

Materials for a Monograph of Freycinetia Gaud. (Pandananaceae)

VI. Species of Borneo

By BENJAMIN C. STONE

School of Biological Sciences, University of Malaya
Kuala Lumpur, Malaysia

Abstract

Twenty-four species of *Freycinetia* Gaud. (Pandananaceae) are reported from Borneo, more than twice as many as previously known. Four species are new to science: *F. parviaculeata*, *F. biloba*, *F. kalimantanica*, and *F. kinabaluana*. The following new infraspecific taxa are also proposed: *F. confusa* var. *minima*, *F. javanica* var. *expansa*, *F. robinsonii* var. *meijeri*, and *F. palawanensis* var. *andersoniana*. A brief phytogeographic discussion is included.

No account of the Bornean species of *Freycinetia* has appeared since that of Merrill (1921), which listed 11 species. Since that time two further species have been described by Martelli (1929). The accumulation of specimens in various herbaria has not been accompanied by investigations into the taxonomy of the genus in Borneo, although other regions, in particular New Guinea and the Solomon Islands, have been the subject of study by Martelli and Perry (1939, 1940). Through the generosity of the Forest Department Herbaria in Sandakan (Sabah) and Kuching (Sarawak), as well as that of the Botanic Gardens (Singapore) and the Forest Research Institute (Kempas), most of the material collected in Borneo in recent years has been available to me for study. During academic leave from the University of Malaya in 1968 studies were undertaken of materials preserved in the herbaria of the University of Firenze (where both the Beccari collections and the Martelli Herbarium are kept), in the Rijksherbarium, Leiden, in the Royal Botanic Gardens, Kew, and also Edinburgh, and in the British Museum (Natural History). From these studies it has been possible to gain a much better understanding of the genus and in particular of the species occurring in Borneo. In this paper, twenty-four species are reported, many for the first time, and four new species are proposed. The species are, wherever possible, referred to sections of the genus. These sections have been described in Part IV of this series.

Phytogeographic considerations. The relationships of the Bornean species rest chiefly with the rest of Malesia (i.e. Sumatra, Java, Malayan Peninsula, and the Philippines) and only to a slight extent with Eastern Indonesia (Celebes, Halmahera, Sunda Islands, etc.). As far as is presently known, there is no species shared by New Guinea and Borneo. Three species, at least (probably some other examples will be discovered) occur both in Borneo and in the Philippines but not elsewhere (*F. discoidea*, *F. gitingiana*, and *F. palawanensis*). Two species occur in the Philippines, Borneo,

and eastward, in Java, Sumatra, and Malaya. These are *F. sumatrana* and *F. angustifolia*. (These species are herein first reported for the Philippines). If, as seems possible, *F. imbricata* occurs in the Philippines under another name (possibly *F. montalbanica* Martelli) it could be added to the list. There are five species (*F. sumatrana*, *F. angustifolia*, *F. javanica*, *F. imbricata*, and *F. rigidifolia*) which occur in Borneo, in Malaya, and additionally in Sumatra, Java, or both, or (as to the first and last only) in the Andaman Islands, or (as to the first and third only) in southern Thailand.

This means that thirteen species appear to be endemic to Borneo. On the other hand it is entirely possible that further species will come to light as the exploration of the rich Bornean vegetation continues.

Taxonomic characters, with some advice to collectors. As is also true of *Pandanus* as represented in herbaria, there is a great preponderance of pistillate specimens of *Freycinetia*. There are perhaps two main reasons for this, one being the fact that the male inflorescences are ephemeral, while the developing fruits persist on the plants over a period of months; and the other reason being that since the classification of the genus has been based so heavily on pistillate materials there is little likelihood of staminate collections being properly identified unless accompanied by pistillate material of the same species. As will be noticed in the key and descriptions to follow, the value of certain vegetative characters has proved to be great, and attention by collectors to the securing of good vegetative material, especially the delicate leaf-base auricles, will greatly facilitate the identification of all specimens and in particular the males. Further distinctive characteristics, such as the color of the floral bracts and of the auricles, the presence of glaucousness, and the differences between leaf size and shape in adult and juvenile plants, should be borne in mind by the collectors and noted down. At present it is not possible to determine very young juvenile and seedling plants. The importance of ripe fruit with mature seeds is also great, and these are generally to be preferred to the immature fruits or flowers of pistillate plants if the floral bracts are lacking. The prophylls of developing young shoots are also of value, at least potentially, in the process of identification.

A cautionary word should be said of the external features of the pedicels. At present, no species known produces the staminate spadices on anything but smooth and glabrous pedicels. However, the presence of epidermal appendages (spine-like processes, aculeate or straight, or other scale-like structures which give to the pedicel a scabrid "feel" and appearance) is a useful and important diagnostic feature, although present only on pistillate inflorescence pedicels.

The following key to species is of necessity based on the features of pistillate specimens, since at least 14 of our species are known only from pistillate collections. It is hoped that careful attention will be paid to the desirability of obtaining material of the staminate inflorescences in future collections.

Key to Borneo Species of Freycinetia

1. Leaf apex rather abruptly acuminate-caudate or cuspidate (but see also *F. gitingiana*). Leaves mostly relatively short, rarely much over 40 cm long.
 2. Berry with one stigma (rarely 2). Leaves small, mostly 7–9 cm long, 2–3 cm wide, and elliptic *1 F. tenuis*
 2. Berry with 2 or more stigmas. Leaves mostly larger.
 3. Berry with 2 or 3 stigmas.
 4. Blades elliptic, proportionally very wide, 7.5×2.5 cm up to 22.5×7.5 cm, apex caudate, cauda slightly acuminate *17 F. hemsleyi*
 4. Blades oblanceolate, proportionally narrower, about 16×1 –3 cm, apex abruptly caudate *12 F. borneensis*
 3. Berry with usually 3–7 stigmas (very rarely only 2).
 5. Fem. pedicels glabrous. Leaves about 40×2.4 cm. Stigmas mostly 4–6 per berry *10 F. palawanensis* var. *andersoniana*
 5. Fem. pedicels spinulose-hispidulous or glabrous. Auricles denticulate to long-ciliate.
 6. Auricles pectinate long-ciliate. Leaves 12–20 cm long, 2–3 cm wide, the margins at base and apex ciliate *13 F. ciliaris*
 6. Auricles minutely denticulate on margins. Leaves about 30 cm long, 2.5–3.5 cm wide, nearly entire except at extreme apex and base where margins bear few very minute denticulations *11 F. biloba*
1. Leaf apex gradually and narrowly attenuate, subulate, or acute; leaves sometimes well over 1 m long.
 7. Auricles lobed (i.e. upper end of auricle extended upward-outward like a lobe).
 - 7a. Robust plants; leaves to 120 cm long, 4–6 cm wide. Cephalia long-cylindric. Stigmas usually 2 (rarely 3) per berry; pedicels stout, minutely scabrous *5 F. sumatrana*
 - 7a. Smaller plants; leaves c. 50×1 cm. Cephalia cylindric; stigmas 2; pedicels slender, distally spinulose *6 F. lucida*
 7. Auricles entire, at apex rounded, truncate, or tapered.
 8. Cephalia usually 4–7 together, spirally crowded. Robust plants with leaves 80–100 cm long, 2.5 cm wide *7 F. kinabaluana*
 8. Cephalia usually ternate (3 together in an umbel), rarely 4, sometimes only 2 or solitary.

9. Auricles deeply pectinate-spinulose; leaves rigidly ensiform, narrow, abruptly narrowed at the auricle and with revolute margins *9 F. rigidifolia*
9. Auricles, etc., not as above.
10. Inflorescences lateral (i.e. below the main cluster of leaves, produced at the apex of a short lateral branch bearing prophylls and floral bracts but no ordinary foliage); or sometimes both lateral and terminal.
11. Leaves mostly 15–35 cm long, 0.6–1.5 cm wide; fem. pedicels glabrous or (in one variety) slightly hispidulous. Cephalia subglobose or nearly short-oblong, ternate, binate or solitary *4 F. imbricata*
11. Leaves mostly 40–60 cm long, 0.6 cm wide, cephalia subglobose, solitary or two *3 F. sarawakensis*
10. Inflorescences invariably terminal (except in *F. imbricata*)
12. Inflorescence a raceme of small oblong well-spaced short-pedicellate cephalia. Leaves linear, less than 1 cm wide *2 F. angustifolia*
12. Inflorescence umbellate (or solitary).
13. Robust plants with leaves 60–100 cm long, up to 3.3 cm wide, thickly coriaceous.
14. Stigmas invariably 2 per berry; berries extremely long and slender, filiform. Cephalia oblong-cylindric, borne on minutely but densely aculeolate pedicels *8 F. parviaculeata*
14. Stigmas usually 4–8 per berry; berries broader than filiform. Cephalia subglobose, borne on glabrous pedicels *15 F. corneri*
13. Leaves shorter, or narrower, or both.
15. Pedicels of pistillate inflorescences quite glabrous.
16. Stigmas 3–7 per berry. Leaves commonly 2 cm wide or wider.
17. Leaves mostly (20–) 40–50 cm long, about 2 cm wide.
18. Leaves acute, unarmed or nearly so; stigmas mostly 3–5 (–7) *14 F. concinna*

18. Leaves acuminate, conspicuously prickly on basal margins; auricles purplish; stigmas usually 2, rarely 3–4
16 F. discoidea
17. Leaves mostly 12–25 cm long, 1–3 cm wide; in juvenile plants these dimensions somewhat exceeded. Auricles not purplish.
18 F. javanica
16. Stigmas 3–4 per berry; leaves 40–60 cm long, 0.6 cm wide
3 F. sarawakensis
15. Pistillate pedicels scabrid or hispidulous.
19. Stigmas usually 2 per berry. Leaves 45–70 cm long, about 1 cm wide, rather stiffly linear-ensiform and attenuate-subulate. Auricles purplish-brown, subtruncate, entire. Floral bracts purple
21 F. winkleriana
19. Stigmas 2–5 (–8) per berry. Auricles entire or somewhat denticulate on margin.
20. Leaves less than 15 mm wide,
21. Leaves 4–10 mm wide, lanceolate or linear.
22. Leaves linear, 4 mm wide
24 F. confusa var. *minima*
22. Leaves 7–10 mm wide
4 F. imbricata var. *kuchinensis*
21. Leaves 10–13 mm wide, long-lanceolate, gradually attenuate. Cephalia cylindric
19 F. robinsonii var. *meijeri*
20. Leaves 18–30+ mm wide.
23. Stigmas usually 2; cephalia slender cylindric, 4–6+ cm long, yellowish; leaves with short conspicuous prickles on margins near apex and base
22 F. gitingiana
23. Stigmas usually 4–8.
24. Stigmas most commonly 4 (but 3–6); cephalia about 25 mm long; leaves virtually unarmed, apex acute
20 F. creaghii
24. Stigmas most commonly 6 (but 5–8); cephalia about 35 mm long; leaves almost unarmed, apex attenuate
23 F. kalimantanica

Enumeration of species

Sect. *Oligostigma* Warb. em. B. C. Stone

(1) *Freycinetia tenuis* Solms, Linnaea 42: 87, 1879.

Liana pumila montana silvatica in saxibus occurs, caulis ad 4–5 mm diametro, internodiis 12–15 mm longis, *foliis* ellipticis acuminatis breve-caudatis basi angustatis 7–9 cm longis, 2–2.8 cm latis, auriculis brevibus ad 8 mm longis (delapsis); marginibus foliorum et costa, apicem versus excepta, inermibus caudis brevedenticulatis. *Inflorescentia* foeminea terminalis ternata pedicellis gracilis semiteretibus laevibus 16–18 mm longis, 1.5–1.8 mm crassis. Cephalia subglobosa vel breviter oblongata 1–1.8 cm longa, 8–10 mm lata. Baccae maturitate ad apicem succulentae, stigma unicum. Apex baccae rotundatus. *Inflorescentia* mascula subterminalis, bracteis ovatis acutis ad 23×16 mm. Spadix ad 1 cm longus, parte floriferis 4×2 mm.

Type: SUMATRA: *Korthals* 23 (L!), staminate.

BORNEO: E. Sabah; Tambunan District, Koingaran, creeper in mountain forest in rocky soil, fruit green, Oct. 1962, *G. Mikil SAN 31851* (SAN!). Mt. Kinabalu, Dallas, alt. 3,000 ft., Aug.–Sep. 1932, *J. & M. S. Clemens 26210* (= 26734) (L!); Penibukan, 4,000–5,000 ft., Jan. 1933, *Clemens 31038* (L!), 50137, 32135 (BM!).

This species is easily recognized among the Bornean Freycinetiae by its small size and unistigmatic gynoeceia. The small globose cephalia and the berries with rounded, succulent apices, place the species in the Sect. *Oligostigma* as recently delimited. It is very similar to *F. beccarii* Solms, the lectotype species of this section. The type specimen was staminate; these collections permit, for the first time, the description of the pistilate characters.

Sect. *Racemosiflorae* B. C. Stone

(2) *Freycinetia angustifolia* Blume, Rumphia 1: 149, t. 43. 1835.

Merrill, l.c. 1921.

Type from Java. Previously reported from Borneo by Merrill (*Foxworthy* 91, from Sarawak; *Motley* 1128, Kalimantan).

SARAWAK: Lundu, unknown collector (but probably a duplicate of *Foxworthy* 91), staminate (SAR!). Simanggang District, Trisa P.F., small climber reaching 5 ft. high, in peat-swamp forest, Jan 1958, *J. A. R. Anderson 14545* (SAR!).

INDONESIAN BORNEO (KALIMANTAN): Bandjermasin, *Motley* 1128 (K!).

This highly characteristic species can now be confirmed from the Philippines for the first time:

PHILIPPINES: Sibuyan; Mt. Giting-giting, Prov. Capiz, May 1910, *Elmer 12426* (labelled with MS name "F. baganot Martelli" — ined.) (L! EDINB!). — Same location, March 1910, *Elmer 12071* (det. as *F. elmeri* Martelli) (K! EDINB!).

Sect. *Sarawakenses* B. C. Stone

- (3) *Freycinetia sarawakensis* Martelli, Webbia 3: 179, 1910. Merrill (1921) p. 34.

Type from Sarawak (*Beccari* 1829). Also recorded from Kalimantan (*Jaheri* 1017). *Hallier* 3188 was also listed; there are two species under this number in Hallier's collections. *Hallier* 3188-bis represents this species, while 3188 proper represents (and is the type of) *F. lucida* Martelli.

KALIMANTAN: C. E. part at W. Koetai n. 40, on Kiau R. in riverbank forest, alt. 700 m., fairly common, Oct. 1925, *F. H. Endert* 4582 (L!). SARAWAK: Sibu, Lassa, 10 ft. alt. May 1961, *Anderson R-19* ♂ (SAR!).

This unusual species is the type of Sect. *Sarawakenses*. No staminate collections are known so far, but in its curious lateral and solitary cephalia, and its elongated (50–60 cm long) leaves, only 6–8 mm wide, it is a striking species. The leaf auricles are about 25 × 3 mm. The pistillate cephalia are subglobose, about 30 × 25 mm, and are borne on a stout short pedicel 10 × 4 mm. So far this plant has not been found outside Borneo.

- (4) *Freycinetia imbricata* Blume, Rumphia 1: 157, t. 40. 1835. Figure 1.

F. kingiana Ridl. Mat. Fl. Mal. Pen. 2: 232, 1907.

Type from Java (Blume). Type of Ridley's *F. kingiana* is *Kunstler* 4654 from Perak, Malaya.

var. *hispidula* B. C. Stone, Gard. Bull. Sing. 25: 204, 1970.

In pedicellis hispidulis et foliis latioribus differt.

F. schefferi Solms, Linnaea 42: 98, 1879.

Holotypus: MALAYA: Selangor; Ginting Sempah, 22nd mile, alt. 1,500 ft., climber on rock, July 1966, *Stone* 5847a (KLU!).

Exsiccatae: MALAYA: Selangor, type locality, *Stone* 5847 (KLU!). Ginting Highlands, 3,000 ft. alt., Nov. 1966, *Stone* 6535 (KLU!).

BORNEO: Sarawak; Kuching, Oct. 1905, *Hewitt* (SAR!). Siol, Apr. 1906, *Hewitt* (SAR!). Puak, bushes by river, Sep. 1903, *Ridley* (SING 026534!). Simanggang, Triso P.F., alt. 10 ft., small climber, Sept. 1958, *Anderson SAR* 14549 (SAR!). Lundu, Sungei Rengas, small climber in peat-swamp forest, fruit bright orange, 15 ft. alt., Oct. 1961, *Anderson et al. SAR* 15421 (SAR!). Without locality, *Ridley* in 1915 (L!). Without locality (but perhaps Labuan), *Mr. (Hugh) Lowe* (K!). Sabah; Madai, *Governor Creagh* (K!).

var. *kuchinensis* (Martelli) B. C. Stone, *comb. et stat. nov.*

F. kuchinensis Martelli, Webbia 3: 167, 1910. (as *Kutchinensis*, p. 316). Merrill (1921) 34.

Type from Sarawak (*Beccari P. B.* 782-bis). Reported also from Indonesian Borneo (*Jaheri* 528).

BORNEO: Sarawak: Gat, upper Rejang River, fruit bright yellow, 1929, *J. & M. S. Clemens* 21902 (FI!).



Fig. 1. *Freycinetia imbricata* Bl. Java, Korthals (L. 908164).

Sect. *Auriculifoliae* B. C. Stone

(5) *Freycinetia sumatrana* Hemsley, Kew Bull. 1896: 158.

F. valida Ridl. Mat. Fl. Mal. Pen. 2: 233, 1907.

Winkler, Engl. Bot. Jahrb. 48: 87, 1912. Merrill (1921) 34.

Type from Sumatra (Beccari). Type of *F. valida* from Malaya (Ridley).

BORNEO: Sarawak; Simanggang Distr., Triso P.F., Jan. 1958, *Anderson 14544* (SAR!). Sabah; Tawau Distr., Apas Rd. 12.5 miles, epiphyte in primary forest, fruit dark brown smelling of meat, Jun. 1959, *Meijer SAN 19371* (SAN! K! L! SING! SAR!). Sepilok Forest Reserve, swamp forest, Mar. 1967. *Stone & Meijer 6731* (KLU!).

PHILIPPINES: Basilan Island; Zamboanga Prov., Isobela de Basilan, Land grant of Univ. Philipp., *Liborio Ela Eballo 988* (PNH! distrib. as *F. banahaensis* Elm.). Vernacular name, "kayakan" in Yakan (Jan. 1941).

The cited specimen from Basilan extends this species for the first time into the Philippines. It is certain that the plants referred to *F. auriculata* Merr. are of the same species as this.

(6) *Freycinetia lucida* Martelli, *Webbia* 3: 168, 1910. Merrill (1921) 34. Figure 2.

Type from Indonesian Borneo (*Hallier 3188*) in BO!

Liana scandens; caulibus vetustioribus ramuligeris ad 12–15 mm diametro, internodiis 15–20 mm longis, radicibus aereis emittentibus, junioribus c. 8 mm diametro, internodiis 10–15 mm longis, foliosis. *Folia* longe lineari-attenuata, 45–50 cm longa, 9–13 mm lata, sensim attenuata, marginibus denticulatis, in sicco revolutis; parte vaginantia c. 4.5 cm longo; auriculis castaneis 4–5 cm longis 4–5 mm latis apice unilobulatis integris vel ciliatis. *Inflorescentia* terminalis binatis. *Cephalia* foeminea cylindracea, immatura 48–50 mm longa, 12 mm crassa; pedunculis angustis 25–27 mm longis 2.5 mm latis distaliter minute et subsparse scabridulosi. *Bacca* (immatura) 4 mm longa, 1 mm lata; pileus vix 1 mm altus, late pyramidatus vertice plano. *Stigmata* 2 (rare 3, rarissime 4). *Staminodia*, minutissima, cetera ignota.

BORNEO: East Indonesian Borneo, Kutei, G. Beratus [Summit, Piek van Balikpapan] alt. 1,200 m, 19 July 1952, *W. Meijer 904* (BO! L!).

This very interesting species is known so far only from the type collection and the recent one cited made by Willy Meijer.

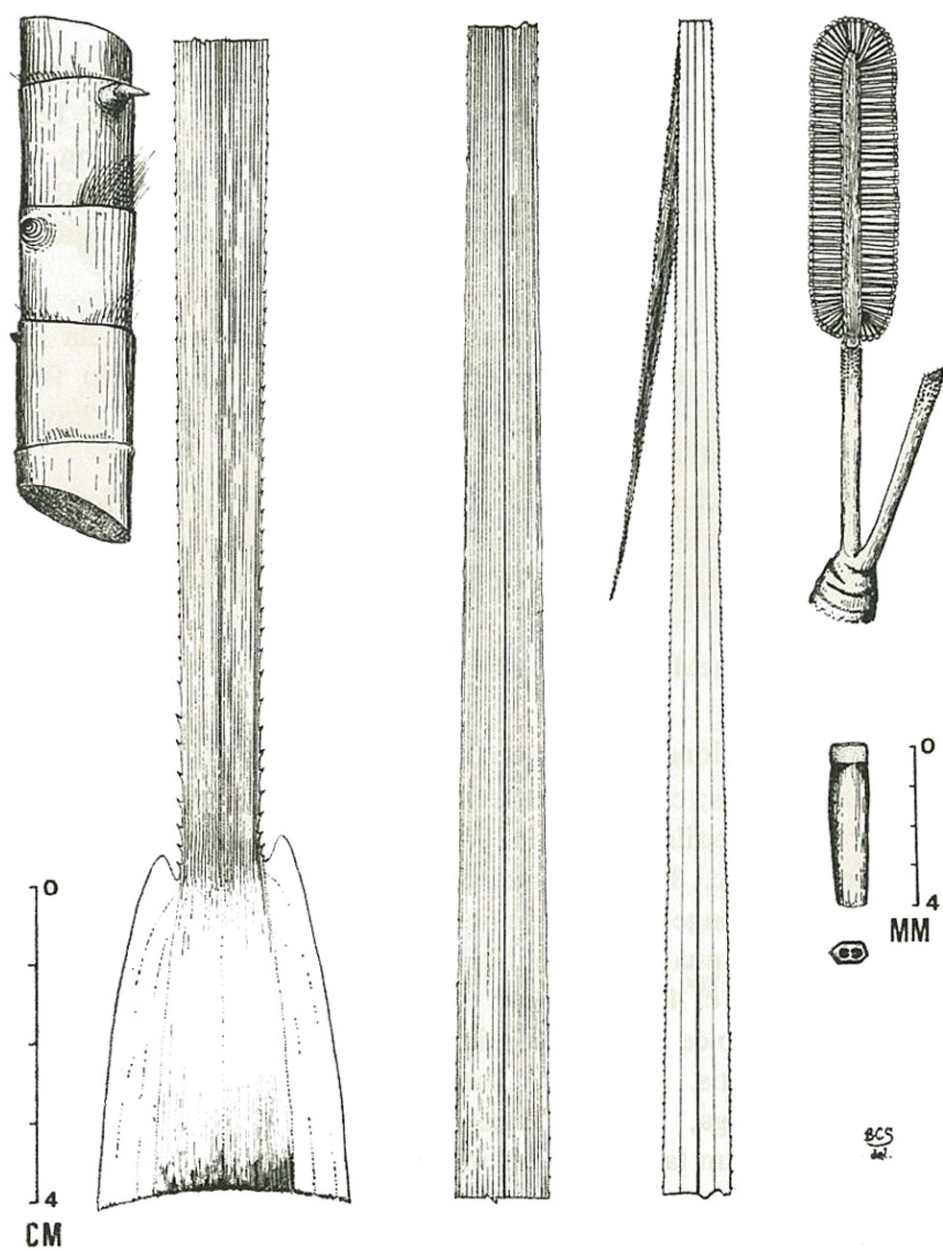


Fig. 2. *Freycinetia lucida* Martelli. Borneo. Meijer 904.

In its lobed auricles, tapered leaves, terminal inflorescence, cylindric pistillate heads, and berries with usually 2 stigmas, *F. lucida* corresponds well with the characters of Sect. *Auriculifoliae*. From *F. sumatrana* Hemsl., it differs in its smaller overall dimensions and entire auricles, and in the different form of spinules which occur at the distal end of the peduncles. From *F. ceramensis* Martelli, which is undoubtedly its closest relative, the present species differs in its slightly smaller yet more strongly denticulate leaves, more slender pedicels with their distal ends, just below the cephalium, spinulose rather than smooth or minutely scabrous, and somewhat fewer and less crowded berries.

Sect. *Polystachya* B. C. Stone

(7) *Freycinetia kinabaluana* B. C. Stone, *sp. nov.*

Liana robusta caulis ad 2 cm diametro, *foliis* anguste attenuato-subulatis coriaceis 80–100 cm longis 2.5 cm latis, basi vaginantibus, auriculis 7–9 (–10) cm longis et 7–10 mm latis, marginibus foliorum basin versus minime et distanter paucidentulatis (dentibus vix 0.7 mm longis), apicem versus dorso simillime denticulatis, cetera laevibus. *Inflorescentia* foeminea terminalis cephalis pluribus plerumque 4–7 spiraliter congestis pedicellis 5 cm longis 4–7 mm crassis subtrigonatis vel semiteretibus ad angulis et in lineis dorsalibus scabridulis (papillis 0.2 mm longis) in sicco fuscoatris. Cephalia breve oblongata vei obscure ellipsoidea juventute breviter cylindracea, ad 5 vel 6 cm longa et 3.5–5 cm lata. Baccae numerosae maturitate flavidae, ad 20–24 mm longae et 3–3.5 mm latae, clavatae, pileis 5 mm longis anguste pyramidatis, areola stigmatica c. 1×1 vel 1×2 mm, stigmatibus (4–) 5–7 (–9); semenibus ad 1.2 mm longis angustis lineari-ellipticis raphe inconspicuis et strophiole nullo.

Holotypus: BORNEO: W. Sabah; Mt. Kinabalu, 5,000 ft., Mesilau River, Apr 1964, *W. L. Chew & E. J. H. Corner* (1964 Royal Society Expedition) *RSNB 7013* (K!). Isotypes (SING! SAR! SAN!).

Exciccatæ: BORNEO: W. Sabah; Mt. Kinabalu, 5,200 ft., below Lumu-Lumu, Apr 1933, *C. E. Carr* *SFN 27104* (SING!). Bembangan River, 5,000 ft., Feb 1964, *Chew & Corner* *RSNB 4405* (K! SING! SAN! SAR!). Mt. Kinabalu, Tenompok, 5,000 ft., Mar 1932, *J. & M. S. Clemens* 28711 (=29550) (L!). Mesilau River, 5,000 ft., Jan 1964, *Chew & Corner* *RSNB 4177* (K!); Feb 1964, *Chew & Corner* *RSNB 4306* (K!).

A distinctive large species apparently related to *F. corneri* B. C. Stone, *F. philippinensis* Hemsl. and *F. multiflora* Merr., and perhaps also to *F. whitmorei* B. C. Stone of the Solomon Islands.

In its numerous spirally crowded cylindric cephalia this species appears to belong in Sect. *Polystachya*. In a very superficial way it also resembles *F. sumatrana* Hemsl. but differs in many characters.

Sect. *Filiformicarpae* B. C. Stone

(8) *Freycinetia parviaculeata* B. C. Stone, *sp. nov.* Figure 3.

F. valde proxime *F. tessellata* et *F. ponapensis* sed pedicellis omnino dense scabridulis et foliorum marginibus conspicue late denticulatis.

Scandens, robusta, caulis ad 15 mm diametro. *Folia* erecto-patentia basi amplexentia coriacea ad 60 cm longa et 3.3 cm lata, apice acuto, margine e basi ad apicem denticulata, dentibus antrorsibus fere 1 mm longis et 3–7 mm separatis; costa media dorso apicem versus simillime denticulata, cetera laevia; auriculis ad 10–12 cm longis et 1–1.5 cm latis, membranaceis, margine ut videtur integris (sed fragmentatis). *Inflorescentia* foeminea terminalis breve pedunculata, cephalis oblongo-cylindraxis ad 7 cm longis et 3 cm latis, pedicellis 20–24 mm longis et 5 mm crassis, obscure trigonatis, in toto dense aculeatissimis. *Baccae* 13–15 mm longae, 2–3 mm latae (in sicco) apice coriaceo pileo angusto elongato 5–6 × 1–2 mm truncato, parte basilari succulenti seminiferosi rubri, areola stigmatica elliptico c. 1 mm lato annulo brunneo nitente cincta, stigmatibus 2 rarissime 3 discretis, seminibus falcato-lunatis c. 1 mm longis rubro-miniatis, raphe alba angusta, strophio nullo.

Holotypus: BORNEO: Sarawak; Miri District, Sungei Dalam, low altitude, on tree by stream in swamp forest, fruit bright red, June 1961, *Dan bin Haji Bakar SAR 4502* (SAR!). Isotypes in K! L!

This species is the first of Sect. *Filiformicarpae* to be reported from Borneo, and indeed is the first known west of Wallace's Line. It is distinguished from its congeners by the broad and conspicuous marginal leaf-prickles and the densely aculeate pedicels (see illustration), to which the specific epithet refers.

BORNEO: Sarawak: Rejang Mangrove Reserve, Nov. 1968, *Anderson S. 26572* (SAR!).

Sect. *Hemsleyella* B. C. Stone

(9) *Freycinetia rigidifolia* Hemsley, Kew Bull. 1896: 166. Merrill (1921) 34. Figure 4.

F. acuminata Ridl. Mat. Fl. Mal. Pen. 2: 233, 1907.

Type of Hemsley's species was from Sarawak (*Haviland 436*); that of Ridley's from Malaya (*Ridley 7656*).

The species has been reported from Indonesian Borneo (*Jaheri 1017*).

Recent collections disclose that this is evidently quite a common species in Borneo, and that it also occurs in the Anambas Islands and in the Andaman Islands.

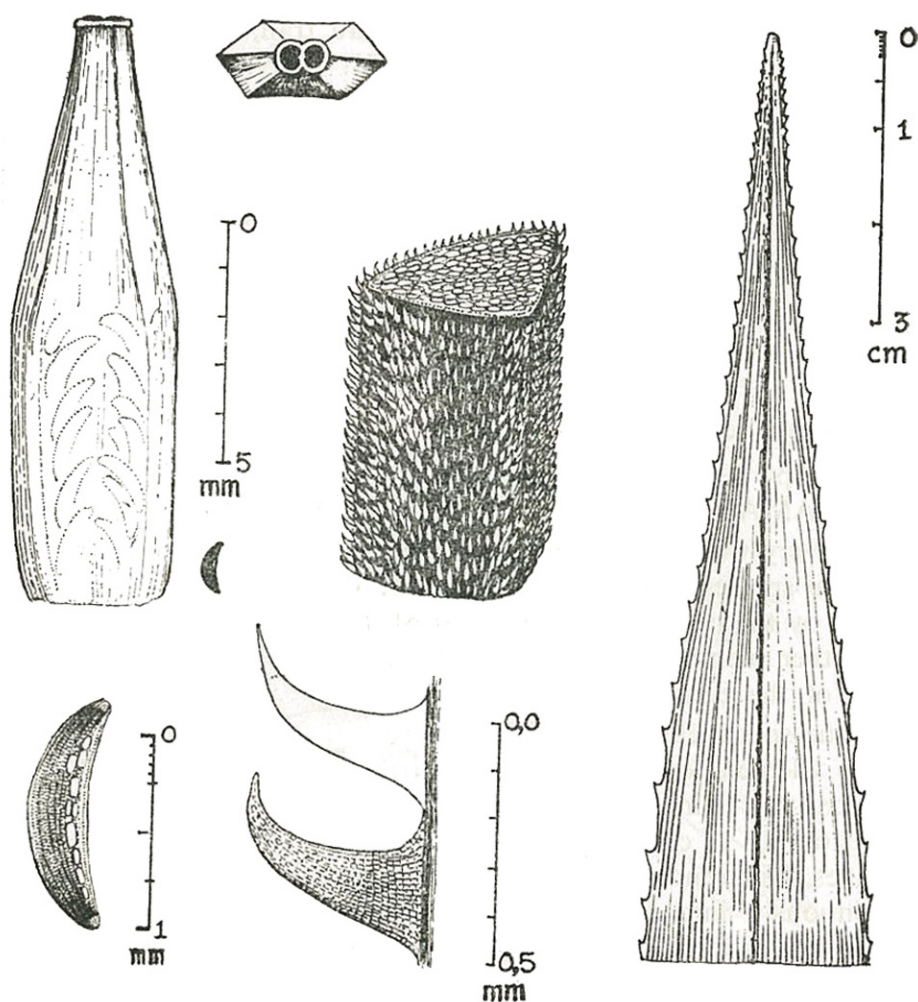


Fig. 3. *Freycinetia parviaculeata* B. C. Stone. Holotype. Right: leaf apex. Center: part of fruit pedicel, showing spinules; below, enlarged view of spinules. Left, above: berry in profile and top view, with seed in profile to same scale; below, seed enlarged.

BORNEO: Sabah; Mt. Kinabalu; Tenompok, 5,000 ft., March 1932, *Clemens* 26075 (K!); 26378 (K!); 28750 (L!); 29331 (K!); 30175 (K! L!). Penibukan, 4,000 ft., Sep 1932, *Clemens* 40510 (L!). Marai Parai, 9,000 ft., Mai 1933, *Clemens* 32385 (L!). Mesilau River, 5,000 ft., Feb 1964, *Chew & Corner RSNB* 4269 (SAN! SING!). Ranau Distr. along Kambarango Rd, Aug 1963, *Mikil SAN* 38635 (K! SAN!). Sandakan Distr. 25 mi SW of Sandakan, Lungmanis, Mar 1955, *G. H. S. Wood SAN A-2922* (SAN!). Kabili-Sepilok Forest Reserve, Mai 1961, *Patrick Ping Sam SAN* 24845 (SAN!). Ranau, Mesilau trail, on tree NT-980, 4,500 ft., Feb 1965, *Sadai SAN* 42888 (K! SAN!). Sarawak; Bau, limestone hills, 1893, *Ridley* 11712 (K!). Same location, Jul 1963, *Quisumbing PNH* 87630 (PNH!). Bidi cliff, *C. J. Brooks* (K!). Gunong Subis, Niah, 400 ft., on 'mor' layer at summit of limestone hill, bracts bright orange, June 1962, *Anderson S.* 16426 (K! SAR!). Bau District, 700 ft., Aug 1963, *Chew* 561 (K!). Near Kuching, Dec, 1892, *Haviland* 3132 (K! SAR!). Near Long Kapa Mt. Dulit, Ulu Tinjar, 700–900 m, bracts scarlet, *P. W. Richards* 1964 (L!) KALIMANTAN: W. Koetai, n. 39, nr. Mt. Kemoel, 1,600 m., Oct. 1925, *Endert* 4374 (L!); 4136 (L!).

ANAMBAS ISLANDS: Boengoeran, east side of Gunong Ranai, Apr 1928, *van Steenis* 1200 (L!).

ANDAMAN ISLANDS: S. Andaman, *Kurz* (FI!).

This very well characterized species seems to be one of the most common species in Borneo. It is also in Malaya, where it has been known by the name *F. acuminata* Ridl. Its closest relative, and the only other member of Sect. *Hemsleyella*, is *F. pectinata* Merr. & Perry of the Solomon Islands.

Of the specimens cited, a few deserve particular mention. Several of the *Clemens* collections, particularly 40510, 40452 and 40453, all from Mt. Kinabalu, are somewhat unusual in their narrower leaves (about 17 cm long and 5.5 mm wide) and the short auricular spinules, differences which however noticeable appear to grade continuously into those of larger plants. The extreme of size increase is afforded by the *Richards* 1964 specimen, which has leaves 44 cm long and 18 mm wide.

Freycinetiae Imperfectae vel Incertae Sedis

(10) **Freycinetia palawanensis** Elmer, Leaflet. Philipp. Bot. 1: 216, 1907, var. **andersoniana** B. C. Stone var. nov.

Liana scandens, caulis ad 1 cm diametro, internodiis ad 2 cm longis, *foliis* anguste lanceolatis ad 42 (vel ultra?) cm longis et 2–2.5 cm latis apice acuminato-caudato, basem versus leviter angustatis, marginibus inermibus apicem versus excepta; cauda minute denticulata; auriculis delapsis ad 3 cm longis. *Inflorescentia* terminalis breve-pedunculatis binis vel ternis pedicellis brevis c. 9 × 5 mm laevibus. *Cephalia* foeminea cylindracea ad 9 cm longa



Fig. 4. *Freycinetia rigidifolia* Hemsley. Habit (SAN. 59284).

et 1.8 cm crassa. Baccae immaturae 6 mm longae lageniformatae in pileo abrupte angustato 2 mm longo terminatae, areola stigmatica 1 mm lato subtruncato, stigmatibus 4–6, parte basilari seminiferi semenibus 1.5 mm longis angustis sublinearis raphe perangusto strophio nullo.

Holotypus: BORNEO: Sarawak; Baram District, Ulu Sungei Melinau Paku, 400 ft., climber on riparian hill, Jun 1961, *J. A. R. Anderson SAR 4076* (SAR! unicate).

Exsiccatae: PHILIPPINES: Mindanao; Bukidnon Province, Mt. Katanglad, Mar 1949, *M. D. Sulit PNH 10082* (PNH!).

This is a very distinct species. The new variety is named in honor of the Conservator of Forests for Sarawak, who collected the type specimen. It differs from the commoner Philippine variety in its broader, longer leaves and larger fruiting heads.

(11) ***Freycinetia biloba*** B. C. Stone, *sp. nov.*

Liana scandens caulis ad 8 mm diametro trigonatis, internodiis 1–2 cm longis, *foliis* erecto-patentibus 23–34 cm longis, 2.5–3.6 cm latis oblanceolatis acuminatis cuspidato-caudatis, fere inermibus caudo (3–4 cm longo) et marginibus basalibus per brevem spatiam (1–2 cm) excepta, dentibus minutis 0.1–0.2 mm longis obtusatis 1–5 mm separatis, costa media cariniformato laeve sed apicem versus minutissime denticulato. Auriculae ad 25 mm longae et 6–7 mm latae, membranaceae mox caducae leniter rotundata marginibus creberrima minutissimeque ciliato-denticulatis. *Inflorescentia* ternata terminalis, pedunculis communis 20–25 mm longis ad angulas dense hispidulis, pedicellis 15–20 mm longis 2.5 mm crassis subteretibus omnino (basem extremam excepta) stramineo-hispidulis (setis ad 0.5 mm longis antrorsis congestis aciculari-ventricosis). Cephalia cylindracea immatura ad 30 × 8 mm. Baccae numerosae, pileis ad 1 mm latis, stigmatibus (3–) 4–8 (–10) vulgo 4–6.

Holotypus: BORNEO: W. Sabah, Beaufort District, Beaufort Hill, in primary forest, Mar 1961, *Meijer SAN 24834* (SAN!).

Exsiccatae: BORNEO: Sarawak; Sungei Belaga, hillside with mixed dipterocarp forest, inflorescence chrome yellow, Apr 1963, *P. S. Ashton S. 18229* (K!). — Mt. Mattang, primary forest, fruit red-orange, 5 April 1968, *J. Dransfield 763* (KLU!).

This species appears similar to *F. ciliaris* Martelli, despite the major difference in facies caused by the much longer and more numerous spinule-like cilia on the leaf of the latter. *F. biloba* also somewhat resembles *F. jaheriana* Martelli (of New Guinea) but has berries with more numerous stigmas and considerably narrower leave. However the nearest relative is *F. kamiana* Stone of Malaya. The specific epithet is in reference to the two short conspicuous auricles.

- (12) ***Freycinetia borneensis*** Martelli, Webbia 3: 167, 1910. (as *bornensis*; corrected, l.c. 310). Merrill (1921) 34.

Type from Indonesian Borneo (*Jaheri* 925) at Leleboelan Tepoetz (1896–97). A fragment in the Martelli Herbarium in Firenze has a leaf 16×2.8 cm, abruptly cuspidate-caudate, with the cauda 2 cm long; basal auricles 24×4 –5 mm, apparently rounded; immature berries 5×2.5 mm, pileus narrowed abruptly below the short stigmatic areola; and stigmas 2 or 3 per berry.

BORNEO: Central E. part, W. Koetai, n. 26, L. Temelin, low riverbank forest, 200 m. common climber, Aug. 1925, *Endert* 2918 (L!). Z. en O. Afd. Borneo, km. 14, tusschen Bandjermassin-Martapoera, Oct. 1939, *Polak* 513 (L!). — Sarawak; G. Matang, 800 ft. alt., primary forest, clay-loam, bracts orange-pink, spikes pale pink, April 1966, *Anderson* S. 25102 (SAR!).

- (13) ***Freycinetia ciliaris*** Martelli ex Merrill, Univ. Calif. Publ. Bot. 15: 15, 1929.

Type from Tawao, Sabah (*Elmer* 21632).

Stems to 5–8 mm thick; *leaves* oblanceolate, 12–20 cm long, (1.3–) 2–3 cm wide, caudate-acuminate, acumen 2–3 cm long, spinulose; margins (except medially) spinulose; auricles 11–14 mm long, 4–5 mm wide, inarched at apex, pectinate-spinulose with setae 1–1.5 (or more) mm long, caducous. *Inflorescence* ternate, terminal, the pedicels hispidulous, berry with 3–7 stigmas on a dome-like pileus.

BORNEO: Sabah; Sandakan District, Paitan Forest Reserve, 50 ft., primary forest nr. swamp, Feb. 1963, *Ampuria* SAN 32085 (K! L! SAN!). Sepilok Forest Reserve, lowland swamp, uncommon low climber, bracts greenish-white, male spadices 3, oblong, 1 cm long, March 1967, *Stone & Meijer* 6713 (KLU!).

One of the most characteristic of the Borneo species, and indeed very distinct in the genus.

- (14) ***Freycinetia concinna*** Martelli ex Merrill, Univ. Calif. Publ. Bot. 15: 16, 1929.

Type from Tawao, Sabah (*Elmer* 21596).

BORNEO: Sarawak; Tatau District, Kakus-Pandan Forest Reserve, on exposed rocky ridge in “kerangas” forest, inflorescence yellowish-green, 1,300 ft., Oct. 1959, *E. F. Brunig* S. 11954 (SAR!).

- (15) ***Freycinetia corneri*** B. C. Stone, Brittonia 20 (3): 199, 1968.

Type from Singapore (*Corner*).

BORNEO: Central E. pt., W. Koetai, n. 39, Mt. Kemoel, alt. 1,800 m, mountains in forest, big climber, Oct. 1925, *Endert* 4453 (L!).

This species hitherto known only from Singapore and Johore now appears in Borneo. Among the large robust species it is quickly distinguished by its smooth pedicels, subglobose cephalia, 4–8-stigmatic berries, and broad acute leaves with the subtruncate auricles slightly denticulate at the apex.

- (16) **Freycinetia discoidea** Martelli, *Leaf. Philipp. Bot.* 111 (Art. 60): 1113, 1911. Figure 5.

Type from Sibuyan Island, P.I. (*Elmer 12197*).

BORNEO: Sabah; Sandakan District, Leila Forest Reserve, 300 ft., Oct. 1951, *Patrick Ping Sam SAN 27822* (SAN!). Sepilok Forest Reserve, Sepilok Besar, in swamp with *Pandanus corneri* Kaneh., March 1967, *Stone & Meijer 6733* (KLU! both stam. and pistill. plants). Happy Valley, near Leila, Apr 1965, *Meijer 48281* (K!).

This is a striking species here first reported tentatively from Borneo. The leaves are markedly glaucous on their undersurface, about 38 cm long and 2.5 cm wide, broadly linear, with auricles 50×5 mm having entire margins though a very few spinules occur at the truncate apex. The floral bracts are pinkish-orange; pedicels are smooth, 15–20 mm long; cephalia about 50×14 mm; and the berries have 2–5, but commonly 2–3, stigmas. One discordant feature is the indication of scabrid pedicels in the original description, while our specimens have quite glabrous pedicels. Conceivably this is an important difference.

- (17) **Freycinetia hemsleyi** Warburg, *Pflanzenr.* IV. 9: 36, 1900. Merrill (1921) 34.

F. beccarii Hemsl. *Kew Bull.* 1896: 166, not of Solms 1879.

Type from Sarawak (*Beccari P. B. 3598*).

This plant has not appeared again in more recent collections. It is probably a close relative of *F. javanica* Bl. and perhaps with that species should form a section. It has however much broader leaves of more oblanceolate form, and fewer stigmas per berry. The following brief description, improving somewhat on Hemsley's and Warburg's, is added, with the hope that the species may be again collected:

Stems to 5–6 mm diameter; leaves elliptico-oblanceolate, broadest beyond the middle, about 3 times longer than wide, up to 22.5×7.5 cm, more often about 16×4.5 –5 cm, slightly cuspidate; auricles short, about 11×4.5 mm, denticulate along their margins and abruptly rounded at apex; leaf-veins widely spaced, 20–25 per leaf-half, from 1–1.9 mm apart; *inflorescence* terminal and ternate, the pedicels about 20×3 mm, scabridulous on the angles, and all around distally; immature cephalia about 15×7 mm; berry with 2–4, or rarely 5, stigmas.



Fig. 5. *Freycinetia discoidea* Martelli. Habit (P. P. Sam 27822).

- (18) **Freycinetia javanica** Blume, Rumphia 1: 156, t. 41. 1835.
Merrill (1921) 34.

Type from Java (Blume).

var. **javanica**

BORNEO: Eastern pt., Nunukan, N. of Tarakan, inner forests at low altitude, with dipterocarps, a climber on *Oncosperma*, Nov. 1953, *Meijer 2100* (L!).

var. **expansa** B. C. Stone, *var. nov.*

Ab var. *typica* in foliis valde latioribus differt.

Holotypus: BORNEO: Sarawak; Stepok Forest Reserve, nr. Kuching, peat-swamp forest, Apr 1967, *Stone, Anderson, & Chai 6773* (KLU!).

Exsiccatae: BORNEO: Sarawak; Near Kuching, Nov. 1892, *Haviland 1970* (K!); Quop, Apr 1907, *Hewitt* (K! SAR). Kuching, Mar 1893, *Haviland 3131* (SAR!).

These plants cannot be specifically segregated from Blume's *F. javanica*, yet they differ from most of the Javan, Malayan, and Sumatran collections I have seen in their broader leaves. However it is somewhat doubtful that this feature is maintained throughout Sarawak; certainly the Meijer specimen from East Borneo appears to be the typical variety.

- (19) **Freycinetia robinsonii** Merrill, Philipp. J. Sci. Bot. 3: 311, 1908.

Type from Luzon, P.I. (Forestry Bureau 3037, *Borden*).

Represented in Borneo only by the following variety.

var. **meijeri** B. C. Stone, *var. nov.*

Liana scandens, caulis ad 7 mm diametro. *Folia* anguste lanceolata attenuata 27–41 cm longa 9–13 mm lata, tenuiter coriacea, basi amplexantia, marginibus, basem apicemque, minute et subsparsely denticulata, tenuiter coriacea, dentibus ad 0.4 mm longis, 1–2 mm separatis; auriculis 28–45 mm longis, basem versus 5–6 mm latis, chartaceis, brunneis, attenuatis, integerrimis, lateraliter fragmentatis. *Inflorescentia* foeminea terminalis, ternatis, pedicellis 23–28 mm longis, 2–2.3 mm crassis, distaliter ad angulas hispidulo-scabridis; cephalis cylindratis 25–40 mm longis, 7–9 mm crassis (immaturis), baccis numerosis, pileo sulcato pyramidato areola stigmatica 1 mm lato, stigmatibus 2–3, plerumque 2. *Inflorescentia* mascula simillima sed parviora ternata, pedicellis c. 24 mm longis, 1–1.5 mm crassis, laevibus, spicibus c. 15 × 3 mm staminibus numerosis filamentis c. 1 mm longis, antheris subgloboso-oblongis, 0.2 mm longis; bracteis lanceolatis.

Holotype: BORNEO: Sabah; Penampang District, Sangai-sangai, Babagon Rd., c. 4,000 ft. alt., primary forest, near riverside, fruit green, 17 March 1965, J. K. Laiangah SAN 44362 (L!). Isotype SAN!

This species is very close to *F. vidalii* Hemsl. of the Philippines, differing in the shorter and slightly wider leaves; and also superficially resembles *F. apayaoensis* Merr., another Philippine species, which however has stiffer, more evidently denticulate, lineate, ensiform leaves. But *F. robinsonii* is closest to *F. multiflora* Merr.

BORNEO: Sabah; Tamu Darat, 7 miles on Kota Belud — Ranau Rd., 200 ft., by river in shade, flowers deep salmon with yellow anthers, Jan. 1954, S. Darnton 77 (BM! L! Staminate paratype). — Diwata River 10 mi. WSW of Lahad Datu, "porumpung" (Dusun Kinabatangan dialect), Feb. 1954, Rapag SAN A-1816 (SAN). Sandakan District, Sungei Meliau near Kiabau, 50 ft. alt., inflor. orange-red, May 1965, Meijer SAN 49834 (SAN).

This new variety is dedicated to Willy Meijer, formerly Forest Botanist at Sandakan, who provided much help in the field on the author's excursions in 1967.

(20) *Freycinetia creaghii* Hemsley, Kew Bulletin 1896: 167. Merrill (1921) 34.

Liana scandens, caulis ad 12 mm diametro. *Folia* erecto-patentia tenue coriacea basi amplexentia vaginata, ad 45 cm longa et 3 cm lata, late linearia sed basim versus paullulo angustata apicem versus subabrupte acutata non acuminata, marginibus inermibus (in base apiceque per brevem spatiam excepta dein perminute persparse denticulatis); auriculis ad 4 cm longis et 4 mm (vel ultra?) latis, ut videtur fragmentatis. *Inflorescentia* foeminea terminalis breve-pedunculata cephalis ternis subellipsoideis 2.5 cm longis et 1.5 cm latis, pedicellis 16 mm longis et 2 mm crassis, minute spinuloso-scabridis. *Baccae* immaturae 6 mm longae, pileo anguste obconico 2.5 mm alto in sicco leviter costulato. *Areola* stigmatica 0.5–0.8 mm lata stigmatibus 3–5 vulgo 3 bene distincta.

Type: BORNEO: Sabah: Madai, Governor Creagh (K!) staminate.

BORNEO: Sarawak; Kuching District, 300 ft., Semengoh Forest Reserve, lowland primary dipterocarp forest, May 1961, Ghazalli S. 13676 (SAR!).

The type is a staminate specimen, which may account for the fact that no other collections have ever been identified as this species. The above collection permits fuller description and shows the characters of the pistillate form.

- (21) **Freycinetia winkleriana** Martelli, *Webbia* 2: 168, 1919. Winkler, *Engl. Bot. Jahrb.* 48: 87. 1912. Merrill (1912) 34. *Engl. Bot. Jahrb.* 48: 87. 1912. Merrill (1921) 34. Type from Indonesian Borneo (*Winkler 3313*).

Stems to 5 mm diameter; *leaves* slender, linear, rather stiffly erect, up to 70 cm long, 10–11 mm wide, apex long attenuate-subulate and subflagellate, triquete, leaf-base marginal teeth (just above auricles) c. 0.5 mm long; median margins unarmed; apex denticulate, teeth 1–2 mm apart; midrib distally dorsally spinulose. Auricles slender, up to 45×3 mm, entire, slightly rounded to subtruncate at apex, often brownish-purplish. *Inflorescence* terminal, cephalia usually 3 but occasionally 4, on pedicels about 20×2 mm, closely and finely hispidulous at distal ends; immature pistillate cephalia cylindric, about 20×4.5 mm. Berries usually with 2, sometimes with 3, rarely with 4 stigmas.

BORNEO: Sarawak; Bintulu District, Bukit Urang, common climber, spathes purple, Apr 1960, *Brunig S. 12033* (K! SAR!). Kuching, 1911, *Salub* (SING-026532!). Kuching, "native collector," 475 (PNH!). KALIMANTAN; near Mempawa, peat forest behind Kampong Sungei Koenjit, Oct. 1940, *Polak 704* (L!).

SUMATRA: Indragiri uplands, Berapit, primary forest, Apr 1939, *Buwalda 6354* (L!).

The above specimen first extends the range to Sumatra.

- (22) **Freycinetia gitingiana** Martelli, ex Elmer, *Leaf. Philipp. Bot.* 3: 1112, 1911.

BORNEO: Sabah; Mt. Kinabalu, Kokolitan, 2,500 ft., Mai 1933, *C. E. Carr SFN. 27342* (SING!).

This plant seems probably to be of Philippine affinity, and in particular resembles *F. gitingiana* Martelli. Because of this, and in view of the imperfect state of our knowledge of the Philippine Freycinetiae, I equate it with that species tentatively. The field notes indicate that it is a species with "golden yellow fruits" which seems to be a rather rare color.

- (23) **Freycinetia kalimantanica** B. C. Stone, *sp. nov.* Figure 6.

Liana scandens, caulis ad 1 cm crassus; *foliis* c. 50–60 cm longis, c. 18 mm latis, attenuatis, paene inermis, marginibus base perpaucae minuteque denticulatis (dentibus 2–3), apice extremam minute denticulato; nervis c. 40–44; auriculis subpersistentibus, usque ad 12 cm longis, attenuatis, inermibus, brunneis subnitentibus, sectilis vel fissis in segmentibus, ultime caducis, base 12–13 mm latis. *Inflorescentia* terminalis ternatis, cephalis oblonge-cylindraceis, pedicellis 12–15 mm longis, 5 mm crassis, dense minuteque aureo-brunneo-hispido-scabridis; cephalis 3.5–4 cm longis, 1.5–1.8 cm crassis; braccis plurimis immaturis 4.5 mm longis, pileo plano 0.5 mm alto, stigmatibus plerumque 5–8. Cetera ignota.

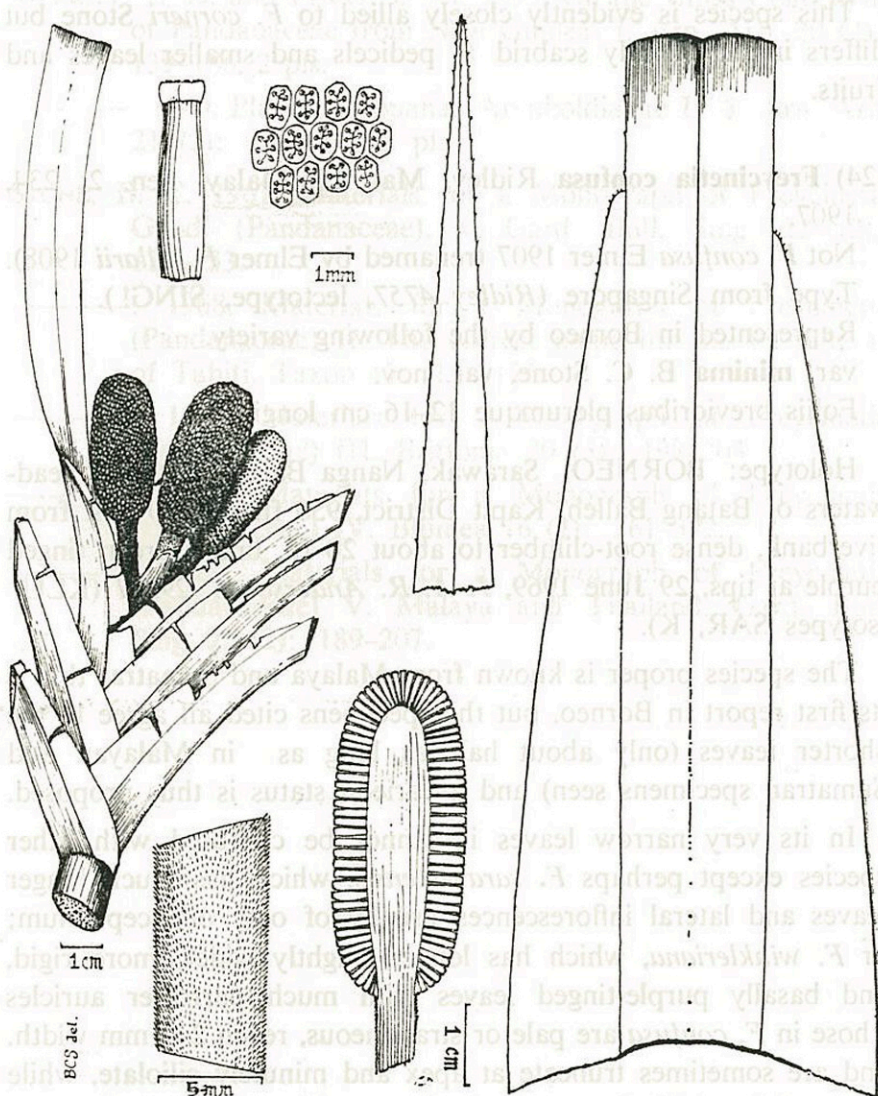


Fig. 6. *Freycinetia kalimatanica* B. C. Stone, Holotype, Endert 4184.

Holotype: BORNEO: W. Koetai no 38, 1,500 m alt., 15 Oct. 1925, *F. H. Endert 4184* (BO!).

Very distinct among the Borneo species by the broad, rather shining brown auricles, which fragment into segments by lateral splits, and are evidently entire. The leaves are virtually unarmed.

The name is based on the Indonesian name for Borneo, Kalimantan.

This species is evidently closely allied to *F. corneri* Stone but differs in the densely scabrid ♀ pedicels and smaller leaves and fruits.

(24) ***Freycinetia confusa*** Ridley, Mat. Fl. Malay. Pen. 2: 234, 1907.

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

Type from Singapore (*Ridley 4757*, lectotype, SING!).

Represented in Borneo by the following variety.

var. ***minima*** B. C. Stone, var. nov.

Foliis brevioribus plerumque 12–16 cm longis.

Holotype: BORNEO: Sarawak; Nanga Balang, extreme headwaters of Batang Balleh, Kapit District, 950 ft. alt., 20 yds. from riverbank, dense root-climber to about 20 ft., bracts green tinged purple at tips, 29 June 1969, *J. A. R. Anderson S. 29301* (KLU! isotypes SAR, K).

The species proper is known from Malaya and Sumatra; this is its first report in Borneo, but the specimens cited all agree in the shorter leaves (only about half as long as in Malayan and Sumatran specimens seen) and a varietal status is thus proposed.

In its very narrow leaves it cannot be confused with other species except perhaps *F. sarawakensis*, which has much longer leaves and lateral inflorescences usually of only one cephalium; or *F. winkleriana*, which has longer, slightly wider, more rigid, and basally purple-tinged leaves with much narrower auricles (those in *F. confusa* are pale or stramineous, reach 2–3 mm width, and are sometimes truncate at apex and minutely ciliolate, while those of *F. winkleriana* are only 1 mm wide at apex, entire, and often purplish). Another similar plant is *F. imbricata* var. *kuchinensis*, but it has somewhat wider, more lanceolate leaves, with the margins sometimes recurved.

An additional specimen:

BORNEO: Sarawak; ridge between Sungei Balang and Sg. Balleh in extreme headwaters of Balleh, Kapit District, 1,200 ft. alt., sandstone-derived soils, small root-climber, 30 June 1969, *Anderson & Ilias Paie S. 28334* (KLU, L, SAR).

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