

ON THE GENUS SCHLEINITZIA (LEGUMINOSÆ-MIMOSOIDEÆ)

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ABSTRACT: The genus *Schleinitzia* was originally established by WARBURG in 1891 who subsequently recanted on its validity. This genus has recently been reestablished by VERDCOURT. Morphological, palynological, and distribution data are presented to substantiate its status. Also included is a complete description of the 3 species of *Schleinitzia*, *S. fosbergii*, *S. insularum*, and *S. novo-guineensis*, along with a key to these species.

RÉSUMÉ : Le genre *Schleinitzia* a été créé par WARBURG en 1891 qui désavoua ensuite sa validité. Il a été récemment rétabli par VERDCOURT; les études morphologiques, palynologiques et la répartition géographique confirment cette prise de position. Description complète de 3 espèces de *Schleinitzia*, *S. fosbergii*, *S. insularum* et *S. novo-guineensis* et clé de détermination.

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There has been considerable nomenclatural and taxonomic confusion surrounding several species of mimosoid *Leguminosæ* from the western Pacific Basin (New Guinea, Melanesia, Micronesia, and Polynesia). This confusion appears to have had its source in the attitudes of previous workers with regard to recognizing a morphologically and geographically isolated genus in the Pacific. They made efforts to place the plants (one or two species, depending on the worker) in a widely distributed genus, e.g., *Leucæna*, *Piptadenia*, or *Prosopis*. We agree with GUINET (1969) and VERDCOURT (1977) that the plants are best treated as species of the genus *Schleinitzia*, in which we recognize three species: *S. fosbergii*, *S. insularum*, and *S. novo-guineensis*. The genus is a member of tribe *Adenanthereæ* because of valvate calyx lobes, staminal filaments loosely united only at the base, stamens 10, and the anthers with a terminal, stalked gland.

The date and authorship of the generic name *Schleinitzia* has been uncertain. It was first used by WARBURG (1891) but withdrawn in an addendum on a subsequent page (p. 453) of the same publication. We believe the pertinent information of page 453 should be interpreted as equivalent to a proof correction. In it, WARBURG rejects his genus (*Schleinitzia*) in favor of *Piptadenia*, on the advice of TAUBERT, and the specific epithet (*microphylla*) is replaced by *novo-guineensis* because *microphylla* was preoccupied in *Piptadenia*. It is best to regard *Schleinitzia micro-*

phylla as published in synonymy. The generic name *Schleinitzia* was effectively, but not validly, published by WARBURG.

Recently, VERDCOURT (1977) has attributed effective generic authorship to H. HARMS (1917) but HARMS wrote « ... die Art steht innerhalb der pantropischen, aber vorzugsweise amerikanischen Gattung *Piptadenia* Benth. einigermaßen isoliert, so dass sie *vielleicht*¹ besser als eigenes Genus abgetrennt wird (*Schleinitzia microphylla* Warb...) ». HARMS' position is not firm enough to constitute validation of the generic name in our opinion.

It is exceedingly difficult to locate the publication in which *Schleinitzia* was first validly published because of the vast amount of literature between 1891 and the present. We regard GUINET's (1969) acceptance of the genus, with reference to HARMS' and WARBURG's descriptions, as sufficient for validation.

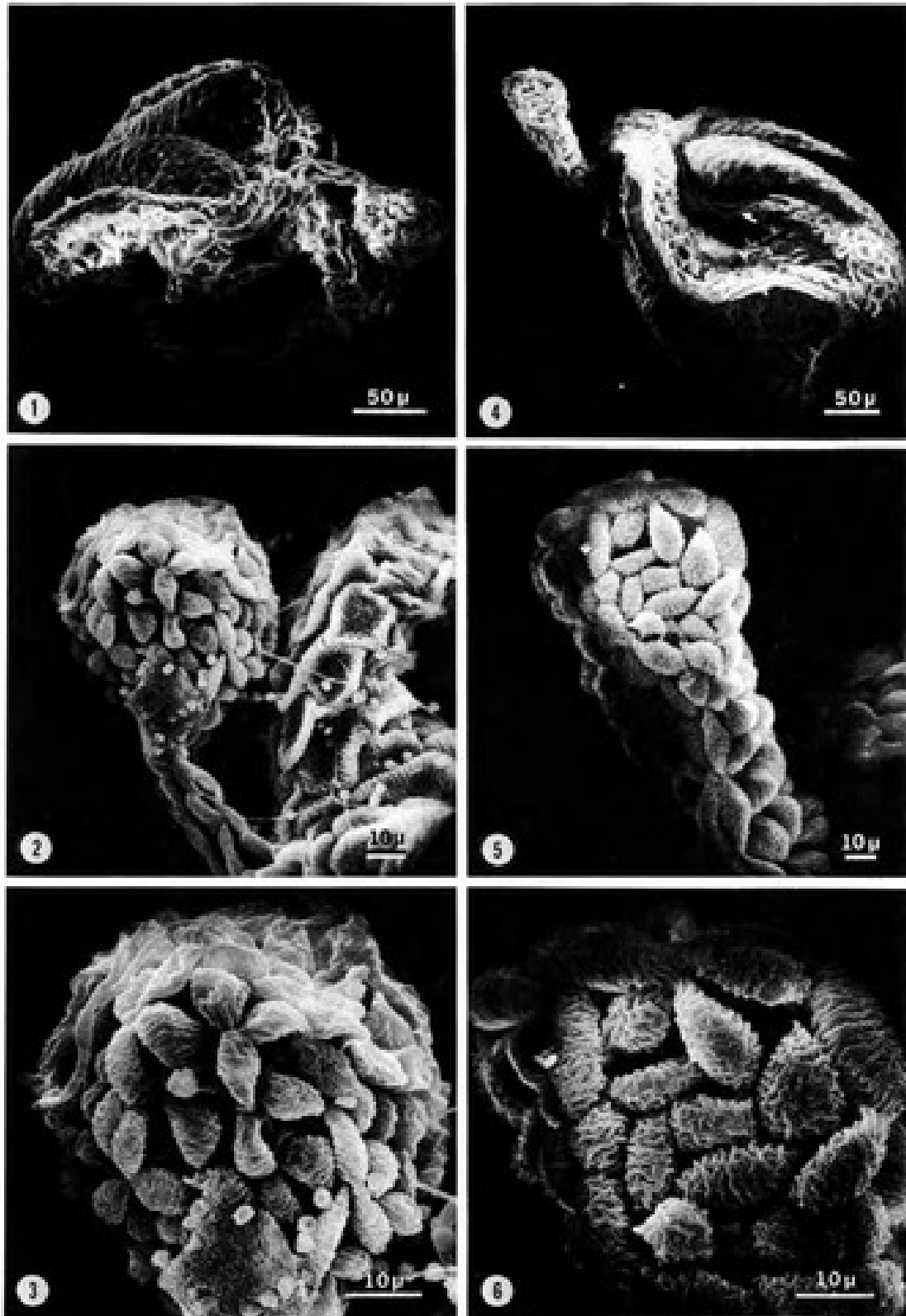
MORPHOLOGICAL NOTES

The characteristics most often used by previous workers in assigning the species under consideration to *Leucana*, *Piptadenia*, or *Prosopis* are: presence or absence of anther glands; presence or absence of albumen in the seeds; dehiscence or indehiscence of pods. These generic placements were the result of faulty observation, biogeographic prejudices, and the inappropriateness of these characteristics for generic discrimination. The characteristics have been summarized in Table 1 :

TABLE 1

GENUS	ANTHERS	SEEDS	PODS	DISTRIBUTION
<i>Leucana</i> . .	eglandular	scanty albumen	dehiscent	Southern North America, Central America, South America
<i>Piptadenia</i> . .	glandular	exalbuminous	dehiscent	South America
<i>Prosopis</i> . . .	glandular	albuminous	indehiscent	Central America, South America, Africa, Middle East, Asia
<i>Schleinitzia</i> . .	glandular	albuminous	indehiscent	New Guinea, Melanesia, Micronesia, Polynesia

1. Italics used here for emphasis.



Pl. 1. — Scanning Electron Micrographs of anther glands of *Schleinitzia* : 1, *S. novo-guineensis*, anther; 2, anther gland; 3, close-up of anther gland; 4, *S. insularum*, anther; 5, anther gland; 6, close-up of anther gland.

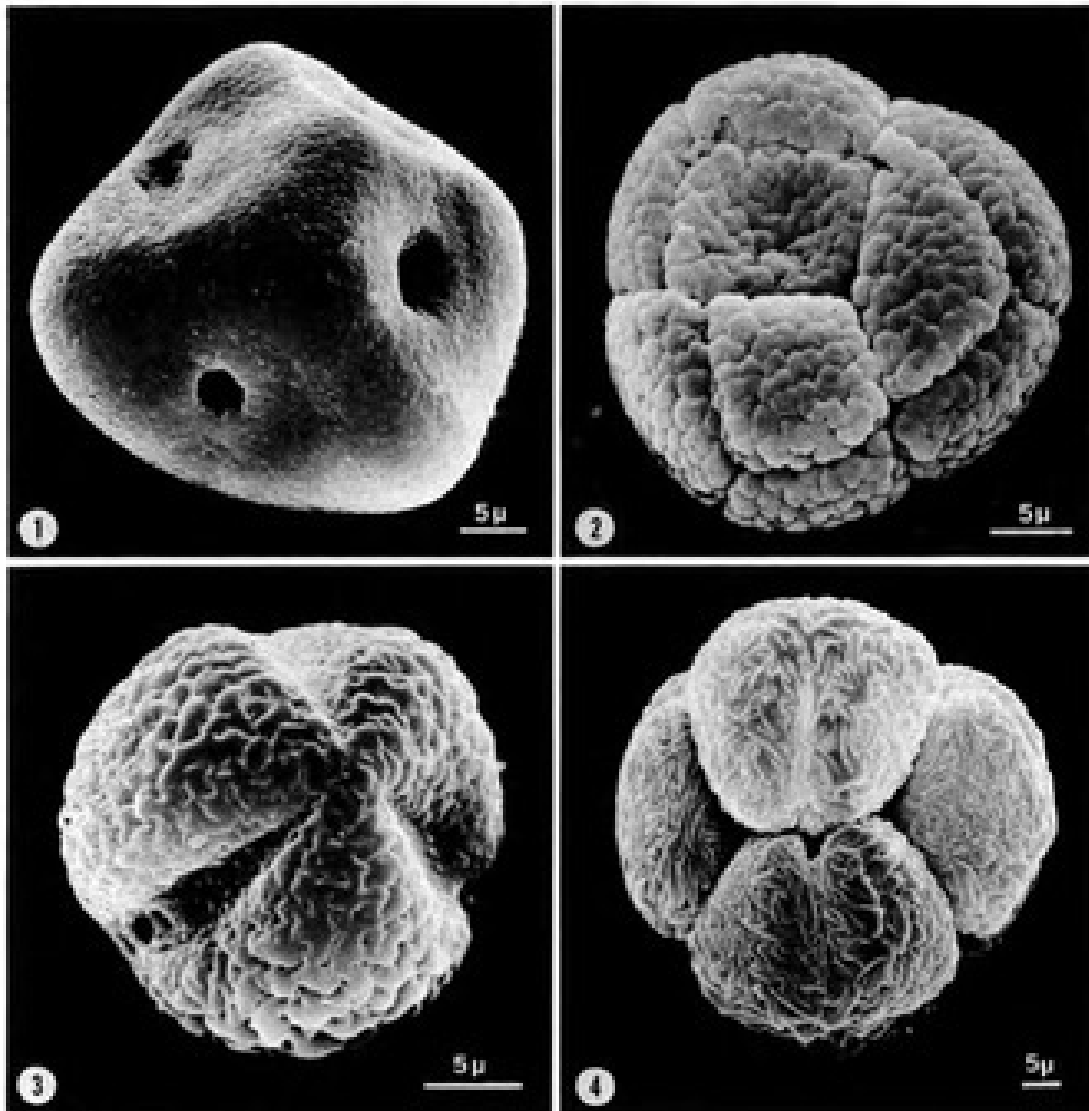
These characteristics were reviewed to determine if they would be useful taxonomically in separating the three species of *Schleinitzia*. Initial observation of the anther glands with the light microscope reveals some variation in their structure. All three species have glands that are stalked but their overall shape differs considerably. A study with the SEM shows that the glands of *S. novo-guineensis* have thin, uniform stalks with the gland appearing as a spherical appendage. The other two species, *S. fosbergii* and *S. insularum*, have stalks that are thin at the base but gradually increase in size to become the gland. There is no pronounced differentiation between the end of the stalk and the gland. These different types of glands are pictured in Plate 1.

Previous authors have mentioned that the seeds of *S. novo-guineensis* are more lustrous and narrower than those of *S. insularum*. Examination of a limited number of specimens seemed to confirm the previous observation, but after examination of all the material available, we believe that very few specimens have mature fruits with normally developed seeds. Insect larvæ in nature have seriously damaged many of the seeds. The long narrow seeds illustrated by BRETELER (1960, fig. 2) are commonly found in *S. novo-guineensis*. When seeds of the three species [*Fosberg 43500* (Guam), *Yuncker 15108* (Tonga), and *Brass 2698* (Solomon Is.)] appear to be developed properly, little useful difference can be seen among them.

It is difficult to establish measureable fruit differences as most of the pods we examined were immature and therefore of variable sizes. From casual observation the pods of *S. novo-guineensis* appear to be shorter and broader than those of *S. fosbergii* and *S. insularum*. However, one character of the infructescence that is consistent in partially separating the species is the appearance of the peduncle: *S. novo-guineensis* with a thin peduncle; and *S. fosbergii* and *S. insularum* with very stout peduncles. BRETELER (p. 397) has given a good description of the pods, especially as regards the question of whether or not they are dehiscent. Although the pod margins gape slightly in some specimens, giving the impression that they might eventually dehisce completely, we have found none with the valves completely separated. One could theorize that the present indehiscent pod had its origin from a dehiscent pod.

A character that has been ignored by most workers in this group is pollen. Pollen is proving to be a useful taxonomic tool in the *Leguminosæ*, as shown by the detailed survey studies of the subfamily *Mimosoideæ* by GUINET (1969) and SORSA (1969). The following pollen descriptions, taken from SORSA, are for *Leucana*, *Piptadenia*, and *Prosopis* (genera in which *Schleinitzia* species have been placed):

- Leucana* - Pollen grains of two types: 3-colporate monads or 6-8 (dizono) porate, paraiso- or heteropolar, similar to the individual grains loosened from polyads.
- Piptadenia* - Pollen grains united in (12-) 16 (-32)-celled bilateral or radially symmetrical, flattened polyads.



Pl. 2. — Scanning Electron Micrographs of pollen grains : 1, *Leucana canescens*; 2, *Piptadenia colubrina*; 3, *Prosopis juliflorum*; 4, *Schleinitzia novo-guineensis*.

Prosopis - Pollen grains in monads, 3-colporate or colporoidate, prolate spheroidal to prolate.

GUINET was the first to notice the discrepancy among the known pollen types of *Leucana*, *Piptadenia*, and *Prosopis* and the pollen of the group under study (he included *Piptadenia novo-guineensis*, *Prosopis insularum*, and *Xylia hoffmannii*), and proposed that these species be united under the name *Schleinitzia*. We agree with his conclusion except that we reject *Xylia hoffmannii* as a member of the genus because of its 8-grained (bitetrad) polyads as well as differences in gross morphology. Unlike *Leucana*, *Piptadenia*, or *Prosopis*, the characteristic pollen of *Schleinitzia* is a tetrahedral tetrad with the individual grains tricolporate, and averaging

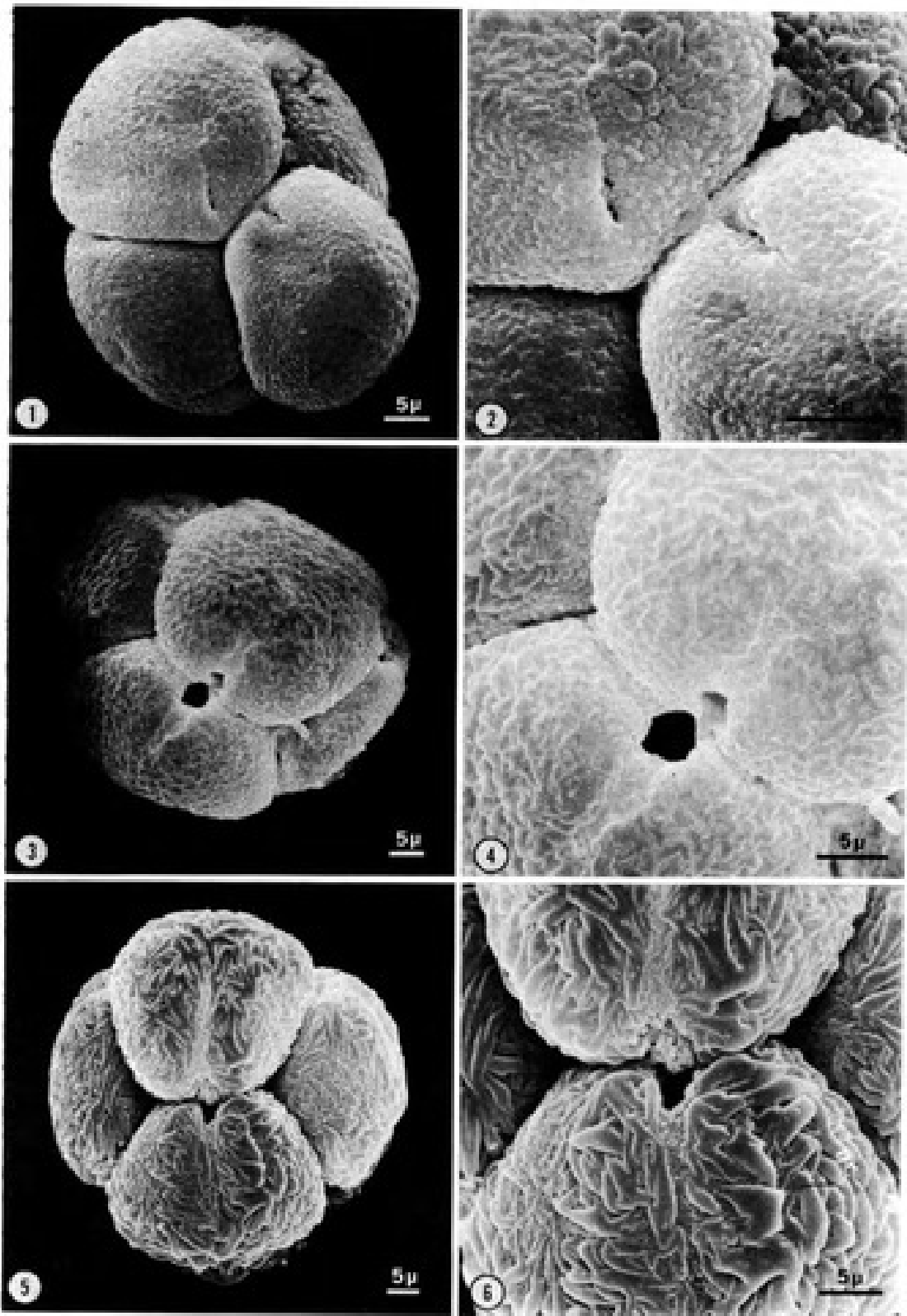
between 62-70 μm in overall size. Plate 2 shows photomicrographs of each pollen type for comparison.

The tetrahedral tetrads of *Schleinitzia* have their apertures arranged in an interrational position (six groups of two apertures each). The individual grains are tricolporate with a rugulate or granular exine (Plate 3). The species of *Schleinitzia* may be grouped according to the exine pattern. The pollen of *S. novo-guineensis* has a very prominent rugulate exine. In *S. insularum* the exine of the grain is granular with occasional patches or rudimentary rugulae persisting at the polar end. *Schleinitzia fosbergii* has pollen with a completely granular exine. The pollen data supports an alliance of *S. fosbergii* with *S. insularum* rather than with *S. novo-guineensis*, which is consistent with other morphological evidence.

SEXUAL STATE

In *Schleinitzia*, as in most other mimosoid genera having capitate inflorescences, all of the flowers of an inflorescence reach anthesis at approximately the same time. In this respect the inflorescence simulates a single flower. The regular occurrence of unisexual and bisexual flowers in a single inflorescence accentuates this resemblance. Unfortunately, the material at hand is too meager to permit the wholesale dissections necessary to confirm absolutely the sexual states of all of the flowers of a number of inflorescences of each species. Casual observation, however, indicates that some, most, or all of the flowers in an inflorescence may be functionally unisexual and staminate by abortion of the gynæcium. Functionally bisexual flowers appear to be arranged most often near the apex of the inflorescence (or in the center of the pseudanthium) in a manner similar to that found in some other mimosoid genera, e.g. *Albizia* and *Calliandra*. A central position in a pseudanthium for a bisexual flower would seem to be advantageous in exploiting any potential pollinator (here assumed to be insects), and in single-fruited infructescences the pod is most often located near the central position. The number of bisexual flowers per inflorescence appears to vary from inflorescence to inflorescence and among species of *Schleinitzia*. Each of the three species appears to have a different average percentage of bisexual flowers in an inflorescence. The evidence for this is largely indirect and is based upon observation of the number of fruit set per inflorescence. The number of fruit seems to be controlled physiologically and not solely by the number of bisexual flowers available (assuming all are pollinated). We have assumed that physiological controls would operate more or less equally in three such closely related species.

Only a minority of inflorescences actually set fruit. Although the sample size is inadequate for a definitive conclusion, it appears that *S. insularum* has the greatest average of fruit set per infructescence, followed by *S. fosbergii* and *S. novo-guineensis*. We interpret this as a partial reflection of the relative number of bisexual flowers per inflorescence. A similar



Pl. 3. — Scanning Electron Micrographs of pollen grains of *Schleinitzia* : 1, *S. fosbergii*; 2, granular exine; 3, *S. intolaram*; 4, granular exine with rudimentary rugulae; 5, *S. novoguineensis*; 6, rugulate exine.

extrapolation in *Albizia julibrissin* in cultivation seems to be valid on the basis of our observations. The percentage of infructescences bearing only a single fruit is interpreted as being significant: *Schleinitzia novo-guineensis*, 67 % (with a maximum of 5 pods); *S. insularum*, 23 % (with a maximum of 14 pods); *S. fosbergii*, 22 % (with a maximum of 5 pods). The details are given in Table 2 and, although the maximum number of pods is approximately the same in *S. novo-guineensis* and *S. fosbergii*, it seems that the *S. insularum* and *S. fosbergii* fruiting patterns are most closely related.

TABLE 2

PERCENTAGE OF DIFFERENT NUMBERS OF PODS PER INFRACTESCENCE IN SCHLEINITZIA			
	<i>S. novo-guineensis</i> ¹	<i>S. insularum</i> ²	<i>S. fosbergii</i> ³
No. frts./Infruct.			
1	67	22	22
2	17	7	22
3	12	15	22
4	1	18	22
5	2	11	11
6	—	7	—
7	—	6	—
8	—	6	—
9	—	1	—
10	—	—	—
11	—	1	—
12	—	1	—
13	—	1	—
14	—	1	—

1. Based on 243 infructescences.
2. Based on 71 infructescences.
3. Based on 9 infructescences.

DISTRIBUTION

The geographic distribution of *Schleinitzia* serves to separate it from other genera into which it has been placed previously (Table 1). The three species of *Schleinitzia* also are isolated from one another in that they occur on separate island groups or parts of island groups in the Pacific Basin (fig. 5). *Schleinitzia novo-guineensis* is found on mainland New Guinea and its associated islands, Moluccas, Solomon Islands, and the northern New Hebrides. BRETELIER (1960) and VERDCOURT (1977) have placed all the New Hebridean material under *S. novo-guineensis*, but we have found no justification for this arrangement. In a discussion of

plant geography of the Pacific, VAN BALGOOY (1971) states: " My impression is that this island group [New Hebrides] is an area of overlap and that if a more detailed analysis could be made a demarcation might prove to exist between the northern and southern parts of the group. This is one of the least explored parts of the whole Pacific. " The morphological evidence from *Schleinitzia* tends to confirm this hypothesis. The specimens from the northern islands belong to *S. novo-guineensis* and those from the southern islands to *S. insularum*. The latter has a widespread distribution ranging from the southern New Hebrides east to the Society and Austral Islands, and encompassing New Caledonia, Fiji, Tonga, Niue, and Cook Islands. The third species, *S. fosbergii*, is confined to south-eastern Guam and small adjacent islands in the Marianas.

In examining these distribution patterns in light of current biogeographical theories concerning the Pacific Basin region, a tentative proposal on the origin and radiation of *Schleinitzia* can be suggested. Considering the land masses on which *Schleinitzia* is found, the New Guinea land surface has existed longer than most of the island groups. The flora of New Guinea is predominantly Indo-Malaysian in character but also has much in common with the Pacific floras to the east and southwest of it. It may be added that this double relationship coupled with the great richness of the flora and its singular deficiency in well-marked large-scale endemics, suggests that New Guinea may indeed have been the aboriginal home from which has spread much of the present Malaysian and Melanesian plant life, and this in turn is a consideration of great importance with regard to the origin of the various Pacific floras (GOOD, 1974). THORNE (1963) agrees that New Guinea is thought to have served as a center of origin and dispersal of many biotic groups. In view of these theories it is quite probable that *Schleinitzia* evolved on New Guinea and radiated to other islands. A westward migration from Polynesia is a less likely solution since it is generally agreed that there is no real ' Polynesian flora ' and that all the plants within this great area, derive more or less directly, from adjacent floras.

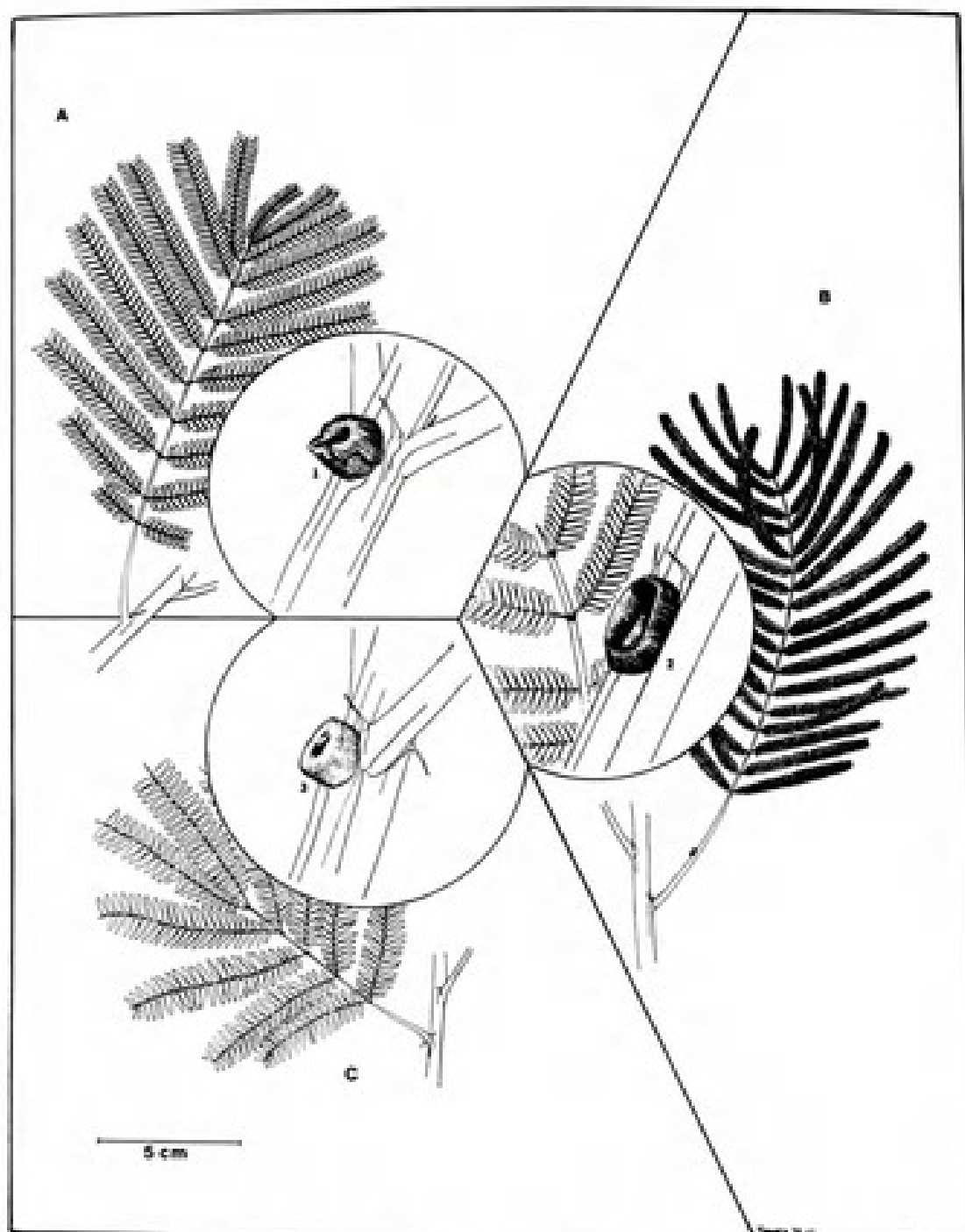
A primary radiation from New Guinea would logically occur to the island groups closest to it: New Britain, New Ireland, and the Solomon Islands. As might be predicted the Solomons have their closest botanical ties with New Guinea and their floras have a remarkable degree of resemblance. At least 572, or almost 98 % of the 585 genera recorded from the Solomons are represented also in New Guinea (THORNE, 1969). It is not unusual then that the same species of *Schleinitzia* occurs on New Guinea and the Solomon Islands considering their geographic position and floristic affinities. Further radiations to other islands coupled with geological changes in land formations and positions and prolonged geographic isolation would account for the present day distribution of *Schleinitzia* and its evolution into three species.

Dispersal from island to island can be accomplished in a number of ways: ocean currents, rafting, winds, birds, or frugivorous bats. Both RIDLEY's (1930) and CARLQUIST's (1974) discussions of island floras show

that the majority of indigenous plants of oceanic islands are dispersed by one of these means. Since legume seeds are notably capable of seawater transport without loss of viability (RIDLEY, 1930; CARLQUIST, 1974), ocean currents may be one of the means of dispersal in *Schleinitzia*. But another important agent of dispersal which must be considered is people. The explorations to various islands of the Pacific by natives is well documented. Plants that were important to their lifestyle (ceremonial, economic, etc...) were often transported. To ascertain whether a plant is distinctly native or introduced and cultivated by people is especially difficult if that species has been used since ancient times. In the case of *Schleinitzia* a few collectors mention uses in cremations, native medicine, frames for fish-nets and handicraft works (specimens collected from the Solomons and Tonga). WALKER (1948) in his study of the forests of the Solomon Islands states: "Almost all the tree species are of considerable use in native economy: some supply light building material, others supply bark-fibre or native medicine. The following are particularly important in this respect, or particularly prominent in forests of the type: *Piptadenia* spp." Later he describes *P. novo-guineensis*, but unfortunately, does not say specifically how it was used by the natives. The alliance of *S. fosbergii* with *S. insularum* rather than with its closest geographic neighbor, *S. novo-guineensis*, might also indicate a long range dispersal by people in ancient times. A network model (TERRELL, 1977) predicting patterns of interaction among the islands in the Solomons chain offers more evidence to support this theory. Two fundamental variables, area and distance, were adopted to construct this model. Following a procedure developed by the author called "proximal-point analysis," it was shown that the resulting model successfully anticipated patterns of trade, inter-island voyaging and cultural diversity. When this model is compared with localities from collection data of *Schleinitzia* from this area (fig. 6), the coincidence of the two is striking. We believe that people did indeed play some role in the movement of *Schleinitzia* around the Pacific.

The geological make-up of the islands does not seem to offer any additional evidence for the distribution patterns exhibited by the three species. Coral limestone and volcanic rock are the main sedimentary components of these land areas. None of the species, however, is confined to only one type of substrate. There is, however, some correlation between the species and their habitats. *Schleinitzia novo-guineensis* occurs mainly in secondary growth areas, near the coast, but inland. The other two species are more commonly located on or near the beach.

A problem often encountered in attempting to plot an accurate distribution record is the scarcity of data. In the Pacific Basin area many of the islands are unexplored or selectively collected, as is the case with New Guinea. New Guinea has been one of the last parts of the world to be penetrated by explorers and until about 30 years ago reports concerning the flora were not only meager but also somewhat misleading because they were inevitably based on studies of the more accessible coastal regions where widespread and adventive plants are especially in evidence (GOOD,



Pl. 4. — Leaves and glands of *Schleinitzia* : A, *S. insularum*: 1, ostiolate gland; B, *S. novoguineensis*: 2, cymbiform gland; C, *S. fosbergii*: 3, cupulate gland.

1974). Our map, therefore, indicates a distribution of *Schleinitzia novoguineensis* from the east coast with a disjunction to the Moluccas, west of New Guinea. This situation could indicate one of two things: either a natural distribution, the Moluccan specimen representing a dispersal by people; or an unnatural distribution due to selective collecting with

Schleinitzia actually occurring across all of New Guinea, the Moluccas simply representing an extension of that range. Either solution is plausible, neither can be proved at this time based on the collections. Problems such as this exemplify the difficulty in determining a true distribution pattern.

TAXONOMIC TREATMENT

SCHLEINITZIA Warb. ex Guinet

Inst. Franc. Pondichéry Trav. Sci. Tech. 9 : 33-34 (1969).

TYPE SPECIES : *Schleinitzia novo-guineensis* (Warb.) Verdc.

Trees or shrubs, to 25 m tall, unarmed; bark fissured; branches with prominent lenticels, pubescent, glabrescent, or glabrous. Leaves alternate, bipinnately compound, pinnæ pairs 4-30; adaxial petiolar and rachidial glands present; petiole and rachis canaliculate, pubescent, glabrescent, or glabrous, with an extended tip at the apex; leaflets minute, opposite, 20-60 pairs per pinna, oblong, obliquely rounded at the base, obtuse or slightly mucronulate at the apex, margin entire, midvein impressed beneath and inconspicuous above, pubescent, ciliate, glabrescent, or glabrous; stipules filiform, broadened at the base, persistent. Inflorescences 1-5 in the axils of the young shoots, capitate, many-flowered, the young heads protected by peltate bracts, pedunculate, the peduncle bracteolate at or near the apex. Flowers externally actinomorphic, 5-merous, bisexual or functionally staminate by abortion of the gynæcium; sepals 5, connate into a tube, the lobes deltoid, valvate, erect; petals 5(6-7), free, alternisepalous except when supernumerary, erect, exceeding the calyx tube, oblanceolate, glabrous, valvate; stamens 10(9-8), the filaments loosely connate at the base, free above, glabrous, the anthers greatly exerted, basifixed, dehiscing longitudinally, introrse, the connective broad, with a small, stalked, apical gland, the pollen shed in tetrads, grains tricolporate; gynæcium 1, bicarpellate, unilocular, sometimes variously aborted; the ovary superior, short stipitate, oblong, laterally compressed, the style eccentric, the stigma minute, cupuliform, exceeding the anthers at anthesis. Fruit an indehiscent pod, flat, oblong to broadly linear, obtuse or truncate at the apex, glabrous, blackish when mature, held erect or nearly so to maturity; seeds 8-20, flat, more or less oblong, brown to almost black, pleurogram obvious, endosperm present.

KEY TO THE SPECIES OF *SCHLEINITZIA*

1. Leaves with 10-30 pinnæ pairs, 30-60 leaflet pairs per pinna, leaflets 2-6 mm long, 0.25-2 mm broad; lowermost foliar gland cymbiform, borne approximately midway between the petiole base and the lowermost pinnæ pair, supernumerary glands heteromorphic; fruiting peduncle thin. Plants of the northern New Hebrides, New Guinea, Solomon, and Molucca Island complexes 1. *S. novo-guineensis*

- 1'. Leaves with 4-16 pinnæ pairs, 20-35 leaflet pairs per pinna, leaflets 5.5-10 mm long, 1-3 mm broad; lowermost foliar gland cupulate, ovate, or ellipsoid, borne at the junction of the lowermost pinnæ pair, supernumerary glands isomorphic; fruiting peduncle stout.
2. Leaves with 7-16 pinnæ pairs, 25-35 leaflet pairs per pinna, leaflets pubescent, ciliate, or glabrescent; lowermost foliar gland cupulate or ovoid, often appearing ostiolate when older. Plants of the southern New Hebrides, New Caledonia, Fiji, Tonga, Niue, Cook, Austral, and Society Island complexes 2. *S. insularum*
- 2'. Leaves with 4-6 pinnæ pairs, 20-25 leaflet pairs per pinna, leaflets glabrous; lowermost foliar gland cupulate. Plants of the Marianas 3. *S. fosbergii*

1. *Schleinitzia novo-guineensis* (Warb.) Verdc.

Kew Bull. 32 : 233 (1977).

- *Piptadenia novo-guineensis* WARB., Bot. Jahrb. 13 : 453 (1891).
- *Schleinitzia novo-guineensis* (WARB.) VERDC. var. *pubescens* VERDC., Kew Bull. 32 : 233 (1977); typus : *Waterhouse 547 BB.*
- *S. microphylla* WARB., l.c. : 336 (1891), nom. inval.
- *Prosopis insularum* (GUILL.) BRET. subsp. *novo-guineensis* (WARB.) BRET., Acta Bot. Neerl. 9 : 402 (1960).

Typus : *Warburg 20458* (holo-, B, delet.; iso-, BM).

Small spreading tree to 25 m tall, d.b.h. to 30 cm, the bole most often straight, without buttresses; branches pubescent or glabrescent. Petiole and rachis pubescent or glabrescent with tip at apex 1-3.5 mm long. Petiole bearing one (rarely two) cymbiform gland(s) midway between base and apex; rachis with a cupulate gland between pinnæ of upper 1-5 pairs, rarely with additional glands scattered elsewhere. Pinnæ pairs (10-)14-22(-30); leaflet pairs 30-60 per pinna, 2-6 mm long, 0.25-2 mm wide, pubescent or ciliate. Stipules erect or recurved, 1-4.5 mm long. Inflorescences bearing ca. 80-120 flowers. Flowers bisexual or functionally staminate, each subtended by a peltate bract, the bract 1.5 mm long, 1.25-1.5 mm broad, erose toward the apex; calyx tube 1-1.25 mm long, 0.5-0.75 mm broad at the orifice, glabrous, the lobes ca. 0.25 mm long and broad, often with a few trichomes near the apex; petals 5, narrowly elliptic, 1.75-2.25 mm long, 0.5 mm broad, acute at the apex; stamens 10, filaments ca. 6 mm long, glabrous, the anthers exerted, 0.25 mm long and broad; gynæcium rudimentary or 1, the ovary ca. 1-1.5 mm long, glabrous, the style ca. 3.5-4 mm long, glabrous, the stigma exerted beyond the anthers. Pods 5-9.9 cm long, 1.2-2.5 cm wide; seeds 14-20. — Pl. 4, B.

VERDCOURT has recognized two varieties within this species, *novo-guineensis* and *pubescens*, based on whether the leaflets are ciliate or pubescent. The New Guinea material is all with ciliate leaflets. Both ciliate and pubescent leaflet types are found in the Solomon Islands, especially Guadalcanal. The ciliate vs. pubescent characteristic is an either/or situation which combined with incomplete geographic disjunction, leads

VERDCOURT to use varietal rank rather than that of subspecies. He gives the impression that the distribution has been modified by intentional introductions. This assumption is probably correct as the wood has both utilitarian and ceremonial uses, the latter being more important in dispersal by people of non-food plants.

We have chosen not to recognize varieties in this species because: the difference although real, is minor; if introductions continue, the geographic disjunction should degrade further; if one recognizes varieties based on leaflet pubescence in this species, they must be considered also in *S. insularum* and no practical purpose seems to be served in that species.

LOCAL USES: wood favored for fuel at cremations; bark used in native medicine; wood used for frames of fish nets (all Solomon Islands).

VERNACULAR NAMES : *baligon*, *behben*, *benebena*, *berebere*, *gili*, *karefo*, *kareho*, *kariho*, *koropoi*, *mommow*, *sangu*, *songo*, *tikoro*, *wassio*.

ILLUSTRATIONS: BRETELIER, *Acta Bot. Neerl.* 9 : 401, fig. 2 (1960), as *Prosopis insularum* ssp. *novo-guineensis*.

CHROMOSOME NO.: $2n = 54$ (*Lam/Versteegh* BW 750, New Guinea), report by J. A. FRAHM-LILVELD in BRETELIER.

MATERIAL EXAMINED : MOLUCCAS : MOROTAI : *Tangkilisan* 18, Tobelo Subdistr., Daigila Penin., L. — WEST IRIAN : Hollandia : *Kalkman* 3709, L; *Lam/Versteegh* 750, Depapre, A, L; *Kalkman* 3592, Berg en Dal, A, L. — PAPUA NEW GUINEA : WEST SEPIK : *Schlechter* 14598, Torticelli Mts., BM, PO. MADANG : *Hoogland* 4895, Gogol Valley, A, BM, K, L, US; *Lewandowsky* 29, Stephansort, L, PO; *Lauterbach* 2236, Nuru Fluss (Basin), PO; *Lauterbach* 2084, Oerizen Mts., Nowulja Fluss (Basin), PO; *Schlechter* 14295, Constantin-Hafen (Konstantinshafen), PO; *Vandenberg & Mann* 42212, Kar Kar airstrip, BB; *Vandenberg & Mann* 42226, South Bagabag I., BB, US. MOROBE : *Womersley* 11835, Lae, Oomsis Creek, K, L; *Hartley* 10957, Lae, Markham R., L; *Henty* 9887, Lae, Markham Road, A, L; *Streimann & Kairo* 27915, Lae, Markham Pt., BB, US; *White & al.* 1646, Yalu, L; *Millar* 12298, Wanaru Plantation, A, K, L; *Clemens* 8023, Sattleberg, Finschhafen, A; *Warburg* 20481, Finschhafen, BM; *Welshland* 340, Viehpark, Finschhafen, PO. MILNE BAY : *Womersley* 19269, Gumni Valley, Cameron Plateau, BB, L; *Hoogland* 4366, Cape Vogel Penin., A, L; *Brass* 21773, Cape Vogel Penin., Menapi, A, L, US; *Brass* 21678, A, US; *Saunders* 92, Cape Vogel Penin., Kwareibo, A, L; *Brass* 1596, Domara R., A; *Cotrell & Dormer s. n.*, Samarai, G; *Brass* 25142, Goodenough I., between Vivigani and Beli Beli, A, US; *Brass* 27339, Fergusson I., Deidei, Gomwa Bay, A, L, US; *Gillison* 25310, Kitava I., K; *Brass* 27569, Misima I., Narian, A, L, K, US; *Brass* 28026, Sudest I., (Tagula I.) Rambuso, A, L, US; *Brass* 28341, Rossel I., Abaleti, A, K, L, US. NEW IRELAND (New Mecklenburg) : *Peckel* 158, PO. BOUGAINVILLE : *Waterhouse* 388 B, Petats I., near Buka, A, K, L; *Kajewski* 1594, Kieta, A, L, P; *Lavarack & Ridsdale* 31157, Pavairi, L; *Waterhouse* 547 AB, Siwai (language or culture locality), A, K, L; *Waterhouse* 547 BB, K; *Waterhouse* 21139, K. — SOLOMON IS. : SANTA ISABEL : *Beer & al.* 6601, Binusa N. W., L, US; *Whitmore* 2434, Maringe Lagoon, Molau village, K, L; MALAITA : *Lipaeto* 3485, Are Are Dist., K, L; *Mauriasi & al.* 13738, Harumou, K, L; *Stone* 2404, Kwara-ai Dist., Kwalo, BB, US; *Mauriasi & al.* 13550, Su'u area, K; *Gafni & al.* 17299, Small Malaita (Maramasike), N. of Palasu'u, L. ULAWA : *Teona* 6276, Mouta, L, US. GUADALCANAL : *Whitmore* 1831, Honiara, Umasami R., K, L; *Whitmore* 720, Honiara, Marmara Road, K, L; *Mauriasi & al.* 11842, Makina area, L; *Walker & White* 120, Point Cruz, A, L, US; *Boraule & al.* 9477, Marau, Makina R. area, K, L; *Lipaeto* 3331, Rere R., K, L; *Kere* 5060, White R. Ridge, L; *Morrison* 239, White R., K, L; *Riley* 29, Tenam R., US. SAN CRISTOBAL : *Brass* 2736, Mahgotha R. (Maghoha), A, BB, L; *Brass* 2698, Balego-Nagonago

- *Leucena insularum* (GUILL.) DÄNIKER, Vierteljahrschr. Nat. Ges. Zurich Jahrg. 77 (Beibl. 19) : 176 (1932).
- *Prosopis insularum* (GUILL.) BRET., Acta Bot. Neerl. 9 : 398 (1960).
- *Prosopis insularum* (GUILL.) BRET. subsp. *insularum*, l.c. : 398 (1960).
- *Leucena insularum* (GUILL.) DÄNIKER var. *insularum*, Micronesica 2 : 67 (1965).
- *Leucena forsteri* BENTH., Hooker London Journ. Bot. 5 : 94 (1846), based on *Acacia insularum*, nom. inval.
- *Mimosa glandulosa* SOLANDER ex FORSTER, Prodr. 92 (1786), nom. nud.

TYPUS: Bertero & Moerenhout s.n. (lecto-, P).

Low shrub to small tree, 2-15 m tall, d.b.h. 45 cm; branches pubescent, glabrescent, or glabrous. Petiole and rachis pubescent, glabrescent, or glabrous with tip at apex 1-5 mm long. Rachis bearing one cupulate or ovoid gland (often appearing ostiolate when older) between the pinnae of lowermost pair and between all or upper 1-6 pairs. Pinnae pairs (7-) 9-13 (-16); leaflet pairs 25-35 per pinna, 5.5-10 mm long, 1-2.5 mm wide, pubescent, ciliate, glabrescent, or glabrous. Stipules erect, recurved, or reflexed, 2-6 mm long. Inflorescences bearing ca. 100 flowers. Flowers bisexual or functionally staminate, each subtended by a peltate bract, the bract 1.25-2.25 mm long; 0.5 mm broad, erose toward the apex; calyx tube 1.25-1.5 mm long, ca. 0.75 mm broad at the orifice, sparsely puberulent or glabrous without, glabrous within; the lobes 0.25 mm long and broad, glabrous; petals 5 (6-7), narrowly elliptic, 2-2.5 mm long, 0.5 mm broad, acute and apiculate at the apex; stamens 10 (9-8), the filaments ca. 4.5 mm long, glabrous, the anthers exserted, 0.25 mm long and broad; gynæcium rudimentary or 1, the ovary ca. 0.75 mm long, glabrous, the style ca. 4 mm long, glabrous, the stigma exserted. Pods 5.5-11.8 cm long, 1.2-1.9 cm wide; seeds 8-15. — Pl. 4, A.

The first relatively recent and well-documented reexamination of this group was published by BRETÉLER in 1960. Basically, he studied all of the plants treated here excepting those of *S. fosbergii*. He recognized a single species, *Prosopis insularum*, with two subspecies, *insularum* and *novo-guineensis*. BRETÉLER's subspecies are nearly equivalent to two of the species recognized here and bear the same names except that BRETÉLER included all the specimens from the New Hebrides in *insularum* (as did VERDCOURT).

LOCAL USES: wood used for handicrafts (Tonga).

VERNACULAR NAMES: *chotha-hao*, *feifai*, *mohemohe*, *ohai*, *siale*, *taihune lau ikiiki*, *tavahihi*, *tavahi kaku*, *toroire*, *toro rire*, *troire*.

ILLUSTRATIONS: BRETÉLER, Acta Bot. Neerl. 9: 399, fig. 1 (1960), as *Prosopis insularum* ssp. *insularum*.

CHROMOSOME NO.: $2n = 52$ (Yunker 15108, Tonga), report by J. A. FRAHM-LELIVELD in BRETÉLER.

MATERIAL EXAMINED: NEW HEBRIDES: Aneityum: Morrison s. n., K; Kafewaki 944, Aneigauhat Bay, A, BB, US, Z; Wilson 993, Anaunae, A. — NEW CALEDONIA: Lenor-

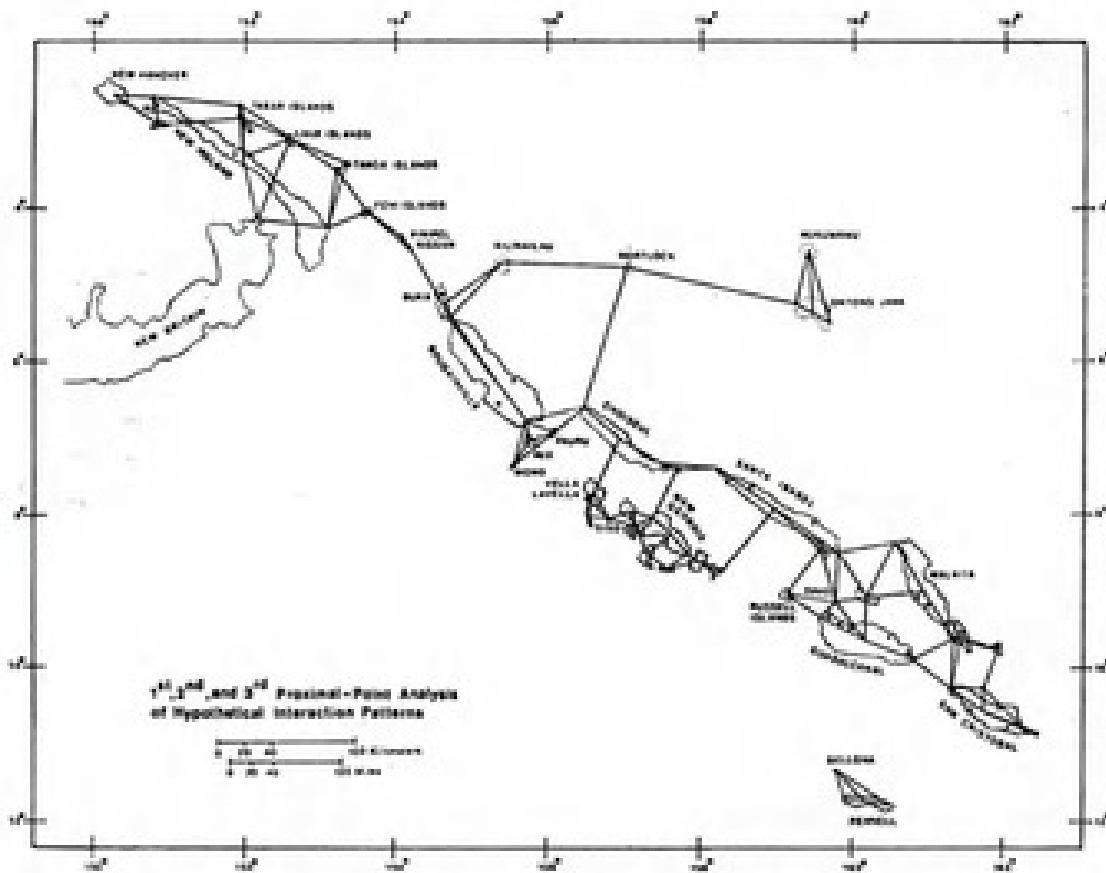


Fig. 6. — Map based on TERRELL (1977), with collection localities of *Schleinitzia novoguineensis* superimposed (■).

mand 346, without further locality, K; *Anderson s.n.*, Balade, BM. LOYALTY IS.: *Däniker 1958*, Uvea, U, Z; *Däniker 1958 a*, Lifu, Z; *Balansa 2455 a*, A, BM. — FIJI: *Seemann 142*, without further locality, K; *Capt. Wilkes Exped. 1838-42*, GH, US. VANUA LEVU: *Degener & Ordóñez 14179*, Thankundrove, Marava, A. MOTHE: *Bryan 479*, BB. TOTOYA: *Bryan 350*, BB; *Tothill 130*, K. — TONGA: *Banks & Solander s.n.*, without further locality, US; *Nelson s.n.*, BM. LIFUKA: *Yuncker 15791*, BM, GH, U, US. TONGATAPU: *Yuncker 15108*, Niutoua, BB, BM, GH, U, US; *Soakai 356*, Kolomotua, BB, K; *Iolalia 86*, Sopa, BB, K; *Hurlimann 92*, Hofoa, Z. EUA: *Yuncker 15532*, Lokupo, BB, BM, U, US; *Hotta 5461*, Ho'otu'a, BB. — NIUE: *Jensen 12*, without further locality, BM. ALOFI: *Yuncker 9899*, BB, US; *Yuncker 10038*, BB; *Yuncker 10153*, BB. — COOK IS.: RAROTONGA: *Wilder 992*, A, BB; *Stoddart 2139*, Motutapu, Ngatangia Har., BB. AITUTAKI: *Stoddart 2203*, Ootu, BB. — SOCIETY IS.: TAHITI: *Vesco s.n.*, L; *Capt. Wilkes Exped.*, US; *Forster & Forster s.n.*, BM; *Bertero & Moerenhout s.n.*, P; *Moerenhout s.n.*, P; *Nadeaud 507*, P. RAIA TEA: *Moore 567*, Fatuna, BB; *Moore 117*, Uturoa, BB; *St. John & Wight 17224*, Tataro Islet, A, BB. MOOREA: *Grant 5367*, Afareaitu Dist., Ahi, BB; *Lepine 22*, Taitapu, P. BORABORA: *Lesson s.n.*, P; *Grant 4839*, Nunue Dist., Faatahi, BB. HUAHEINE: *Banks & Solander s.n.*, BM. — AUSTRAL IS.: RAIYAVAE: *St. John 16074*, Anatonu, BB; *Fosberg 11684*, Vaiannaua Penin., BB; *St. John & Wight 15891*, Motu Tuitui, BB. RURUTU: *Hambuechen s.n.*, BB; *St. John 16764*, Arapiia, BB. — POLYNESIA: *Powell s.n.*, without further locality (Samoa?), K.

3. *Schleinitzia fosbergii* Nevl. & Niezgoda, *nom. et stat. nov.*

— *Leucena insularum* (GUILL.) DÄNIKER var. *guamensis* FOSBERG & STONE, *Micronesica* 2 : 67, 1965.

Typus: *Fosberg* 43502 (holo-, US; iso-, F).

Shrub or small tree to 6 m tall; branches glabrescent or glabrous. Petiole and rachis glabrescent or glabrous with tip at apex 1.5-2 mm long. Rachis bearing one (rarely 2) cupulate glands between the pinnæ of lowermost pair and between all or upper 2-3 pairs. Pinnæ pairs 4-6; leaflet pairs 20-25 per pinna, 5.5-10 mm long, 2-3 mm wide, glabrous. Stipules erect, recurved, or reflexed, 1-2.5 mm long. Inflorescences bearing ca. 50-100 flowers. Flowers bisexual or functionally staminate, each subtended by a peltate bract, the bract 2-2.5 mm long, 0.5 mm broad, erose toward the apex; calyx tube 1.75-2.5 mm long, ca. 0.5 mm broad at the orifice, glabrous, the lobes ca. 0.25 mm long and broad, glabrous; petals 5, narrowly elliptic, 2.5-2.75 mm long, 0.5 mm broad, acute at the apex; stamens 10, the filaments ca. 1.5 (-6?) mm long, glabrous, the anthers exerted, 0.25 mm long and broad; gynæcium 1, variously aborted in functionally staminate flowers, ovary 1.15-2.5 mm long, glabrous, 14 ovules, the style 2-4 mm long, glabrous, the stigma exerted beyond the anthers. Pods 7.5-10.8 cm long, 1.4-1.5 cm wide; seeds 8-14. — Pl. 4, C.

PHOTOGRAPHS: FOSBERG & STONE, *Micronesica* 2: 67-70, *figs. 1, 2* (1965), as *Leucena insularum* var. *guamensis*; STONE, *Micronesica* 6: (Flora of Guam), *fig. 45* (1970), as *Leucena insularum* var. *guamensis*.

MATERIAL EXAMINED: MARIANA IS.: GUAM: *Stone* 4243, Cocos Is., BB, US; *Fosberg* 43500, F, US; *Fosberg* 43501, F, US; *Fosberg* 43502, F, US; *Fosberg* 38648, Anao, US; *Stone* 4920, Asanite Bay, Asanite Pt., US; *Moore* 342, Inarajan, US.

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