unexpected new species seems to be very rare in Malaya at least, and John Dransfield’s collection is the first known. This was made at a time when no fruits were seen, and the large leaves and short auricles suggested F. javanica, but could not really be satisfactory as such because of the great size and unusual shape. When my student, Miss Kam, revisited the same locality later on
she was fortunate to find young syncarps which have permitted the recognition and description of this species. Because of this, and because of her valuable work in elucidating the systematic anatomy of the Pandanaceae, it is a pleasure to dedicate this interesting *Freycinetia* to her.

The plants cultivated in the Botanic Gardens in Bogor were observed on a recent study visit there. They seem to be precisely this species. However, no fruiting or flowering materials were seen. There seems no doubt about the source, so that it can be asserted that the species is a native of both Malaya and Sumatra.

The habit of this species is unusual in the genus, since the appearance is distinctly that of an erect shrub. The plants have not, as yet, been seen as climbers. The branches, however, are rather straggling, and it is quite possible that in due course the plants will become topheavy and may eventually undertake the ordinary climbing behaviour of Freyacinetiae. The main stems are however, at least up to 2.5 m high, perfectly straight and relatively rigid.

References

