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# The genus *Freycinetia* Gaudich. (Pandanaceae) in the Solomon Islands

KIM-LANG HUYNH

## RÉSUMÉ

HUYNH, K.-L. (1997). Le genre *Freycinetia* Gaudich. (Pandanaceae) aux îles Salomon. *Candollea* 52: 359-382. En anglais, résumés français et anglais.

Huit espèces nouvelles de *Freycinetia* des îles Salomon sont décrites (*F. brevipedunculata*, *F. coagmentata*, *F. insulana*, *F. lepida*, *F. longifolia*, *F. plana*, *F. pseudohombronii*, *F. tenella*, cette dernière observée aussi en Nouvelle-Bretagne et en Nouvelle-Irlande). Pour la description, des caractères anatomiques récemment trouvés de la baie et de la graine, ainsi que des caractères anatomiques nouveaux des auricules de la feuille, sont utilisés conjointement avec des caractères macromorphologiques déjà utilisés. Une clé des espèces de *Freycinetia* des îles Salomon est proposée.

## ABSTRACT

HUYNH, K.-L. (1997). The genus *Freycinetia* Gaudich. (Pandanaceae) in the Solomon Islands. *Candollea* 52: 359-382. In English, French and English abstracts.

Eight new species of *Freycinetia* from the Solomon Islands are described (*F. brevipedunculata*, *F. coagmentata*, *F. insulana*, *F. lepida*, *F. longifolia*, *F. plana*, *F. pseudohombronii*, *F. tenella*, this latter being also observed in New Britain and New Ireland). In the description, recently found characters from the berry and seed anatomy, and new characters from the anatomy of leaf auricles, are applied in conjunction with those from gross morphology which have been used. A key to the Solomon species of *Freycinetia* is tentatively proposed.

**KEY-WORDS:** Anatomy – *Freycinetia* – *PANDANACEAE* – Solomon Islands – Taxonomy.

## Introduction

The genus *Freycinetia* Gaudich. in the Solomon Islands was first studied by HEMSLEY (1896) who described *F. humilis* and *F. marantifolia* from Fauro Island. In the early thirties, a large number of other Solomon specimens was collected by L. J. Brass. They were studied by MERRILL & PERRY (1939) who described nine other species (*F. anomala*, *F. decipiens*, *F. oligodonta*, etc.). STONE (1963) while revising the genus in the islands, described two others (*F. bicolor* and *F. solomonensis*). A very large number of other specimens was further collected by the Royal Society in 1965, and especially by the Forestry Division Honiara (BSIP!). Several of them were investigated by STONE (1970) who described four other species (*F. regina*, *F. insolita*, *F. simulatrix*, and *F. whitmorei*). This was Stone's second and last revision of *Freycinetia* in the islands.

A new revision of *Freycinetia* in the Solomon Islands appears necessary. Actually, a large number of collections has not been investigated. In addition, some specific characters recently found from the berry and seed anatomy (HUYNH, 1995a, 1995b, 1996) have proved useful in the taxonomy of this genus in making it possible to distinguish some Solomon species which have been confused (HUYNH, 1995b: 33; 1996: 531). This indicates that they should be applied in the study of these plants in conjunction with the characters from gross morphology which have been used. In particular, the following characters (see HUYNH, 1996: 530-532): (1) the presence of a central sclerenchyma in the upper part of berries that overtops ovary (HUYNH, 1995a: Fig. 2 and 21), or the absence of this tissue (for example, *F. brevipedunculata* vs *F. tenella*); (2) the presence of very characteristic fusiform/elliptic fibre bundles at successive levels along berry (HUYNH, 1995a: 235 and Fig. 2-6), or the absence of these fibre bundles (for example, *F. coagmentata* vs *F. tenella*); (3) the presence/absence of fibre strands which extend in a single stretch along berry (in the Solomon Islands, these fibre strands are observed in *F. simulatrix* and *F. tessellata* only); (4) the presence/absence of crystal cells in seeds (for example, *F. pseudohombronii* vs *F. tenella*: Fig. 11 and 4) (whenever these cells are present, they are only observed in the raphe, each with one prismatic crystal); (5) the approximate ratio between the raphe and the remainder of seeds at midlevel (for example, *F. pseudohombronii* vs *F. hombronii*: Fig. 11 and 12); (6) the cell composition of raphe (for example, *F. pseudohombronii* vs *F. hombronii*: Fig. 11 and 12); (7) the presence/absence of a "strophiole" in seeds (for example, *F. tenella* vs *F. pseudohombronii*: Fig. 4 and 11), which was also used in the past. Although the seeds of *Freycinetia* do not have strophioles in the current acceptance of this term (HUYNH, 1996: 532), the term "strophiole" was currently used from the time the genus was known to describe seeds (as being with "strophiole distincto", "strophiole nullo", etc.); therefore, for practical reasons it is also used in the present revision. The first four characters are the most important, because firstly their observation does not depend on the stages of fruit development (they can be observed using either mature or young berries), secondly their invariability within one and the same species has been established in a very large number of species, and thirdly they can be quickly observed by using hand-made sections of berries or squashes of seeds. For the fusiform/elliptic fibre bundles, in those species where they exist they are formed in the pilei of the berries at a young stage and in the ovary walls at a later stage: the fibre bundles in the ovary walls can be observed with a stereo-microscope with  $\times 6-50$  magnification currently used in the identification of plants, but those in the pilei with the light microscope only.

Leaf auricles of *Freycinetia* varied widely in size, shape (they were entire, minutely denticulate, fimbriate, etc.), and development (they were found  $\pm$  intact or lacking on adult leaves collected, or splitted lengthwise into separate fibres, or broken transversely into fragments). Consequently, they have been currently used in diagnosing species. Their anatomy, investigated for the first time in the present study, also varies widely, therefore it will be also applied below in the description of new species. They generally comprise an adaxial and an abaxial epidermis, an adaxial and an abaxial hypodermis, and a mesophyll. As far as known, their anatomy observed in transverse sections at midlevel varies as follows: the epidermal cells are all unlignified, or a small percentage of them in the abaxial epidermis, or in both epidermises, is lignified (for suitable observation of this feature, no transverse sections but large fragments of auricles should be used: the lignified epidermal cells are readily distinct with their walls much thicker than those of the other epidermal cells); the abaxial hypodermis is lignified while the adaxial hypodermis unlignified, or both are lignified or unlignified, and the number of cell layers in the lignified hypodermises varies (1-3 layers); the mesophyll has separate fibre-strands between vascular bundles, or not. Furthermore, in some species (for example *F. stenophylla*) where the abaxial hypodermis is lignified while the adaxial hypodermis unlignified, several cells in the abaxial hypodermis are strongly lignified at the abaxial side but unlignified at the adaxial side. Although the anatomy of auricles has been only studied in a small number of species, it now appears certain that, at least for the auricles described as splitting lengthwise into separate fibres (see above, in this paragraph) both hypodermises are unlignified and the mesophyll has separate fibre strands.

With regard to the sectional positions, most of the Solomon species belong to sect. *Pleio stigma* Warb., the others to sect. *Oligostigma* Warb. These sections can be distinguished by their

berries, which have 1-3 (generally 2) stigmas in the former but 3-10 stigmas or more in the latter (WARBURG, 1900). WARBURG's classification (1900) with only these two sections is simple to use and practical for identifying plants. Another classification was elaborated by STONE (1968, 1969, 1971, 1979) with not less than 21 sections, while HUYNH (1995a, 1995b) described 4 other sections. It accounts better for the "natural" relationships of species. However, its elaboration was not completed.

The main purpose of the present paper is to describe some unknown species which have been identified. In order to facilitate their recognition in the Solomon Islands, a key to the Solomon species will be tentatively proposed, and the essential specific characters of the other, formerly known, species will be given.

### Material and methods

Herbarium material was used after rehydration in 65°C water. Preparations with transverse and longitudinal sections of berries made by hand under the stereo-microscope then mounted in Aquatex were used: the former sections to observe the presence/absence of a central sclerenchyma, the latter sections the presence/absence of fusiform/elliptic fibre bundles, their shapes and sizes, especially in pilei where these bundles are very small therefore observable only with the light microscope. Other berries were embedded in paraffin, microtome-sectioned, stained in Safranin-Astrablue, and mounted in Eukitt, a synthetic resin: these preparations were used to observe the presence/absence of lignification in some tissues (epidermises, hypodermises, parenchymas, etc.) and to corroborate the observations with hand-made sections.

For the study of seeds, preparations were obtained using entire seeds or seed sections. Entire seeds were mounted in Aquatex and used to observe the seed shape. Other entire seeds were squashed in ethanol on a slide then observed to ascertain the presence/absence of crystal cells which is an important specific character (HUYNH, 1996), after which they were also mounted in Aquatex. Seed sections were made by hand, stained in Safranin-Astrablue, and mounted in Aquatex; only those from the middle part of seeds and perpendicular to the seed axis were used. The anatomy of leaf auricles was also studied with hand-made sections mounted in Aquatex.

### Observations

#### *Tentative key to the Solomon species of Freycinetia*

1. Stigmas 1-3 (sect. *Oligostigma*) . . . . . 2
- 1a. Stigmas 3-10 or more (sect. *Pleiostigma*) . . . . . 5
2. Berries succulent, without a central sclerenchyma; leaves 8-15 × 0.2-1 cm . . **1. *F. tenella***
- 2a. Berries lignous, with a central sclerenchyma; leaves 35-120 × 2.5-7 cm . . . . . 3
3. Berries never filiform, never with fibre strands extending in a single stretch along berry; pileus with prominent corneous nitid buttresses alternating with shallow non-corneous unnitid vallecules . . . . . **2. *F. whitmorei***
- 3a. Berries filiform, with fibre strands extending in a single stretch along berry; pileus not so 4
4. Leaves 35 × 2.5 cm; syncarps cylindric; infructescence peduncle 3 cm long  
**3. *F. simulatrix***
- 4a. Leaves 80-120 × 5-7 cm; syncarps clavato-cylindric; infructescence peduncle 12 cm long  
**4. *F. tessellata***



5. Inflorescence lateral on short shoots bearing basal prophylls and floral bracts but no foliage leaves ..... **5. *F. funicularis***
- 5a. Inflorescence terminal, i.e. terminating a shoot that bears ordinarily foliage leaves merging upward with floral bracts ..... 6
6. Leaves widely obtuse at apex, cuspidate-caudate ..... 7
- 6a. Leaves not so ..... 10
7. Leaves long-pseudopetiolate ("petiole" 8-12 × 1.5-1.8 cm) ..... **6. *F. petiolacea***
- 7a. Leaves not pseudopetiolate, or 1-2 cm pseudopetiolate (*F. marantifolia*) ..... 8
8. Leaves 60 cm long, caudate along 3.5 cm ..... **7. *F. regina***
- 8a. Leaves 13-20 cm long, cuspidate along 4-9 mm ..... 9
9. Stem internodes pustular-scabridulous; berries with a central sclerenchyma **8. *F. decipiens***
- 9a. Stem internodes smooth; berries without a central sclerenchyma. .... **9. *F. marantifolia***
10. Leaf auricles deeply pectinate in the upper part ..... **10. *F. pectinata***
- 10a. Leaf auricles entire or minutely denticulate ..... 11
11. Leaves long-elliptic, abruptly narrowed at base ..... **11. *F. divaricata***
- 11a. Leaves not so ..... 12
12. Stigmas convex, cushion-shaped; syncarps 5 ..... **12. *F. anomala***
- 12a. Stigmas ± flat, not cushion-shaped; syncarps 3, rarely 2 or 4 ..... 13
13. Stigmas mostly 4-6 ..... 14
- 13a. Stigmas mostly 6-12(-15) ..... 22
14. Syncarp peduncles smooth ..... 15
- 14a. Syncarp peduncles scabrid to hispidulous ..... 17
15. Leaves 90 cm long; syncarps clavato-cylindric ..... **13. *F. insolita***
- 15a. Leaves 12-35 cm long; syncarps ellipsoid ..... 16
16. Stem internodes pustular-scabridulous; leaves lanceolate, to 16 × 0.9 cm  
..... **14. *F. brevipedunculata***
- 16a. Stem internodes smooth; leaves ensiform, to 35 × 1.6 cm ..... **15. *F. oligodonta***
17. Leaves abruptly attenuate in the upper part ..... **16. *F. membranacea***
- 17a. Leaves gradually attenuate in the upper part ..... 18
18. Pileus corneous, nitid, unsulcate between angles ..... **17. *F. stonei***
- 18a. Pileus non-corneous, unnitid, sulcate between angles ..... 19
19. Leaves 2.5-3 cm wide; seeds without crystal cells ..... **18. *F. humilis***
- 19a. Leaves not wider than 1.5 cm; seeds with crystal cells ..... 20
20. Leaves 1.5 cm wide; berries abruptly attenuate in middle; seeds with a "strophiole"  
..... **19. *F. nesiotica***
- 20a. Leaves not wider than 1 cm; berries not abruptly attenuate in middle; seeds without a "strophiole" ..... 21
21. Leaves to 60 cm long; leaf auricles breaking transversely into fragments, abaxial hypodermis lignified; syncarps 2.3 × 1.4 cm when mature ..... **20. *F. pseudohombronii***

- 21a. Leaves to 30 cm long; leaf auricles splitting lengthwise into fibres, abaxial hypodermis unlig-nified; syncarps 5 × 2.3 cm when mature ..... **21. *F. insulana***
22. Leaves to 210 cm long ..... **22. *F. longifolia***
- 22a. Leaves at most 100 cm long ..... 23
23. Berries with fusiform/elliptic fibre bundles ..... 24
- 23a. Berries without fusiform/elliptic fibre bundles ..... 27
24. Pileus unsulcate between angles; fusiform/elliptic fibre bundles in ovary walls to 6-7 mm long ..... **23. *F. plana***
- 24a. Pileus sulcate between angles; fusiform/elliptic fibre bundles in ovary walls at most 2 mm long ..... 25
25. Pileus entirely corneous, entirely nitid; syncarps short ellipsoid; syncarp peduncles 2.5 cm long; infructescence peduncle 2 cm long; leaves 40-50 × 1.3-1.5 cm ..... **24. *F. lepida***
- 25a. Pileus non-corneous, dark brown, unnitid; syncarps cylindric; syncarp peduncles 4-5 cm long; infructescence peduncle 5-7 cm long; leaves 65-90 × 2-5 cm ..... 26
26. Leaves 80-90 × 2 cm, gradually attenuate in the upper part; stigmas mostly 6-8; syncarp peduncles 4-5 cm long; infructescence peduncle 5 cm long ..... **25. *F. solomonensis***
- 26a. Leaves 65-80 × 4-5 cm, abruptly attenuate in the upper part; stigmas mostly 8-15; syncarp peduncles 4 cm long; infructescence peduncle 7 cm long ..... **26. *F. coagmentata***
27. Syncarps about 11 cm long when mature; stigmas mostly 6-8; leaf auricles deciduous ..... **27. *F. bicolor***
- 27a. Syncarps about 21 cm long when mature; stigmas mostly 8-12; leaf auricles persistent ..... **28. *F. percostata***

**1. *Freycinetia tenella* Huynh, spec. nova (sect. *Oligostigma*)**

*Internodia ramorum laevia, 3-9 mm longa, 3-4 mm crassa. Folia infra infructescentiam 8-15 cm longa 2-3 mm lata prope basim (auriculis exclusis), latissima in quarta infera ibi 6-8 (-10) mm lata, anguste elliptico-lanceolata, e circa quarta infera ad apicem sensim attenuata, breviter acuminata, dissita, in basi vix semiamplexicaulia, in sicco membranacea flexuosaque; lamina dense longitudinaliter striata inter obscuras vel vix visibiles venas in pagina adaxiali, prominule nervata sed non longitudinaliter striata in abaxiali; marginibus minute denticulatis in parte supera, inermibus in infera; costa media non vel vix distincta in pagina adaxiali, prominula in abaxiali, minute denticulata in 3/4 superis; auriculis ensiformibus circa 3 cm longis 3 mm latis, scariosis, longitudinaliter nervatis, cito in fibras solutis, mesophyllo separatis filis fibrarum inter fasciculos vasorum praedito, cellulis epidermicis hypodermicisque omnibus non lignescentibus. Infructescentia terminalis, 3 spicis (interdum 4) praedita; pedunculo communi circa 7 mm longo; pedunculis 1.5 cm longis, 1.5 mm latis, laevibus; syncarpiis late ellipsoideis, immaturis 2.1 cm longis 1.1 cm latis (maturis 3.7 cm longis 2.2 cm latis), baccis modice numerosis. Baccae maturae circa 7 mm longae 3-4 mm latae, succulentes; stigmatibus unicis, interdum 2, raro 3-4; areola stigmatica prominula, plana vel subplana, leviter cincta; sclerenchymate centrali et fasciculis fibrarum fusiformis/ellipticis absentibus. Semina recta interdum subrecta, ± lunata, circa 1.2 mm longa 0.5 mm lata in medio; raphe in medio 1/4-1/3 tenuiore quam reliquis seminis, cellulis raphidiphoris e micropyle ad chalazam numerosissimis sed cellulis crassitalliferis absentibus, cellulis circum fasciculum vasorum tantum lignosis; cellulis internis integumento externi a raphe remotis valde auctis ("strophiole distincto"); crassificationibus lignosis in integumento externo a raphe remotis leviter visibilibus in parietibus interno-tangentialibus, fortis in radialibus (Fig. 1-4).*

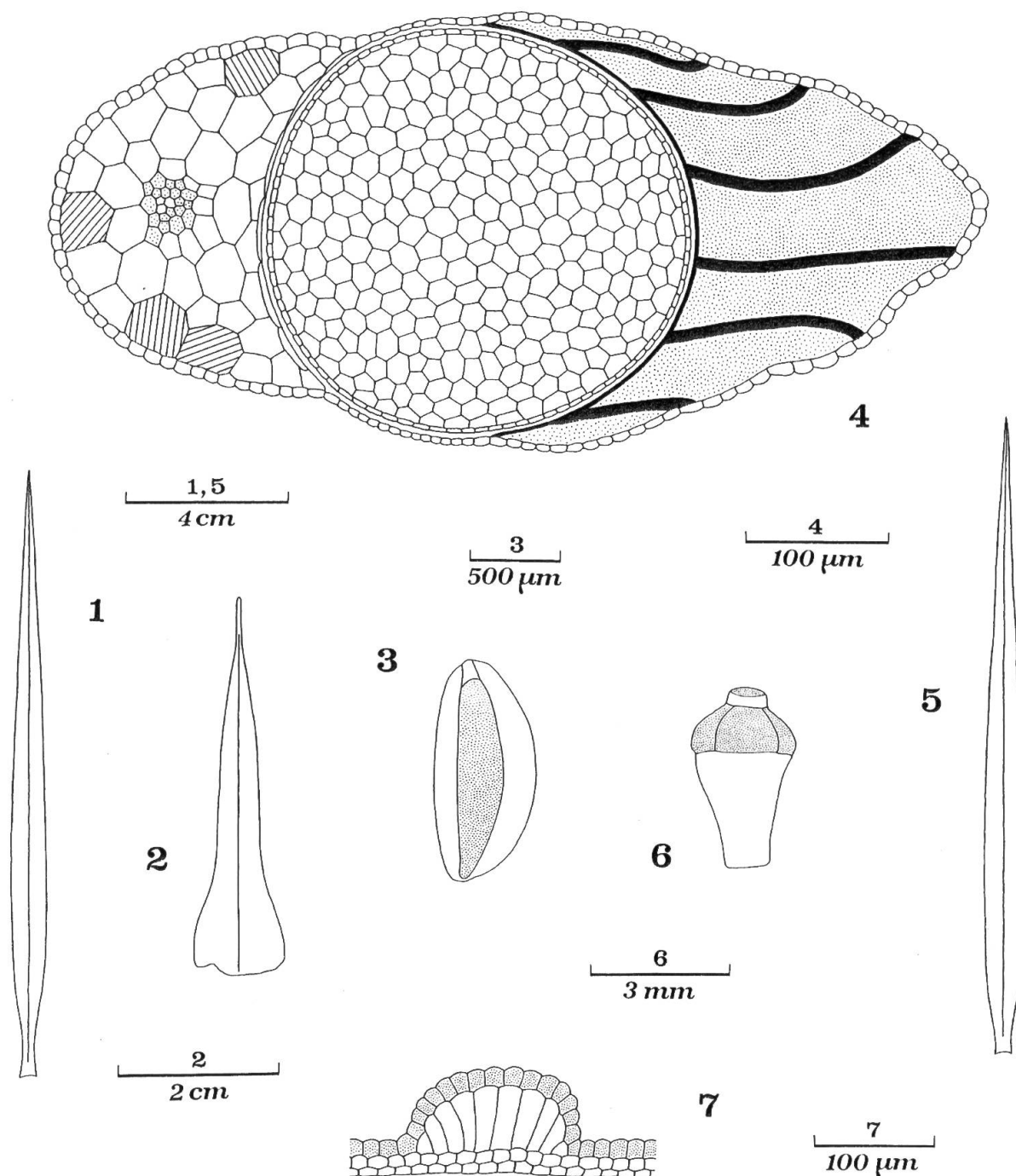


Fig. 1-7. – *Freycinetia tenella* Huynh (1: Beer's collectors BSIP 5148; 2: Whitmore BSIP 2128; 3, 4: Sands 1898) and *F. brevipedunculata* Huynh (5-7: Nakisi BSIP 8088):

**1, 5:** Leaves viewed by adaxial face (prickles and auricles not represented). **2:** Bract viewed by adaxial face (prickles not represented). **3:** Seed in optical section passing by symmetry plane (from left to right: raphe, endosperm dotted, integuments; micropyle above, chalaza below). **4:** Seed in middle transverse section, showing raphe on left and integuments on right (vascular bundle in raphe represented by smallest cells; raphide cells hatched; lignified cells dotted; the inner cell layer of outer integument developed into a "strophiole" with largest cells). **6:** Berry in lateral view (pileus dotted). **7:** Outer part of radial section of stem passing by a pustule (in centre), showing epidermal cells (dotted) and hypodermal cells only, the latter cells in 2-3 layers.

**Type:** *Beer's collectors BSIP 5148* (holo L!); Santa Ysabel, Kolokofa River, flat plain 300' above sea level, swampy forest, 4 April 1966; climber, reaching 15 ft above ground; Kwara'ae name "Ariari".

**Other material:** *Whitmore BSIP 2310* (L!); Santa Ysabel, Maringe Lagoon, near Tiratona village, dense forest, canopy circa 80', 22 October 1963; branching climber covering dense mass at 20', fruit green; Kwara'ae name "Ari ari". *Hunt RSS 2489* (L!); Kolombangara, dense wet river valley, with many shrubby trees, alt. 2500 ft, 2 September 1965; climber, very branched, fruit green. *Whitmore BSIP 2127* (L!) and *Whitmore BSIP 2128* (L!) (this latter is a staminate plant but no staminate material seen); Kolombangara, West coast, inland from Iri iri village (Merusu Cove), wet gully forest, alt. 2500', 28 September 1963; common on boles to crown bases, fruits ripening red; Kwara'ae name "Ariari". *Isles & al. NGF 31485* (A!, BRI!, L!); New Britain, 2 miles West of Fulleborn Harbour, rain forest, 6°07'S 150°39'E, alt. 70 m, 4 May 1973; scrambler, 1 m high, leaves dark green glossy above, lighter green below, fruit red when ripe. *Stevens & al. LAE 58341* (BRI!), New Britain, 8 km west of Fulleborn Harbour, lower montane rain forest on slope, 6°10'S 150°40'E, alt. 390 m, 8 May 1973; climbing up trunks, fertile branches horizontal, leaves mid dull green above paler below, fruit turning reddish, 1-4 infructescences together. *Sands 2149* (with *Pattison & Wood*) (A!, BRI!, K!); New Ireland, Hans Meyer Range, low land rain forest, 4°26'S 152°59'E, alt. 675 m, 8 October 1975; epiphytic in shade, climbing to c. 6 m. *Sands 1898* (with *Pattison, Wood & Croft*) (A!, K!); New Ireland, Hans Meyer Range, Mandih River, 4°26'S 152°59'E, alt. 575 m, 7 October 1975; epiphytic climber to several metres, stems olive-green, younger stems yellowish-green, leaves deep mid-green above pale green beneath, fruiting heads dull green ripening dull apricot.

The seeds were studied in *Sands 1898*, *Beer's collectors BSIP 5148*, and *Isles & al. NGF 31485*. In the first specimen, where the syncarps are mature, 3.7 cm long 2.2 cm wide, they have a distinct "strophiole" (Fig. 3 and 4). In the second, they are immature but a "strophiole" is also observed. In the third specimen, they are young and no "strophiole" is visible. In none of the three specimens does the raphe have crystal cells. Two bracts were observed in *Whitmore BSIP 2128*, one about 4.5 × 1.2 cm (Fig. 2), the other 4 × 1.2 cm. Both are narrowly deltoid, translucent in the basal part, sharp-angled in the apical part, the margins minutely or obscurely denticulate along the upper three quarters, the midnerve similarly armed along the upper third.

*F. tenella* is named with reference to its thin and delicate leaves. It may be placed in the affinity of *F. inermis*. This New Guinean species, which has unarmed leaves, was recognized by STONE (1970) in some collections mentioned above (*Hunt RSS 2489*, *Whitmore BSIP 2127*, *Whitmore BSIP 2128*, and *Whitmore BSIP 2310*). However, in these and the other collections of *F. tenella* studied in the present paper, the leaves are invariably armed on both the margins and the midnerve. Other differences were observed. In *F. inermis*, the berries have 2 stigmas, the syncarp peduncles are 3.1 mm long, the leaves obtuse and 8-9 cm long 5-10 mm wide (RIDLEY, 1916). In *F. tenella*, the berries generally have 1 stigma, the syncarp peduncles are 15 mm long, the leaves 8-15 cm or more long 6-8 (-10) mm wide, the leaf apex always sharp-angled (Fig. 1), never blunt or obtuse; those leaves which are as long as those of *F. inermis* (viz. 8-9 cm) are at most 3-4 mm wide, never up to 10 mm. From another point of view, *F. tenella* can be readily recognized in the Solomon Islands with its berries which generally have 1 sometimes 2 stigmas. In these islands, *F. simulatrix*, *F. tessellata* and *F. whitmorei* also have berries with 2 stigmas, but they differ from *F. tenella* in other features: for example, their berries have a central sclerenchyma while those of *F. tenella* do not.

## 2. *Freycinetia whitmorei* B. C. Stone (sect. *Oligostigma*) in Kew Bull. 24: 360. 1970.

**Type:** *Whitmore BSIP 2016* (K! holo), New Georgia group, Roviana Lagoon.

Leaves 50 × 2.5 cm, abruptly attenuate in the upper part, acuminate along 1.5 cm, slightly narrowed towards base, membranaceous; syncarps 5-7 (a rare feature in the Solomon Islands), cylindric, 7 × 1.5 cm (± mature), peduncles 4.5 cm long, smooth, spirally congested (i.e. with

bases at different levels on the infructescence peduncle); infructescence peduncle 4-5 cm long; stigmas 2-3 (-4); berries with a central sclerenchyma, but without fusiform/elliptic fibre bundles; seeds devoid of both crystal cells and "strophiole". Pileus formed of prominent corneous nitid buttresses alternating with shallow non-corneous unnitid vallecules; hypodermal layers very variably lignified (they are unlignified at vallecules, but lignified at buttresses; when the buttresses are more prominent, the lignified layers are more numerous, the lignified cells radially longer, and the walls of these latter thicker: Fig. 24). Such a pileus has not been observed in any other known Solomon species, and can therefore facilitate the recognition of this species. Pistillode observed in radial sections of staminate spike very small, about 80-100 µm high 150-200 µm wide (Fig. 25).

*Material studied:* Whitmore BSIP 2016 (L! isotype), New Georgia group, Roviana Lagoon; Cowmedow's collectors BSIP 3214 (L!), New Georgia group, Hovoro; Whitmore BSIP 4141 (L!♂), Fauro.

**3. *Freycinetia simulatrix*** B. C. Stone (sect. *Oligostigma*) in Kew Bull. 24: 362. 1970.

**Type:** Hill RSS 9001 (K! holo), Guadalcanal.

Leaves to 35 × 2.5 cm, acute, slightly acuminate, abruptly attenuate in the upper part, gradually narrowed to base where they are about 1.8 cm wide, coriaceous; syncarps cylindric, 5 × 2.5 cm (immature), peduncles 3 cm long, smooth; infructescence peduncle 3 cm long; stigmas generally two and opposite; berries with a thick central sclerenchyma and fibre strands extending in a single stretch along berry, but without fusiform/elliptic fibre bundles. To date no mature fruits appeared to have been collected.

*Material studied:* Hill RSS 9001 (L! isotype), Guadalcanal.

**4. *Freycinetia tessellata*** Merr. & L. M. Perry (sect. *Oligostigma*) in J. Arnold Arbor. 20: 149. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 7. 1963, Kew Bull. 24: 362. 1970.

**Type:** Brass 3384 (A! holo), Santa Ysabel.

Leaves 80-120 × 5-7 cm, acute, abruptly attenuate in the upper part, very slightly narrowed near base, subcoriaceous, tessellately nerved; syncarps clavato-cylindric, 10 × 3 cm (immature), peduncles 3.5 cm long; infructescence peduncle to 12 cm long; stigmas generally two and opposite; berries with a thick central sclerenchyma and fibre strands extending in a single stretch along berry, but without fusiform/elliptic fibre bundles. To date no mature fruits appeared to have been collected.

*Material studied:* Brass 3122 (BISH!, BRI!), San Cristobal; Brass 3176 (BISH!, BRI!) and Stone 2481 (BISH!), Santa Ysabel; Nakisi & Babala BSIP 8219 (L!), Guadalcanal; Whitmore BSIP 1739 (L!), Santa Cruz group, Vanikoro. This latter specimen represents a form of *F. tessellata*, its syncarp peduncles being smooth, not scabrid.

**5. *Freycinetia funicularis*** (Savigny) Merr. (sect. *Pleio stigma*), Interpr. Herb. Amboin.: 83. 1917; Merr. & L. M. Perry in J. Arnold Arbor. 20: 155. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 359. 1970.

≡ *Pandanus funicularis* Savigny in Lam., Encycl. 4: 735. 1798.

**Type:** Savigny in Lam., Encycl. 4: 735. 1798 (description), Amboina.

Leaves 40 × 2 cm or longer, ± abruptly attenuate in the upper part, submembranaceous; syncarps cylindric, 13 × 2.7 cm (mature), peduncles 4 cm long, scabrid; stigmas mostly 4-6; berries with a thick central sclerenchyma, but without fusiform/elliptic fibre bundles; seeds with a little



developed “strophiole”, and a raphe devoid of crystal cells and broader than the remainder of the seed at midlevel. This species appears to be widespread from East Indonesia (Amboina, Celebes, Sunda Islands, Irian) to the Solomon Islands.

*Material studied:* Mauriasi & al. BSIP 13353 (L!), Bougainville.

6. *Freycinetia petiolacea* Merr. & L. M. Perry (sect. *Pleio stigma*) in J. Arnold Arbor. 20: 157. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 361. 1970.

**Type:** Brass 3256 (A! holo), Santa Ysabel.

Leaves 35–45 × 4–5 cm, caudate along 3–4 cm, long-pseudopetiolate (“petiole” 8–12 × 1.5–1.8 cm), membranaceous; syncarps cylindric, 5 × 2 cm (immature), peduncles 2 cm long, smooth; infructescence peduncle 7.5 cm long; stigmas 3–10; berries with a central sclerenchyma and fusiform/elliptic fibre bundles; seeds (young) devoid of crystal cells (presence/absence of a “strophiole” not known). To date no mature fruits appeared to have been collected. This is the only known Solomon species which has long-pseudopetiolate leaves.

*Material studied:* Beer’s collectors BSIP 7384 and BSIP 7761 (L!), Santa Ysabel; Brass 2931 (BISH!, BRI!), San Cristobal; Kajewski 2147 (BISH!), Bougainville; Mauriasi & al. BSIP 12059 (L!), Guadalcanal; RSS 225 (L!), Malaita.

7. *Freycinetia regina* B. C. Stone (sect. *Pleio stigma*) in Kew Bull. 24: 375. 1970.

**Type:** Corner RSS 181 (K! holo), Guadalcanal.

Leaves to 60 × 6 cm, caudate along 3.5 cm, from lower 1/3–1/4 gradually narrowed to base where they are 2–2.4 cm wide, membranaceous; syncarps cylindric, 4 × 1.5 cm (immature), peduncles 4.5 cm long, scabrid; infructescence peduncle 2 cm long; stigmas 5–10; berries with a central sclerenchyma and fusiform/elliptic fibre bundles. To date this species was only known by its type which has no mature fruits.

*Material studied:* Corner RSS 181 (L! isotype), Guadalcanal.

8. *Freycinetia decipiens* Merr. & L. M. Perry (sect. *Pleio stigma*) in J. Arnold Arbor. 20: 154. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 3. 1963, Kew Bull. 24: 368. 1970.

**Type:** Brass 3138 (A! holo), San Cristobal.

Stem internodes pustular-scabridulous (see below, under *F. brevipedunculata*); leaves 13–18 × 2.5–4.5 cm, ± elliptic, cuspidate along 4–5 mm, abruptly narrowed and semi-amplexicaul at base, membranaceous; syncarps ellipsoid, 6 × 3.2 cm (mature), peduncles 2.2 cm long, scabrid; infructescence peduncle 1 cm long; stigmas mostly 3–6; berries with a central sclerenchyma, but without fusiform/elliptic fibre bundles; seeds with a “strophiole”, but without crystal cells.

*Material studied:* Brass 3113 (BISH!, BRI!, L!) and Whitmore RSS 6129 (L!), San Cristobal; Stone 2485 (BISH!) and Beer’s collectors BSIP 7398 (L!), Santa Ysabel (this latter specimen represents a form of *F. decipiens*, its syncarp peduncles being smooth, not scabrid); Whitmore BSIP 2024 (L!), New Georgia group, Roviana Lagoon; Griffith 3/31 (BRI!), Guadalcanal; Schodde (& Craven) 4045 (L!), Bougainville.

9. *Freycinetia marantifolia* Hemsl. (sect. *Pleio stigma*) in Bull. Misc. Inform. 1896: 164. 1896; Merr. & L. M. Perry in J. Arnold Arbor. 20: 154. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 369. 1970.

**Type:** Guppy 324 (K! holo), Fauro.



Leaves  $12-20 \times 5-6$  cm,  $\pm$  elliptic, cuspidate along 7-9 mm,  $\pm$  pseudopetiolate along 1-2 cm, membranaceous; syncarps ellipsoid,  $3.5 \times 2$  cm ( $\pm$  mature), peduncles 2.5 cm long, smooth; infructescence peduncle 1 cm long; stigmas 3-4 (-8); berries devoid of both central sclerenchyma and fusiform/elliptic fibre bundles; seeds with a "strophiole", but without crystal cells.

*Material studied:* Brass 3230 (BISH!, BRI!, L!), Santa Ysabel.

*F. marantifolia* is very similar to *F. decipiens* with which it has been sometimes confused. The distinction was essentially based on their stem internodes, which are smooth in the former but pustular-scabridulous in the latter species. Anatomy now provides another distinction: berries have a central sclerenchyma in *F. decipiens*, but none in *F. marantifolia*.

**10. *Freycinetia pectinata*** Merr. & L. M. Perry (sect. *Pleio stigma*) in J. Arnold Arbor. 20: 153. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 361. 1970.

**Type:** Brass 3247 (A! holo), Santa Ysabel.

Leaves  $14-20 \times 0.7-0.9$  cm, ensiform lanceolate, revolute in the upper part,  $\pm$  coriaceous, auricles deeply pectinate-setose in the upper part with setas to 2 mm long; syncarps ellipsoid,  $3.5 \times 1.4$  cm (mature), peduncles 4 cm long, scabrid; infructescence peduncle 1.5 cm long; stigmas mostly 4-6; berries with a central sclerenchyma and fusiform/elliptic fibre bundles; seeds with crystal cells, but without a "strophiole". This is the only known Solomon species which has leaves with pectinate auricles. The fact that the auricles are persistent and that the leaves are always clearly revolute in the upper part facilitates its recognition.

*Material studied:* Brass 3247 (BISH!, L!, isotypes), Santa Ysabel; Gafui & al. BSIP 18420 (L!), Choiseul; RSS 153 (L!), Guadalcanal.

**11. *Freycinetia divaricata*** Merr. & L. M. Perry (sect. *Pleio stigma*) in J. Arnold Arbor. 20: 154. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 3. 1963, Kew Bull. 24: 370. 1970.

**Type:** Brass 3480 (A! holo), Florida.

Stem internodes pustular-scabridulous (see below, under *F. brevipedunculata*); leaves  $13-21 \times 1.5-2.5$  cm, long-elliptic, abruptly narrowed and semi-amplexicaul at base, subcoriaceous; syncarps ovoid-ellipsoid,  $5 \times 2.7$  cm (mature), peduncles 2.3 cm long, smooth, sometimes also sparsely scabrid; infructescence peduncle 1 cm long; stigmas mostly 3-4; berries with a central sclerenchyma, but without fusiform/elliptic fibre bundles; seeds with a "strophiole", but without crystal cells.

*Material studied:* Brass 3480 (BISH!, L!, isotypes), Florida, Olevuga; Gafui & al. BSIP 17312 (L!), Runikera & al. BSIP 10394 (L!) and Stone 2359 (BISH!), Malaita; Heyligers 1109 (L!) and Schodde (& Craven) 3618 (L!), Bougainville; Mauriasi & al. BSIP 11676 (L!), Kolombangara; Whitmore BSIP 2561 (L!), Guadalcanal; Whitmore's collectors BSIP 2920 (L!), New Georgia group, Baga; Mauriasi & al. BSIP 11706 (L!), New Georgia group, Gizo.

**12. *Freycinetia anomala*** Merr. & L. M. Perry (sect. *Pleio stigma*) in J. Arnold Arbor. 20: 152. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 3. 1963, Kew Bull. 24: 370. 1970.

**Type:** Brass 2886 (A! holo), San Cristobal.

Leaves  $16 \times 1.3$  cm, lanceolate-ensiform, narrowed by one half along 1-1.5 cm above base, coriaceous; syncarps cylindric,  $4.5 \times 1$  cm (immature), peduncles 4 cm long, smooth; infructescence peduncle 1 cm long; stigmas generally 4-5, convex, cushion-shaped; berries devoid of both central sclerenchyma and fusiform/elliptic fibre bundles. To date this species was only known by its type which has no mature fruits.

*Material studied:* Brass 2886 (A!, BISH!, L!, types), San Cristobal.

*F. anomala* was described as having an infructescence with 4 syncarps (MERRILL & PERRY, 1939); however, the isotype in Leiden includes an infructescence with 5 normal syncarps, while the holotype an infructescence with 1 aborted and 4 normally developed spikes, the latter spikes each with a syncarp, the former spike without a syncarp (probably lost). STONE (1970: 370) equated this species with *F. schlechteri* (New Caledonia), which however has berries generally with 3 stigmas and leaves 6-8 cm broad (WARBURG, 1907).

**13. *Freycinetia insolita* B. C. Stone (sect. *Pleio stigma*) in Kew Bull. 24: 367. 1970.**

**Type:** Whitmore BSIP 2394 (SING! holo), Santa Ysabel.

Leaves 90 × 4 cm, ensiform, gradually attenuate from middle to apex, a little enlarged near base, coriaceous; syncarps clavato-cylindric, 10 × 3 cm (immature), peduncles 4 cm long, smooth; infructescence peduncle 9 cm long; stigmas mostly 4-6; berries with a narrow and incomplete central sclerenchyma, and fusiform/elliptic fibre bundles. Although the syncarps were up to 10 cm long, they had no seeds but only young ovules. To date no mature fruits appeared to have been collected.

*Material studied:* Whitmore BSIP 2394 (L! isotype), Santa Ysabel.

*F. insolita* is noticeable with its syncarps distinctly clavato-cylindric as seen in the isotype. As far as known, such syncarps were only observed in this species and *F. tessellata*, a widely different species. This facilitates the recognition of *F. insolita* in the Solomon Islands.

**14. *Freycinetia brevipedunculata* Huynh, spec. nova (sect. *Pleio stigma*)**

*Internodia ramorum dense pustuloso-scabridiuscula, acute angulata, circa 5-10 mm longa 4 mm crassa. Folia infra infructescentiam (7-) 12-16 cm longa, (0.5-) 0.8-0.9 cm lata in medio 0.7 cm circiter 1 cm supra basim 0.4-0.5 cm in basi (auriculis exclusis), elliptico-lanceolata, sensim attenuata in dimidio supero, non acuminata interdum in 3 mm acuminata, dissita, in basi vix semiamplexicaulia, in sicco submembranacea subflexuosaque; lamina dense longitudinaliter striata inter venas in pagina adaxiali, obtuse nervata sed non longitudinaliter striata in abaxiali; marginibus infra apicem minute denticulatis, prope basim obscure denticulatis rare manifeste denticulatis, caeterum inermibus; costa media prominenti in pagina abaxiali minute remoteque denticulata in dimidio supero, inermi in infero; auriculis circa 9-10 mm longis 1.8 mm latis in basi, inermibus, deciduis, cito in fibras solutis, mesophyllo separatis filis fibrarum inter fasciculos vasorum praedito, cellulis epidermicis hypodermicisque omnibus non lignescentibus. Infructescentia terminalis, 4 spicis praedita; pedunculo communi 7-10 mm longo; pedunculis 2 cm longis, 1.5-2 mm latis, laevibus; syncarpiis oblongo-ellipsoideis, immaturis 1.5 cm longis 0.8 cm latis, baccis parum numerosis (circa 5-6 in linea recta ex apice ad basim syncarpium). Baccae immaturae circa 4 mm longae, fasciculis fibrarum fusiformis/ellipticis destitutae, stigmatibus (2-) 4-5 (-6), areola stigmatica cincta, plana vel subplana, rotundata interdum late elliptica; pileo pyramidali, 1-1.5 mm longo, fusco, anguloso, intra sclerenchymate centrali crasso. Semina immatura, subrecta, circa 1.1 mm longa 0.3 mm lata in medio; raphe tenui, cellulis raphidiphoris e micropyle ad chalazam numerosis sed cellulis crystalliferis absentibus (Fig. 5-7).*

**Type:** Nakisi BSIP 8088 (holo L!); N. W. Guadalcanal, Vara Creek, South of Honiara, valley bottom 45' above sea level, poorly drained riverside, 7 September 1967; epiphytic climber reaching 30' above ground, fruits red colour, strawberry-like appearance, 0.75-1" long 0.75" diameter; Kwara'ae name "Ango'ango finguan".

*Other material:* Waterhouse 302-B (L!); Bougainville, Siwai, September-October 1930; trailing plant, flower white; local name "Sisirai" or "Sūrai". This specimen comprises stem and leaves but no fruits. Therefore its identity should be further confirmed using fruit-bearing collections. The stem comprises pustular-scabridulous internodes up to 2.5 cm long. The leaves are similar in shape to those in the type and about 17 cm long 1.3 cm wide, and their auricles also split lengthwise into fibres.

In the type, the auricles were lost except for some upper leaves, the seeds immature, and the raphe devoid of crystal cells. In those species whose raphe has crystal cells, these cells were observed from an early stage of the seed development. This indicates that the mature seed of *F. brevipedunculata* has no crystal cells. Radial sections of stem were studied in order to elucidate its pustular-scabridity. In these sections, the cells of the hypodermal layer are elongated radially at the site of the pustules but not at the other sites (Fig. 7), thus revealing that pustules are formed by radial elongation of hypodermal cells.

In its stem with pustular-scabridulous internodes, *F. brevipedunculata* recalls *F. decipiens* and *F. divaricata*. These are the three presently known Solomon species to have such a stem. They are also similar in having short infructescence peduncles (about 1 cm), seeds without crystal cells, and berries with a thick central sclerenchyma but without fusiform/elliptic fibre bundles. This close relationship suggests that *F. brevipedunculata* probably has the same mature seed as those of the other two species, viz. a seed which has a distinct "strophiole" and a raphe devoid of crystal cells and only lignified in the cells around the vascular bundle. The three species can be readily distinguished using their leaves: these are  $16 \times 0.9$  cm in *F. brevipedunculata*,  $21 \times 2.5$  cm in *F. divaricata*,  $18 \times 4.5$  cm in *F. decipiens*.

By its pustular-scabridulous stem, *F. brevipedunculata* also recalls *F. ellipsoidalis* and *F. stenodonta*, both from New Guinea. The former species has leaves 4.5-5.5 cm long 1.5 cm wide, and berries with 1-2 stigmas; the latter, leaves 4-6 cm long 2-3 cm wide, and berries with 2-5 stigmas.

**15. *Freycinetia oligodonta*** Merr. & L. M. Perry (sect. *Pleiostigma*) in J. Arnold Arbor. 20: 155. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 372. 1970; A. C. Smith in Flor. Vit. Nov. 1: 472. 1979.

**Type:** *Brass* 2930 (A! holo), San Cristobal.

Leaves  $35 \times 1.6$  cm, ensiform, slightly narrowed near base, submembranaceous; syncarps ellipsoid,  $2.5 \times 1.2$  cm (immature), peduncles 4 cm long, smooth; infructescence peduncle 2.5 cm long; stigmas mostly 4-6; berries with a central sclerenchyma, but without fusiform/elliptic fibre bundles. To date this species was only known by its type which has no mature fruits.

*Material studied:* *Brass* 2930 (A!, BISH!, types), San Cristobal.

Both STONE (1970: 372) and SMITH (1979: 472) equated this species with *F. pritchardii* (Fiji). However, the berry and seed anatomy is not known in *F. pritchardii*, and the seed anatomy remains to be observed in *F. oligodonta*. Since it now appears evident that berry and seed anatomy is also essential in the taxonomy of *Freycinetia*, it seems better to wait until at least these anatomical features would be elucidated to examine this case of synonymy, especially as *F. pritchardii* and *F. oligodonta* are found in two different and remote areas (see the confusion between *F. pseudohombronii* and *F. hombronii* below, under *F. pseudohombronii*).

**16. *Freycinetia membranacea*** Merr. & L. M. Perry (sect. *Pleiostigma*) in J. Arnold Arbor. 20: 156. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 372. 1970; Huynh in Bot. Helv. 105: 26-30. 1995.

**Type:** *Waterhouse* 168 (NY! holo), Bougainville.

Leaves  $65-80 \times 1.4-1.5$  cm, abruptly attenuate in the upper part (HUYNH, 1995b: Fig. 6), membranaceous; syncarps cylindric,  $7 \times 3.5$  cm (mature), peduncles 3 cm long, scabrid; infructescence peduncle 5-7 cm long; stigmas mostly 4-6; berries with a central sclerenchyma and fusiform/elliptic fibre bundles; seeds with crystal cells, but without a "strophiole" (HUYNH, 1995b: Fig. 9).

*Material studied:* Waterhouse 168 (A! isotype), Craven & Schodde 380 (A!) and Schodde & Craven 4103 (A!), Bougainville; Hunt RSS 2388 (K!, L!), Mauriasi & al. BSIP 11543 (L!) and RSS 2388 (A!), Kolombangara; Maenu'u BSIP 5984 (L!), New Georgia Group, Viru Harbour.

**17. *Freycinetia stonei*** Huynh (sect. *Pleiostigma*) in Bot. Helv. 105: 30. 1995.

**Type:** Stone 2475 (BISH! holo), Santa Ysabel.

Leaves 50-60 × 1.1-1.2 cm, gradually attenuate in the upper part (HUYNH, 1995b: Fig. 10), submembranaceous; syncarps ellipsoid, 3 × 2 cm (mature), peduncles 3 cm long, scabrid; infructescence peduncle 5 cm long; stigmas mostly 4-6; berries with a central sclerenchyma and fusiform/elliptic fibre bundles; seeds with crystal cells, the raphe much broader than the remainder of the seed at midlevel, the inner tangential walls in the inner layer of the outer integument strongly lignified all around the endosperm (HUYNH, 1995b: Fig. 13). With these inner tangential walls, the seed of *F. stonei* appears unique in the Solomon Islands, and can therefore facilitate its recognition. To date this species was only known by its type.

*Material studied:* Stone 2475 (BISH! holotype), Santa Ysabel.

**18. *Freycinetia humilis*** Hemsl. (sect. *Pleiostigma*) in Bull. Misc. Inform. 1896: 164. 1896; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 372. 1970.

**Type:** Guppy 323 (K! holo), Fauro.

Leaves 70 × 2.5-3 cm, gradually attenuate in the upper part, coriaceous; syncarps cylindric, 6 × 2 cm (mature), peduncles 5 cm long, minutely denticulate along the angles; infructescence peduncle 5 cm long; stigmas mostly 4-5; berries with a central sclerenchyma and fusiform/elliptic fibre bundles; seeds devoid of both crystal cells and "strophiole".

*Material studied:* Whitmore BSIP 998 (L!), New Georgia group, Vangunu.

**19. *Freycinetia nesiotica*** Merr. & L. M. Perry (sect. *Pleiostigma*) in J. Arnold Arbor. 20: 156. 1939; B. C. Stone in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 374. 1970; Huynh in Bot. Helv. 105: 26-30. 1995.

**Type:** Brass 2929 (A! holo), San Cristobal.

Leaves 65 × 1.5 cm, gradually attenuate in the upper part (HUYNH, 1995b: Fig. 1), coriaceous; syncarps ellipsoid, 4 × 3 cm (mature), peduncles 3 cm long, scabrid; infructescence peduncle 1.5 cm long; stigmas mostly 5-6; berries divergent in syncarp, abruptly attenuate in middle, with a central sclerenchyma and narrow fusiform/elliptic fibre bundles; seeds with distinct "strophiole" and crystal cells, the lignified inner tangential walls in the inner layer of the outer integument at the side furthest away from the raphe at least half as thick as the cells in which they are located (HUYNH, 1995b: Fig. 4). With these inner tangential walls, the seed of *F. nesiotica* appears unique in the Solomon Islands, and can therefore facilitate its recognition. To date this species was only known by its type.

*Material studied:* Brass 2929 (A!, BRI!, L!, types), San Cristobal.

**20. *Freycinetia pseudohombronii*** Huynh, *spec. nova* (sect. *Pleiostigma*)

*Rami laeves, superne circa 5 mm crassi. Folia infra infructescentiam 35-60 cm longa, 8-10 mm lata in medio 6-7 mm in basi laminae, sensim attenuata in dimidio supero, in 6-7 mm subtiliter caudata, imbricata, in basi amplexicaulia, in sicco membranacea flexuosaque; marginibus minute vel obscure denticulatis prope basim et in parte supera, caeterum inermibus; costa media minute vel obscure denticulata in parte supera inermi in infera; auriculis 2.8 cm longis 0.5 cm latis in basi, submembranaceis, subdeciduis, brunneolis, laevibus (i.e. non longitudinaliter ner-*



vatis/striatis) margine excepto, cito in fragmenta transversalia solutis, mesophyllo separatis filis fibrarum inter fasciculos vasorum praedito, cellulis epidermicis et cellulis hypodermicis adaxialibus omnibus non lignescentibus, sed cellulis hypodermicis abaxialibus in uno strato compacto omnibus fortiter lignescentibus. Infructescentia terminalis, 3 vel 4 spicis praedita; pedunculo communi circa 3.5 cm longo; pedunculis circa 3.5 cm longis 2-2.5 mm latis, minute denticulatis in angulis, superne dense scabridis inter angulos et non incrassatis; syncarpiis ellipsoideis, maturis circa 2.3 cm longis 1.4 cm latis, baccis parum numerosis (circa 9-11 in linea recta ex apice ad basim syncarpium). Baccae maturae 6-7 mm longae 2 mm latae, stigmatibus (4-) 5-6 (-7), areola stigmatica cincta, plana vel subplana, subrotundata interdum late elliptica; pileo 2-2.5 mm longo, anguste pyramidali, atro-brunneo, leviter angulato, sulcato inter angulos, intra sclerenchymate centrali crasso et angustis fasciculis fibrarum fusiformis/ellipticis praesentibus; parte infera 2-3-plo latiore quam pileo, fasciculis fibrarum fusiformis/ellipticis semine-similibus albidisque 1 mm vel ultra longis usque ad 0.25 mm latis cooperta. Semina recta vel subrecta, circa 1.5 mm longa 0.4 mm lata in medio; raphe lignosa, in medio circa 7/10 tenuiore quam reliquis seminis, cellulis crystalliferis e micropyle ad chalazam numerosissimis sed cellulis raphidiphoris sparsis; cellulis internis integumentum externum a raphe remotis non auctis ("strophiole nullo"); crassificationibus lignosis in integumento externo manifestis praecipue in partibus a raphe remotis (Fig. 8-11).

**Type:** Kotali & al. BSIP 11325 (holo L!; iso K!); New Georgia Group, S. Vella Lavella, Oula River area, primary forest, ridge top 110' above sea level, 10 August 1968; climber, reaching 40' high, fruits green, yellow when ripe; Kwara'ae name "Ari Ari".

**Other material:** Whitmore 2126 (L!); New Georgia Group, Kolombangara, West coast, inland from Iri iri village (Merusu Cove); wet gully forest, alt. 2500', 28 September 1963; common on boles to crown bases, fruits green; Kwara'ae name "Ariari". Whitmore RSS 6367 (L!); Kolombangara, S. W. Summit Peak, 30 August 1965; very common narrow leaved lower bole climber and ground scrambler; local name "Ari Ari". Hunt RSS 2491 (L!); Kolombangara, river valley, alt. 2500 ft, 2 September 1965; dense wet river valley, with many shrubby trees; climber, very branched, flowers cream. RSS 224 (K! ♀ ♂) (L!); Malaita, Alasa Mt, alt. 2500 ft, 21 November 1965; common on limestone ridge, slender leaves.

The stem is smooth as seen on the remnant beneath the infructescences (no entire internodes preserved in the specimens). The seed of *F. pseudohombronii* was studied in Kotali & al. BSIP 11325 and Whitmore 2126. It is mature in the former (Fig. 10 and 11) but immature in the latter specimen. In the staminate plant of RSS 224, the spike peduncles are up to 2.5 cm long 2.5 mm wide, denticulate along the angles; the staminiferous parts up to 1 cm long 2.5 mm wide, with smooth pollen and anthers devoid of endothelial thickenings. This is one of the three species of *Freycinetia* known to have anthers devoid of endothelial thickenings, the other two being *F. samoensis* (HUYNH, 1995a: 243) and an unknown species from New Britain (Stevens & Lelean LAE 58290, L!). The denticulate staminate peduncles of *F. pseudohombronii* are also a noticeable feature because staminate peduncles of *Freycinetia* are generally smooth.

*F. pseudohombronii* is that Solomon species which was recognized by STONE (1970: 373) as being *F. hombronii* Martelli. This latter is a native species of the Samoa Islands. These two species have similar syncarps and leaves, which probably explains their equation by Stone. However, they can be distinguished, thus each corresponds to a different area, in concordance with the species endemism commonly observed in Pandanaceae. In *F. pseudohombronii*: the ratio between the raphe and the remainder of the seed at midlevel is about 7/10, and the raphe composed of large cells (Fig. 11); the syncarp peduncles are not enlarged at apex; the stigmas are generally 5-6. In *F. hombronii*: the ratio is 1/4 to 1/5, and the raphe composed of much narrower cells (compare Fig. 12 with Fig. 11), as seen in Vaupel 352 (B!) and Whistler 6902 (PTBG!), both collections from Savaii Island; the syncarp peduncles are invariably enlarged at apex such that the apical part is about 3/2 as thick as the middle part, as seen in Bristol 2161 (A!), Christophersen 736 and 2017 (UC!), Cox 246 (A!, UC!), and Vaupel 352 (B!), all five collections also



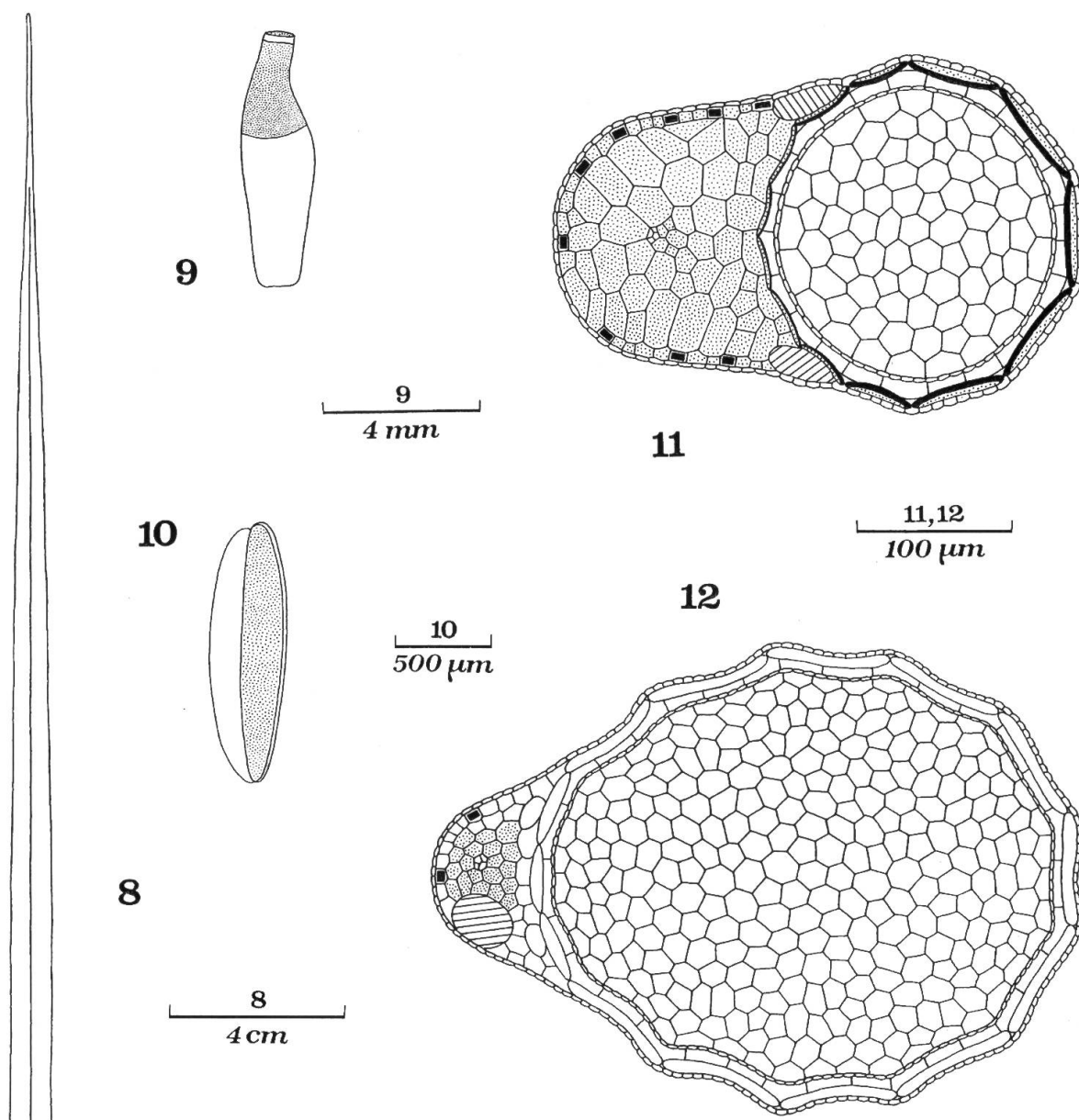


Fig. 8-12. – *Freycinetia pseudohombronii* Huynh (8-11: Kotali & al. BSIP 11325) and *F. hombronii* Martelli (12: Vaupel 352):

**8:** Upper part of leaf viewed by adaxial face (prickles not represented). **9:** Berry in lateral view (pileus dotted). **10:** Seed in optical section passing by symmetry plane (from left to right: raphe, endosperm dotted, integuments; micropyle above, chalaza below). **11, 12:** Seeds in middle transverse section, showing raphe on left and integuments on right (vascular bundle in raphe represented by smallest cells; crystal cells each with black rectangle; raphide cells hatched; lignified cells dotted; each integument with two cell layers).

from Savaii Island; the stigmas are generally 4-5 (MARTELLI, 1934: 5). In particular, the wide difference in the seed structure (Fig. 11 and 12) indicates that *F. pseudohombronii* is a distinct species.

## 21. *Freycinetia insulana* Huynh, spec. nova (sect. *Pleio stigma*)

*Rami laeves, superne 5-6 mm crassi. Folia infra infructescentiam 26-30 cm longa, 8-10 mm lata in medio 8-9 mm in basi laminae, ± sensim attenuata, imbricata, in basi amplexicaulia, in sicco subcoriacea subflexuosaque revoluta praecipue in parte supera; marginibus obscure denticulatis prope basim et in parte supera, caeterum inermibus; costa media obscure denticulata in dimidio supero, inermi in infero; auriculis circa 3.5 cm longis 5-6 mm latis in basi, superficiariter, dense longitudinalinerviis, non corneis, non nitidis, submembranaceis, deciduis, cito in fibras (partim) solutis, mesophyllo separatis filis fibrarum inter fasciculos vasorum praedito, cellulis epidermicis hypodermicisque omnibus non lignescentibus. Infructescentia terminalis, 3 spicis praedita; pedunculo communi 3-3.5 cm longo; pedunculis circa 4 cm longis 4 mm latis, denticulatis in angulis, superne sparsim scabridis inter angulos; syncarpiis ellipsoideo-cylindraceutis, maturis circa 5 cm longis 2.3 cm latis. Baccae lageniformes, maturae circa 10 mm longae 4 mm latae, stigmatibus (4-)5-6, areola stigmatica cincta, subplana, generaliter late elliptica; pileo anguste pyramidalis, circa 2.5 mm longo, fusco, leviter angulato, obscure sulcato inter angulos, intra sclerenchymate centrali crasso et angustis fasciculis fibrarum fusiformis/ellipticis praesentibus; parte infera circa duplo latiore quam pileo, fasciculis fibrarum fusiformis/ellipticis semine-similibus albidisque usque ad 2 mm longis 0.45 mm latis cooperta. Semina recta vel subrecta, circa 2 mm longa 0.5 mm lata in medio; raphe lignosa, in medio paulo crassiore quam reliquiis seminis, cellulis crystalliferis e micropyle ad chalazam numerosissimis sed cellulis raphidiphoris sparsis; cellulis internis integumentum externum a raphe remotis non auctis ("strophio nullo"); crassificationibus lignosis in integumento externo non manifestis (Fig. 13-16).*

**Type:** Ridsdale & Lavarack NGF 30662 (holo A!; iso BISH!); Bougainville, 6°15'S 155°30'E, alt. 2750 ft, 20 January 1967; climber, leaves dark green, fruit medium green.

The stem is smooth as seen on the remnant beneath the infructescence (no entire internodes preserved in the specimen). *F. insulana* appears very close to *F. membranacea*. Both have similar berries, with fusiform/elliptic fibre bundles the same size, and similar seeds, straight, sometimes subincurved, about 2 mm long. However, they can be distinguished, especially in Bougainville Island where both were found. In *F. insulana*: the leaves do not exceed 28-30 cm in length, and are gradually attenuate in the upper part (Fig. 13); the leaf auricles show longitudinal veins on their surface and split lengthwise into fibres, and their abaxial hypodermis is unligified; the ovariferous part of the berries is about twice as broad as the pileus (Fig. 14); the raphe is broader than the remainder of the seed at midlevel (Fig. 16). In *F. membranacea*: the leaves are up to 80 cm long and abruptly attenuate in the upper part (HUYNH, 1995b: Fig. 6); the leaf auricles are smooth and break transversely into fragments, and their abaxial hypodermis is lignified as observed in *Mauriasi & al. BSIP 11543* (L!); the ovariferous part of the berries is almost as broad as the pileus (HUYNH, 1995b: Fig. 7); the raphe is as broad as the remainder of the seed at midlevel and composed of many less cells (HUYNH, 1995b: Fig. 9).

## 22. *Freycinetia longifolia* Huynh, spec. nova (sect. *Pleio stigma*)

*Rami laeves, superne 1.3 cm crassi. Folia infra infructescentiam 200-210 cm longa, 2.6-3 cm lata in medio 2.6-3 cm in basi laminae, imbricata, in basi amplexicaulia; lamina superne abrupte attenuata, in 7-8 cm caudata, dense longitudinaliter striata in pagina adaxiali, in sicco rigida coriacea ferruginea in parte infera, flexuosa submembranacea cinerascens perleviter ferruginea in supera; venis secundariis longitudinalibus indistinctis in pagina adaxiali, distinctis sed non prominentibus in abaxiali; marginibus denticulatis prope basim cum denticulis ut maximum 1 mm longis, infra apicem minute denticulatis, caeterum inermibus; costa media minute vel obscure denticulata in tertia supera, caeterum inermi; auriculis 8-9 cm longis (latitudine exacta*

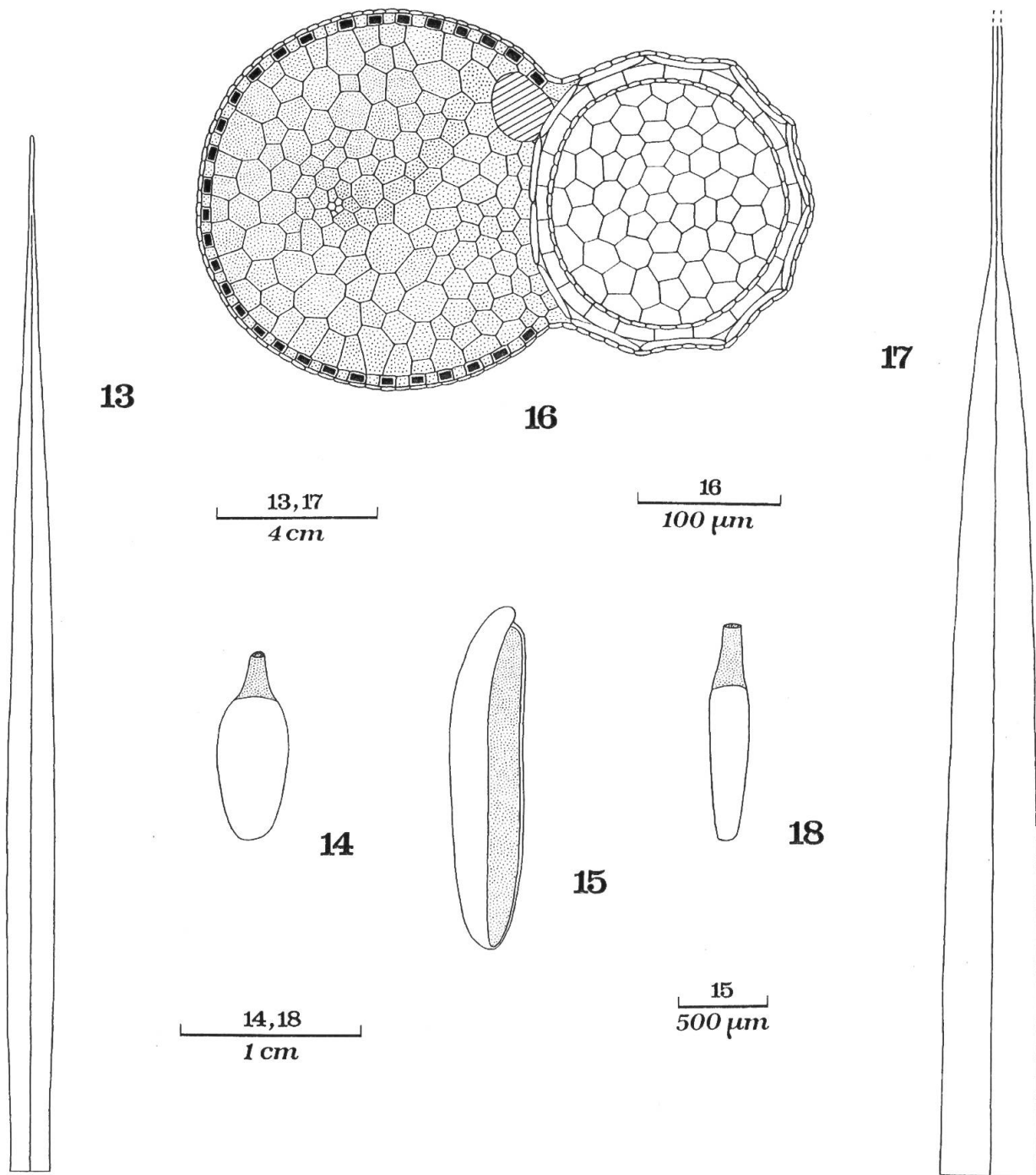


Fig. 13-18. – *Freycinetia insulana* Huynh (13-16: Ridsdale & Lavarack NGF 30662) and *F. longifolia* Huynh (17, 18: Mauriasi & al. BSIP 16171):

**13, 17:** Upper part of leaves viewed by adaxial face (prickles not represented). **14, 18:** Berries in lateral view (pileus dotted). **15:** Seed in optical section passing by symmetry plane (from left to right: raphe, endosperm dotted, integuments; micropyle above, chalaza below). **16:** Seed in middle transverse section, showing raphe on left and integuments on right (vascular bundle in raphe represented by smallest cells; crystal cells each with black rectangle; raphide cell hatched; lignified cells dotted; each integument with two cell layers).

ignota), membranaceis, deciduis, ut videtur cito in fragmenta transversalia solutis, mesophyllo separatis filis fibrarum inter fasciculos vasorum praedito, cellulis epidermicis omnibus non lignescentibus, cellulis hypodermicis omnibus fortiter lignescentibus, adaxialibus in 2 compactis stratis, abaxialibus in 3-4 compactis stratis. Infructescentia terminalis, 3 spicis praedita; pedunculo communi circa 5 cm longo; pedunculis 6 cm vel ultra longis, 7 mm latis in medio, apice leviter incrassatis, minute denticulatis in angulis, superne dense scabridis inter angulos; syncarpiis cylindraceis, immaturis circa 7 cm longis 2.7 cm latis. Baccae immaturae circa 12 mm longae 2 mm latae, stigmatibus generaliter 6-8, areola stigmatica cincta, plana vel subplana, subrotundata interdum late elliptica; pileo 3.5-4 mm longo, anguste pyramidalis, fusco, leviter angulato, leviter vel obscure sulcato inter angulos, intra sclerenchymate centrali reducto incompletoque; parte infera leviter latiore quam pileo, fasciculis fibrarum fusiformis/ellipticis semine-similibus 1-1.5 mm longis usque ad 0.42 mm latis cooperta (Fig. 17 and 18).

**Type:** Mauriasi & al. BSIP 16171 (holo L!); Santa Ysabel, Barora Ite, Madagha Bay area; well drained primary forest, hillside 150' above sea level, 27 August 1969; climber reaching 50' high, girth 4", fruits green, oval; Kwara'ae name "Ariari".

The stem is smooth as seen on the remnant beneath the infructescence (no entire internodes preserved in the specimen). *F. longifolia* is the only known Solomon species which has inflorescence leaves up to 210 cm long, thus at least twice as long as those in the other species. In addition, they are twofold in both texture and colour, being coriaceous and ferrugineous in the lower half but submembranaceous and greyish slightly ferrugineous in the upper half. Such leaves did not seem to be observed in any other known Solomon species. Furthermore, their auricles are unusual in that both the adaxial and the abaxial hypodermis are strongly lignified, the former with 2 the latter with 3 or 4 cell-layers. Also, its berry is uncommon in having a reduced and incomplete central sclerenchyma. *F. longifolia* is close to *F. membranacea*, both having several similar features: for example, leaves abruptly attenuate in the upper part, fusiform/elliptic fibre bundles in ovary walls up to 0.42 mm in width.

### 23. *Freycinetia plana* Huynh, spec. nova (sect. *Pleiostigma*)

*Internodia ramorum laevia, 2 cm longa, 1 cm crassa. Folia infra infructescentiam erecto-adscendentia, 55-70 cm longa, 1.2-1.5 cm lata in medio 1 cm in basi laminae, in 3-4 cm caudata, imbricata, in basi amplexicaulia, in sicco submembranacea subflexuosaque revoluta praecipue in parte supera; marginibus minute vel obscure denticulatis prope basim, perminute vel obscure denticulatis infra apicem, caeterum inermibus; costa media minute denticulata in parte supera inermi in infera; auriculis circa 6 cm longis 1 cm latis in basi, membranaceis, subdeciduis, brunneis, laevibus (i.e. non longitudinaliter nervatis/striatis), cito in fragmenta transversalia solutis, mesophyllo separatis filis fibrarum inter fasciculos vasorum praedito, cellulis epidermicis et cellulis hypodermicis adaxialibus omnibus non lignescentibus, sed cellulis hypodermicis abaxialibus in uno strato compacto omnibus fortiter lignescentibus. Infructescentia terminalis, 3 spicis praedita; pedunculo communi 3-4 cm vel ultra longo; pedunculis circa 3.5 cm longis 3.5 mm latis, minute denticulatis in angulis, superne perminute scabridis inter angulos; syncarpiis cylindraceis, immaturis circa 5 cm longis 2.8 cm latis. Baccae immaturae circa 10 mm longae 2-3 mm latae, stigmatibus generaliter 6-8, areola stigmatica vix cincta, plana, generaliter late elliptica; pileo circa 3 mm longo 2-3 mm lato, anguste pyramidalis interdum subrecto, brunneo, tote corneo nitidiusculoque, obtuse angulato, inter angulos plano interdum leviter concavo sed nunquam sulcato, intra sclerenchymate centrali crasso, angustis fasciculis fibrarum fusiformis/ellipticis praesentibus; parte infera ± tam crassa quam pileo, fasciculis fibrarum fusiformis/ellipticis usque ad 6-7 mm longis 0.3 mm latis cooperta (Fig. 19 and 20).*

**Type:** Waterhouse 220-B (holo L!); Bougainville, Siwai, August 1930; local name "Sürai".

**Other material:** Waterhouse 220 B-B (L!), juvenile; Bougainville, Siwai, October 1930; local name "Sürai".

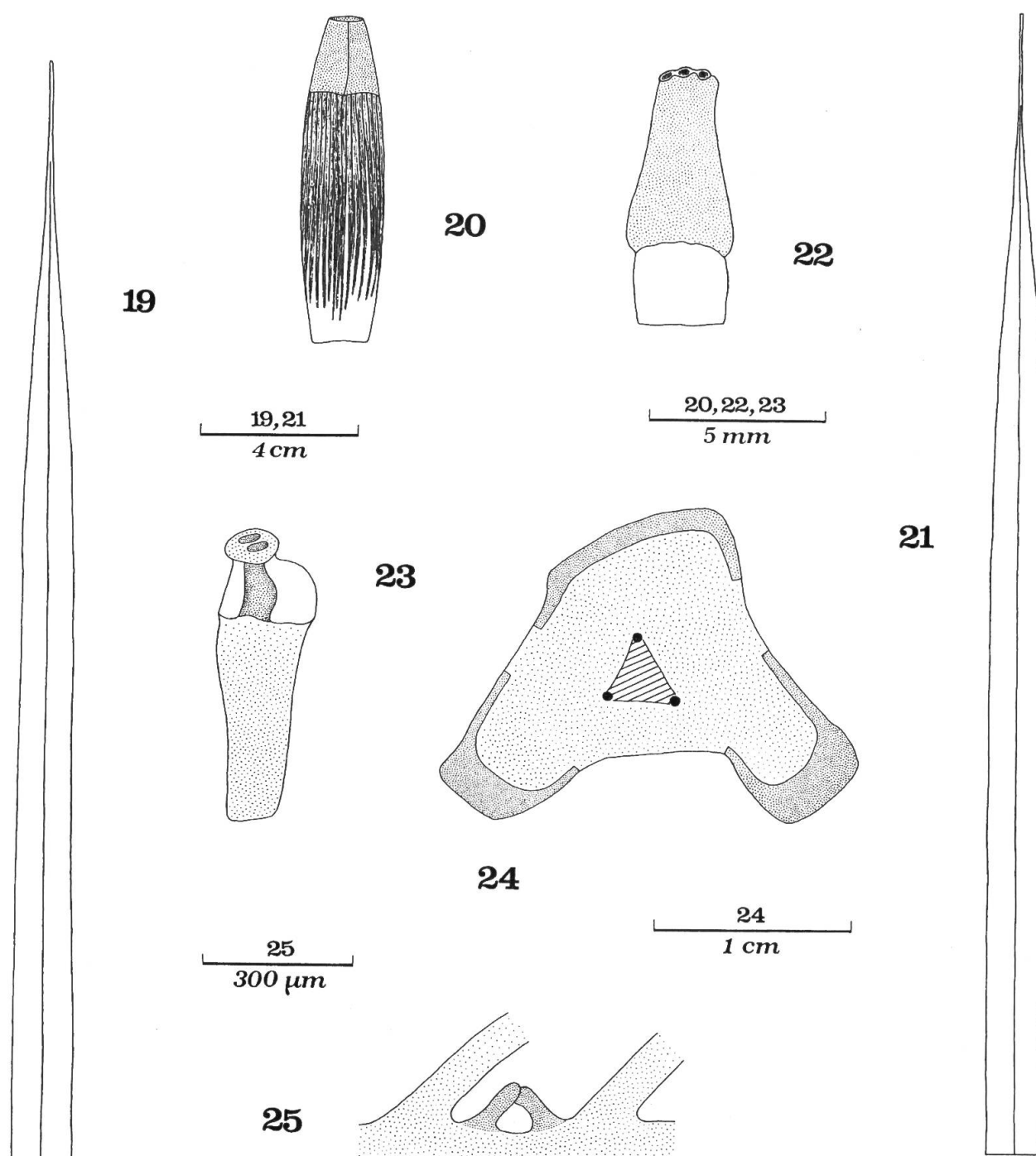


Fig. 19-25. – *Freycinetia plana* Huynh (19, 20: Waterhouse 220-B), *F. lepida* Huynh (21, 22: Hunt RSS 2718), and *F. whitmorei* B. C. Stone (23, 24: Whitmore BSIP 2016; 25: Whitmore BSIP 4141):

**19, 21:** Upper part of leaves viewed by adaxial face (prickles not represented). **20, 22:** Berries in lateral view (pileus dotted). **23:** Berry with 2 stigmas in lateral view, showing pileus where one vallecule (densely dotted) and two buttresses (blank) are visible. **24:** Middle transverse section of pileus of 3-stigmatic berry, showing central sclerenchyma (hatched), fertilization canals (black) each corresponding to one stigma, and buttresses with lignified hypodermis (densely dotted) comprising 1-4 layers, these not represented. **25:** Part of radial section of staminate spike whose apex is on right, showing a pistillode (walls densely dotted) and two stamens (only basal parts of filaments represented).



*F. plana* is named with reference to its smooth, unsulcate pileus. It has some noticeable features. Firstly, the fusiform/elliptic fibre bundles in the ovary walls are very long, up to 6-7 mm (Fig. 20). To date no other known Solomon species have fusiform/elliptic fibre bundles of this length. Secondly, the pileus is brownish, corneous and nitid, thus resembling the girdles around stigmatic areolas in a very large number of other species of *Freycinetia*. This resemblance results in that the stigmatic areolas in *F. plana* are not distinctly girdled, by contrast with those in the species which have dark-brown non-corneous unnitid pilei (e.g. *F. insulana*).

#### 24. *Freycinetia lepida* Huynh, spec. nova (sect. *Pleio stigma*)

*Rami laeves, superne 4-5 mm crassi. Folia infra infructescentiam (30-) 40-50 cm longa, 1.3-1.5 cm lata in medio 1.2 cm in basi laminae, superne abrupte attenuata 2-3 cm caudata, imbricata, in basi amplexicaulia, in sicco submembranacea subflexuosa rubelliuscule-brunnea; marginibus breviter denticulatis in basi, minute vel obscure denticulatis in parte supera, caeterum inermibus; costa media inermi in parte infera, minute denticulata in supera; auriculis 3 cm longis 5 mm latis, haud liberis, in apice interdum 1-2 denticulis armatis, submembranaceis, subdeciduis, brunneolis, cito in fragmenta transversalia solutis. Infructescentia terminalis, 3 spicis praedita; pedunculo communi circa 2 cm longo, sparsim scabrido in apice; pedunculis circa 2.5 cm longis 3 mm latis, denticulatis in angulis, superne omnino scabridis; syncarpiis ellipsoideis, immaturis circa 3 cm longis 1.8 cm latis, baccis modice numerosis (circa 12 in linea recta ex apice ad basim syncarpium). Baccae immaturae circa 7 mm longae, separatae divergentes in pileis; stigmatibus (3-) 6-8 (-18), areola stigmatica vix cincta; pileo anguste pyramidalis, circa 5 mm longo 1.5-3 mm lato 1.5 mm crasso, brunneolo, tote corneo nitidoque, longitudinaliter sulcato, intra sclerenchymate centrali crasso, angustis fasciculis fibrarum fusiformis/ellipticis praesentibus; parte infera fasciculis fibrarum fusiformis/ellipticis semine-similibus albidisque 1 mm vel ultra longis usque ad 0.4 mm latis cooperta (Fig. 21 and 22).*

**Type:** Hunt RSS 2718 (holo K!); San Jorge, Talise Village, alt. sea level, 24 September 1965; climber, fruits green.

**Other material:** Hunt RSS 2838 (K!); Santa Ysabel, head of Tatamba Bay, alt. sea level, 1 October 1965; climber, fruits pale green.

The stem is smooth as seen on the remnant beneath the infructescences (no entire internodes preserved in the specimens). *F. lepida* is named with reference to its nitid pileus which was found agreeable to observe. It has some unusual features: its leaves are reddish-brown, its pileus entirely corneous and nitid, and longitudinally sulcate, its infructescence peduncle scabrid. It appears closest to *F. nesiotica*: both have syncarps similar in being ellipsoid and composed of berries with divergent pilei; also, their infructescence peduncles have almost the same length (about 2 cm in the former, 1.5 cm in the latter species); furthermore, the reddish-brown leaves of *F. lepida* recall those of *F. nesiotica*. Their difference involves in particular the leaves and the fusiform/elliptic fibre bundles in the ovary walls. In *F. lepida*: the leaves are abruptly attenuate in the upper part (Fig. 21); the auricles break transversely into fragments; the fibre bundles are up to 0.4 mm broad. In *F. nesiotica*: the leaves are very gradually attenuate in the upper part (HUYNH, 1995b: Fig. 1); the auricles split lengthwise into fibres; the fibre bundles are all small (the largest do not exceed about 60 µm in width).

#### 25. *Freycinetia solomonensis* B. C. Stone (sect. *Pleio stigma*) in Proc. Biol. Soc. Washington 76: 5. 1963, Kew Bull. 24: 367. 1970; Huynh in Bot. Jahrb. Syst. 118: 531. 1996.

**Type:** Stone 2484-A (BISH! holo), Santa Ysabel.

Leaves 80-90 × 2 cm, gradually attenuate in the upper part, subcoriaceous; syncarps cylindric, 10 × 4 cm (mature), peduncles 4-5 cm long, scabrid; infructescence peduncle 5 cm long; stigmas mostly 6-8; berries with a central sclerenchyma and fusiform/elliptic fibre bundles. Seeds (in Stone 2484-A) similar to those of *F. membranacea* shown in HUYNH (1995b: Fig. 9): raphe

± as thick as the remainder of the seed at midlevel and rich in crystal cells from micropyle to chalaza; vascular bundle ± centric in raphe; “strophiole” absent.

*Material studied:* Stone 2484-A (BISH!, holotype), Hunt RSS 2771 (BISH!, L!) and Whitmore & Womersley BSIP 840 (L!), Santa Ysabel; Kajewski 1830 (BISH!) and Lavarack & Ridsdale NGF 31459 (K!), Bougainville.

## 26. *Freycinetia coagmentata* Huynh, spec. nova (sect. *Pleiostigma*)

*Rami laeves, superne circa 1 cm crassi. Folia infra infructescentiam 65-80 cm longa, 4-5 cm lata in medio 3 cm in basi laminae, ensiformia, superne abrupte attenuata, 3-4 cm caudata, imbricata, in basi amplexicaulia, in sicco submembranacea subflexuosa, biplicata, leviter tessellata praecipue in pagina adaxiali; plicis prominulis in pagina adaxiali, canaliculatis in abaxiali; marginibus minute vel obscure denticulatis in basi apiceque, caeterum inermibus; costa media minute vel obscure denticulata in parte supera inermi in infera; auriculis carentibus (in Craven & Schodde 306: 9-10 cm longis 7 mm latis submembranaceis fuscis cito in fibras solutis, mesophyllo separatis filis fibrarum inter fasciculos vasorum praedito, cellulis epidermicis hypodermicisque omnibus non lignescentibus). Infructescentia terminalis, 3 spicis praedita; pedunculo communi circa 7 cm longo 1.3 cm crasso; pedunculis circa 4 cm longis 9 mm latis, ex apice ad basim perdense omninoque scabridis et denticulatis in angulis; syncarpiis late cylindraceis, maturis circa 9 cm longis 4.2 cm latis, interdum arcuatis. Baccae maturae circa 2 cm longae, constrictae infra pileum, stigmatibus 8-15 (-18), biseriatis, areola stigmatica elliptica cincta; pileo 3-3.5 mm longo 2-3 mm lato 2 mm crasso, pyramidali, atro-brunneo, leviter angulato, perleviter sulcato inter angulos, intra sclerenchymate centrali manifesto sed non crasso et angustis fasciculis fibrarum fusiformis/ellipticis praesentibus; parte infera fasciculis fibrarum fusiformis/ellipticis semine-similibus albidisque usque ad 1.7 mm longis 0.4 mm latis cooperta. Semina recta vel subrecta, circa 1.2 mm longa 0.3 mm lata in medio; raphe lignosa, in medio circa 1/4 tenuiore quam reliquiis seminis, cellulis raphidiphoris praecipue cellulis crystalliferis e micropyle ad chalazam numerosissimis; cellulis internis integumentum externum a raphe remotis non auctis (“strophiole nullo”); crassificationibus lignosis in integumento externo non manifestis (Fig. 26-29).*

**Type:** Beer’s collectors BSIP 6705 (holo L!); Santa Ysabel, Binusa, hillside, 24 January 1966; climber reaching 100’ above ground; Kwara’ae name “Ariari”.

*Other material:* Craven & Schodde 306 (L!); Bougainville, lower South slopes of Lake Loloru crater, circa 15 miles North of Buin, primary montane rain forest with a number of very small water courses, alt. circa 2250 ft, 19 August 1964; climber, fruit dull mid green. This specimen appears to match well with the type of *F. coagmentata*; its leaf auricles are described above, in the diagnose.

The stem is smooth as seen on the remnant beneath the infructescences (no entire internodes preserved in the specimens). *F. coagmentata* is named with reference to its berries, which are very closely arranged along their infrapileal parts in syncarps. It is very close to *F. percostata* (New Guinea), also observed in the Solomon Islands. Both have berries with the largest number of stigmas ever observed in the Solomon Islands (generally 8-12-15 stigmas), but can be distinguished. In *F. coagmentata*: the leaves are 4-5 cm wide and abruptly attenuate in the upper part; the berries have fusiform/elliptic fibre bundles; the seeds are rich in crystal cells from micropyle to chalaza. In *F. percostata*: the leaves are 2.5-3 cm wide and gradually attenuate in the upper part; the berries do not have fusiform/elliptic fibre bundles; the seeds are devoid of crystal cells.

*F. coagmentata* also shows very close relationships with *F. laeta*. This New Guinean species also has berries with a very large number of stigmas (to 12 or more) and leaves abruptly attenuate in the upper part, but differs in other features. Its mature syncarps are about 14 × 4 cm, its infructescence peduncle about 1 cm long, its leaves about 140 cm long, in particular its leaf

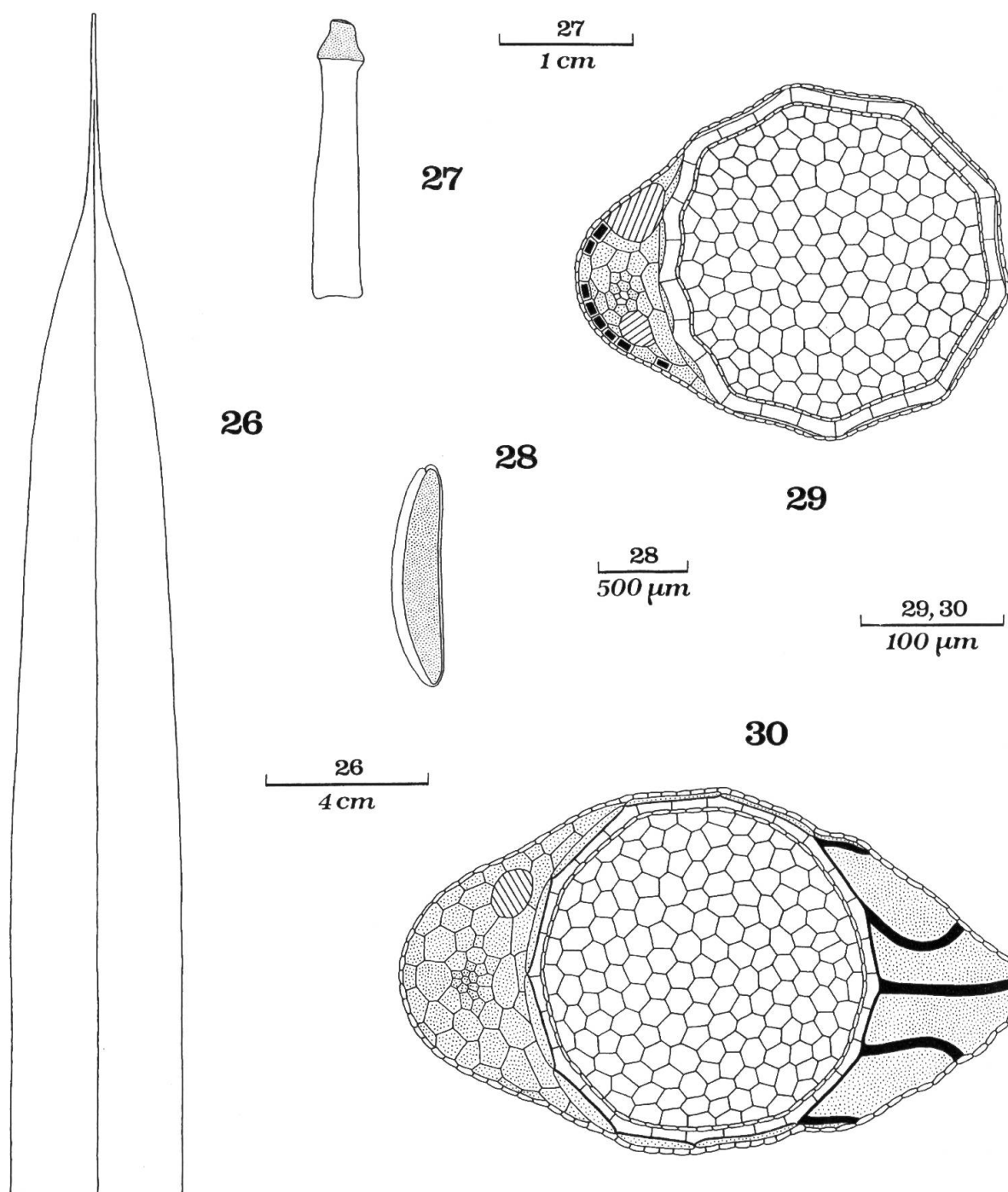


Fig. 26-30. — *Freycinetia coagmentata* Huynh (26-29: Beer's collectors BSIP 6705) and *F. bicolor* B. C. Stone (30: Stone 2484):

**26:** Upper part of leaf viewed by adaxial face (prickles not represented). **27:** Berry in lateral view (pileus dotted). **28:** Seed in optical section passing by symmetry plane (from left to right: raphe, endosperm dotted, integuments; micropyle above, chalaza below). **29, 30:** Seeds in middle transverse section, showing raphe on left and integuments on right (vascular bundle in raphe represented by smallest cells; crystal cells each with black rectangle; raphide cells hatched; lignified cells dotted; each integument with two cell layers; in Fig. 30, the inner cell layer of outer integument developed into a "strophiole" with largest cells).

auricles up to  $25-30 \times 3$  cm (so far such leaf auricles have not been observed in any Solomon species). In *F. coagmentata*, the mature syncarps are about  $9 \times 4.2$  cm, the infructescence peduncle to 7 cm long, the leaves 65-80 cm long, the leaf auricles about  $9-10 \times 0.7$  cm.

27. *Freycinetia bicolor* B. C. Stone (sect. *Pleiostigma*) in Proc. Biol. Soc. Washington 76: 4. 1963, Kew Bull. 24: 368. 1970; Huynh in Bot. Jahrb. Syst. 118: 531. 1996.

**Type:** Stone 2484 (BISH! holo), Santa Ysabel.

Leaves  $70 \times 2$  cm, gradually attenuate in the upper part, subcoriaceous; syncarps cylindric,  $11 \times 4$  cm (mature), peduncles 4.5 cm long, smooth in the type but scabrid in *Whitmore BSIP 1879* (L!); infructescence peduncle 4 cm long; stigmas (5-) 6-8 (-10); berries with a central sclerenchyma, but without fusiform/elliptic fibre bundles; seeds with a “strophiole”, but without crystal cells (Fig. 30).

*Material studied:* Stone 2484 (BISH! holotype), Santa Ysabel; *Whitmore BSIP 1879* (L!), New Georgia group, Rendova. The second specimen represents a form of *F. bicolor* (HUYNH, 1996: 544).

*F. bicolor* is very similar in habit to *F. solomonensis*, therefore they have been sometimes confused with one another. Both have similar syncarps, cylindric and up to 11 cm or more long, similar leaves, subcoriaceous, gradually attenuate in the upper part, 70-90 cm long about 2 cm wide, and similar berries, mostly with 6-8 stigmas. The confusion first occurred when their types (BISH!) were collected on 15 October 1957 by Sesedo village (Santa Ysabel). Actually, the two collections were at first given the same number *Stone 2484*; later, when studying them, Stone apparently realized that they did not belong to one and the same species, and he allowed one to keep 2484 and make the type of *F. bicolor*, while he gave 2484-A to the other which became the type of *F. solomonensis*. The most reliable difference between *F. bicolor* and *F. solomonensis* found by STONE (1963: 5, Fig. 1c and Fig. 2c) involved the seed aspect: the former species had seeds 0.9 mm long and with a “strophiole”; the latter species, seeds 2 mm long and without a “strophiole”. This distinction however, works with mature fruits only. Recently, when studying these types, two other differences were found: in *F. bicolor*, the berries do not have fusiform/elliptic fibre bundles, and the raphe is devoid of crystal cells (Fig. 30); in *F. solomonensis*, by contrast, the berries have fusiform/elliptic fibre bundles, and the raphe is rich in crystal cells from micropyle to chalaza. Either distinction works with mature or immature fruits: this is an evident example of the utility of the berry and seed anatomy in the taxonomy of *Freycinetia*. A useful application of the presence/absence of fusiform/elliptic fibre bundles in particular is that *Hunt RSS 2771*, which was attributed to *F. bicolor* by STONE (1970: 368), is in reality *F. solomonensis*.

28. *Freycinetia percostata* Merr. & L. M. Perry (sect. *Pleiostigma*) in J. Arnold Arbor. 20: 159. 1939; B. C. Stone in Kew Bull. 24: 365. 1970.

**Type:** Brass 7860 (A! holo), New Guinea.

Leaves  $80 \times 3$  cm, gradually attenuate in the upper part, subcoriaceous, auricles  $13 \times 1.2$  cm, splitting lengthwise into strips almost down to base; syncarps cylindric,  $21 \times 4$  cm (mature), peduncles 4.5 cm long, denticulate along the angles; infructescence peduncle 4-5 cm long; stigmas (4-) 8-12 (-20); berries with a thick central sclerenchyma but without fusiform/elliptic fibre bundles; seeds without crystal cells (young seeds in *Runikera & Collectors BSIP 10020* devoid of these cells). To date no mature fruits appeared to have been collected in the Solomon Islands.

*Material studied:* *Kajewski 2131* (BISH!), Bougainville; *Runikera & Collectors BSIP 10020* (L!), Guadalcanal; *Whitmore BSIP 4259* (L!), San Cristobal.

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