

# VANUATU PALMS: THEIR DISTRIBUTION AND USES

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## Introduction: Vanuatu Plant Collections in the World

Knowledge of the Vanuatu (formerly New Hebrides) flora has developed in several stages, the last two Compendia published by Guillaumin in 1927 (1) and 1948 (2).

Since then many collections have been made; by botanists of the 1971 Royal Society Expedition (3); by ORSTOM (4), ethnobotanists and botanists from Noumea to 1979 and then from Port Vila; and in the field of Bryophytes by American scientists (5) in 1984 and 1985. No general and systematic work on the flora has been published since 1948.

In 1979, when I began my work on Vanuatu traditional pharmacology, I required good determinations for my samples. As information was to be found in numerous books and articles which often were not available in Vanuatu, this task was not easy. With a certain amount of innocence, I began to collect every published line on the flora of Vanuatu and compiled the literature under names of collector and identification of the specimens. At the same time, the Port Vila Herbarium (PVNH, proposed to be PVV) was developed to a normal standard sending three parts on four to other herbaria; one to Paris (P), one to Noumea (NOU) and one to Kew (K) or a specialist.

Although these two projects are not finished, we now have a better idea of the location of Vanuatu botanical collections in the world.

In the Pacific region, the richest institutions for Vanuatu specimens are Port Vila, Noumea, Sydney (NSW and SYD), Melbourne (MEL) and the Bishop Museum (BISH) in Hawaii.

The 1983 estimate for Noumea and Port Vila (6) Herbaria was respectively of six and 4000 numbers of Pteridophytes and Phanerogams. It is now of seven and 6000, amounting to a total of 8000 different numbers. Bishop Museum maintains some unique Vanuatu collections, for example Krauss's and Searle's specimens, and samples are classified by their geographic origin, which makes the work easy. Australia probably has the greatest number of exsiccata from Vanuatu, most of which have not been studied, as Australian botanists have had enough to do in Australia and Papua New Guinea.

I was unable to visit Melbourne; the herbarium there was curated before the turn of the century by Ferdinand von Mueller, who asked many missionaries and travellers to collect for him in the 'South Seas' (7). In Sydney (NSW), the estimated number of Vanuatu specimens is a total of two to 3000 Pteridophytes and Phanerogams. Fifty percent are represented by the Royal Society collections. Most of the other samples have yet to be studied: these were collected between 1880 and 1915, for example Quaipe's and Layard's specimens.

Certainly, other herbaria in the world keep unknown Vanuatu collections. For example, in the United States, there are samples taken from Vanuatu by US soldiers during the Coral Seas War, when Vanuatu was base for operations.

A prudent estimate gives for Vanuatu the following results: the total number of collectors is more than 130. The number of Pteridophytes and Phanerogams exsiccata located in various institutions may be over 10,000 and 14,000 for Bryophytes.

I arrive now at my conclusion, which may lead to the preparation of the first Flora of Vanuatu. Technically the realization is now possible as there are about 10,000 samples for about 1500 indigenous and introduced species of Pteridophytes and Phanerogams in the archipelago. For Bryophytes, the figure is 14,000 specimens for about 600 species (8). Scientifically the conditions are now better than before, even if collections have not been made everywhere in Vanuatu. (For Pteridophytes and Phanerogams there is 0.7 sample/km<sup>2</sup>, for Bryophytes there is one sample/km<sup>2</sup>, algae has ten samples collected and lichens 200 samples). Botanists may now also find useful two new Floras, published or being published, for New Caledonia and the Fiji Islands, Vanuatu's closest neighbours.

## VANUATU PALM GENERA

Genera thus far reported as occurring in Vanuatu may be grouped as such:

## (i) Substantiated or recently collected

*Licuala*  
*Metroxylon*  
*Calamus*  
*Gulubia*  
*Veitchia*  
*Carpoxyton*  
*Clinostigma*  
*Cyphosperma*  
*Physokentia*  
*Cocos*

## (ii) Known or suspected to be introduced

*Caryota*  
*Areca*  
*Pelagodoxa*  
*Roystonea*

## (iii) Recorded but unsubstantiated

*Livistona*  
*Chambeyronia*  
*Cyphophoenix*  
*Basselinia*

## LICUALA

*Licuala grandis* H. Wendl. ex Linden

This species was once thought to have been introduced from New Britain and A.C. Smith reports that it occurs on Espiritu Santo and Malekula (A.C. Smith, 1979). Accordingly, Schmid reported it as occurring in the Rentabao Valley, very close to Port Vila on the island of Efate (Schmid, note added to the manuscript of 'Plant Species Observed on Efate', 1965). This is not indicated on herbarium sheets but, Mr. Robert Lambert, horticulturist of Port Vila, reconfirmed this to me in 1984.

The species also is reported on Pentecote (Schmid, Flora of Pentecote, 1974). A sterile sample, collected by Vienne indicates that the species is distributed in the Banks Group, where it has also been observed on Maewo by Genevieve Bourdy in 1986.

## Non-Medicinal Utilization:

The leaves of *Licuala grandis* are used as traditional umbrellas or improvised in case of sudden rainfall, on Motlav (Dominique Bourret, No. 20NH), on Pentecote (Annie Walters, pers. comm. 1989) and on Malekula at South-West Bay (Pierre Cabalion, 16th November, 1982).

On Motlav, the leaf is used as a plate, as well as for wrapping traditional objects such as statues and masks which are created by inhabitants of Toman Island off the south of Malekula, as I observed at Port Vila during the Arts Festival of 1979.

This species is well known as a cultivated ornamental in many places throughout the world as noted by A.C. Smith (1979).

## Medicinal, Ritualistic and Symbolic Utilization:

A medicinal use is recorded by G. Bourdy in her thesis. '... On Maewo... the leaves are used to cure the condition known as GWATUWAWALE. This is a 'headache' which affects men who have been in contact with menstrual blood. The leaf must be crushed as it is very tough and the pulp thus obtained is mixed with a little water, so as to make a juice which is spread on the head of the patient. The treatment is repeated daily until recovery...' (G. Bourdy, 1989, Annexes.) This of course is only symbolic.

In the central region of Pentecote, which is an APMA language area (Tryon, 31, 1976), the leaves of

this species represent a 'grade' within the social structure assigned to women. In fact the society of northern Vanuatu is structured so that everyone is required to pass through grades to attain higher status. The *Licuala grandis* leaf is specifically symbolic for a woman who has passed the initial grade or RABANKAMEL. After attaining the pass into the next grade, the woman will always have the leaf, either in her hand or slipped into her belt, at the time of passage into subsequent grades, so as to indicate that she is a woman who has successfully reached that status. (Annie Walter and Pierre Cabalion, 2nd October, 1984).

Vernacular Names: (as per the enumeration of languages by D.T. Tryon, 1976).

- NDAUBIHU on Maewo, from the TETERARA language (T, 20), (Thesis of G. Bourdy, 1989).
- NEYEDIP, a language from Mota Lava (T, 5), (D. Bourret, NH 20).
- OVLOR TATA, OVLOR is the name of the species on Mota (T, 6) and TATA denotes the natural occurrence (non cultivated) of the species (D. Bourret and B. Vienne, pers comm).
- WILOG WEWIA is a name mentioned in herbarium notes by B. Vienne for a sample collected in 1972 in the Banks Group (T, 3 to 18)
- TABATABA in the north of Pentecote, in RAGA language (T, 30), according to M. Taillade, ex-Professor of Art at Bougainville School, at Port Vila as well as APMA language (T, 31) (Annie Walter and Pierre Cabalion, 2nd October, 1989) To be more precise, BUTSU TABATABA indicates the arborescent character, BUTSU meaning 'the trunk.'
- SONGE M JAM in the central south west of Pentecote, according to Schmid (Flora of Pentecote, 1974) and probably in SEKE language (T, 32).
- PUNE PELE, in PIAMATSINA language from the Cumberland Peninsula of Espiritu Santo.
- NIRIVIUH in the BENOUR and LEMBINWEN languages from South-West Bay of Malekula (P. Cabalion, 16th November, 1982).
- NEVEHU at Lamap, south-eastern Malekula, according to M. Taillade, probably in the Port Sandwich language (T, 81).

## METROXYLON

*Metroxylon warburgii* (Heim) Beccari

*Metroxylon salomonense* (Warb.) Beccari

*Metroxylon* is reported on Anatom as being "... near the houses ..." by MacGillivray in 1853 (1854) and by Guilfoyle in 1968, in which he states that this palm was "... abundant in the interior of the island ..." (Guilfoyle, 1869). This is not the case today, as the only villages are near the seashore and the interior is completely deserted.

Guillaumin reported it in 1937 and 1948 under the name of *Coelocarpus* and considered it endemic to Espiritu Santo and Malekula. Schmid reported it on Efate in 1973 (Vegetaux Superior of Efate), on Tanna (Flora of Tanna, Supplement I, 1970) where it is occasionally planted and on Erromango (1974) where it is also cultivated. Although the only species thought to occur in Vanuatu was *M. warburgii*, it has recently been reported by John Dowe that *M. salomonense* is also found (see page 30 of this volume) in the archipelago.

### Notes:

This is a monocarpic genus, and therefore the palm dies following the first fructification. The inflorescence, positioned vertically at the apex of the trunk, becomes yellow when the fruit is ripe. The leaves also turn yellow and finally the entire palm dies. As with the agaves or the *Cerberiopsis*, the decline and decay is very long, exceeding six months, as I have witnessed at Port Vila.

The fruit is decorative and appealing and germinates very easily. Nevertheless, this palm is not regarded as an ornamental and is avoided due to its spiny petiole and rachis.

It would be of interest to determine if the native peoples of Vanuatu differentiate between the two species, if they are named vernacularly or if they have different uses. Further study is needed in this regard.

### Utilization:

There appears to be little use of *Metroxylon* as a medicinal plant in Vanuatu. Only one reference is known: Annie Walter reports (AW 225 and 225A) that on Pentecote, the juice of the stem is used in the

treatment of diarrhoeic bleeding. In fact this is medically inconsistent, as it is often the result of the presence of intestinal parasites, such as 'amibes' or giardia, and these parasites, at least during in vitro cultivation, require the presence of starch similar to that found in the *Metroxylon* juice.

The use of *Metroxylon* as a food source is well documented, for example in Papua New Guinea. According to the available literature, the use of *Metroxylon* starch is only a recently introduced practise in Vanuatu (Guillaumin, 1954). Claude Jardin mentions that *Metroxylon warburgii* is used as a food plant in Vanuatu, but without further details. Schmid, in his Flora of Erromango, says that the species is cultivated as well as occurring naturally. According to Jean Guiart, the starch is extracted in remote localities. Barrau notes that on Pentecote and on Tanna, the extraction of starch can be encountered (Barrau, 1956). Such brief mentions encouraged me to seek more information on the use of the starch of this palm in Vanuatu. On Pentecote, no records of the edible uses have been recorded (P. Cabalion, 3rd March, 1979. Annie Walter, pers. comm.)

During a visit to South-West Bay, Malekula (16th November 1982) I was informed that *Metroxylon* was not a food for human consumption, "... befo man ino kakai insaet blong hem . . .", but that the base of the trunk was used for pig food. According to an inhabitant of Fila Village, he saw, on Espiritu Santo, *Metroxylon* being used as a source of starch as well as a source of salt. Some 'Bushmen' from the interior of the island had cut down a large palm and removed the inside of the trunk. The removed material was crushed, placed back in the hollow trunk which was then filled with water. After some time the removed material sank to the bottom, and the 'water' was siphoned off into a 200L container where it was left to ferment. Edible starch was obtained after the removal of floating salty matter which was later used as a condiment in cooking.

Starch has been obtained from *Metroxylon*, primarily by the population which lives in the interiors of the islands, for a long time. At times, it has also been a source of salt due to the difficulty of travel to the sea, usually brought about by 'wars' between the 'MANBUSH' and those people who live by the sea, known as 'MANSALWATA.'

It appears that the gathering of starch from *Metroxylon* is declining, with the gradual introduction of other starch rich foods (for example manioc) which are easier to cultivate. Even other 'traditional' starch sources, such as yams and taro, are becoming less cultivated. According to Barrau (1956), the presence of *Metroxylon* in Vanuatu is due to its introduction by man as a food source. This raises the problem of evolution of agriculture in Vanuatu. On Anatom, the population is presently found almost exclusively living near the coast, and, contrary to the observations of Guilfoyle in 1868, which state that the island had many thousands of inhabitants scattered in small villages in the mountainous interior, today there are very few *Metroxylon* to be found in the interior. This may suggest that it has been introduced to Vanuatu and is not the natural environment.

On Pentecote, an unusual use has been observed; the base of the petiole is used to grate bananas and yams in the preparation of LAP LAP, a sort of pudding cooked between two stones.

In the artistic domain, the hollow trunks are used as large dye tubs in the preparation of ceremonial matting.

The most important contemporary use of *Metroxylon* is for construction material. The leaves are used for the fabrication of very durable thatch used as roofing in traditional houses. In central Pentecote, the leaves are used for making tiles which are supported on beams. Similar tiles have also been reported from Vanua Lava (P. Cabalion, 1983). In northern Pentecote, it has been observed that the rachis, cleaned of the leaflets, is used as a rafter (Loltong, P. Cabalion, 8th March, 1983).

On Malekula, at South-West Bay (P. Cabalion, 16th November, 1982), at the villages of Mele and Fila near Port Vila (P. Cabalion, 18th January, 1982) and on Erromango, it has been observed that the leaves are used as a durable thatch, reputed to last fifty to sixty years, and superior to the thatch made from WAELKEN (an unidentified Poaceae). *Metroxylon* is specifically cultivated for this purpose (P. Cabalion, 21st June, 1982).

Although not usually mentioned in notes, the leaves are used in the making of baskets and matting. This particular use is very common on Pentecote (P. Cabalion, 3rd May, 1973).

#### Vernacular Names:

*Metroxylon* has many names throughout the archipelago. On Erromango, there are two names in use, which may indicate that there may be two species present. The names are ULUWAR and NEV-REPIN which suggests that the plants are identical in trunk but different in leaves and fruit (P.

Cabalion, 10th November, 1985). NEVREPIN and NUVREIPIN are used in the south of the island and elsewhere the equivalent NEMPREHI, which indicates the same species in the traditional sense (P. Cabalion, 26th June, 1982). On Pentecote, the only indigenous language still used is that of the SEE language, although it appears that many plants retain their names from the extinct languages of URA and UTAHA. In 1985, there were only five people still alive who could recall the URA language. To demonstrate the abandonment of vernacular names in contemporary Vanuatu, a questionnaire was submitted to students in grade 8 at the Bougainville High School. Two lists of words were given to the students, the first of vernacular words the second of contemporary words which were their equivalent. Few students could match the names from the second list to the first list, which of course indicates a lack of knowledge of vernacular words.

In conclusion, it appears that *Metroxylon* is distributed throughout the entire archipelago and has been that way for some time as most children know at least one vernacular name. Unfortunately this is not the case with other plants in Vanuatu; the children are 'forgetting' more and more the names through the structure of the contemporary education system which separates children from their villages for long periods.

It is by no means that the ethnobotanical study of *Metroxylon* is complete, although it is nevertheless legitimate to speculate that it has been known and utilized by the inhabitants for a long time. In my opinion, *Metroxylon* has been introduced to the archipelago by man, firstly as a source of food (although not used for this since the 1960-70s) and secondly as a source of building material, primarily as thatch for the roofing of houses. It is probably an example of one of the most ancient introductions of plants into Vanuatu, equivalent to the contemporary introduction of taro and yams. Analysis of myths and legends and archeological exploration may prove this.

## CALAMUS

No botanical revision of this genus has been undertaken in Vanuatu, although there are reports of species being distributed throughout the archipelago.

On Efate, D. Levat in 1883 reported LELAOROS (T 157) as occurring inland of the island (Guillaumin 1919). This species appears to be identical to the one found on Espiritu Santo by Schmid (1965). There is the same indication by Schmid (1973, Veg. Sup. Efate: 13) which indicates the species is abundant in the forests of the interior plateau. Also in the south/centre of the island at the edge of the secondary forest (Schmid Phaner. NH: 51), Schmid 3271, NOU:RSNH 1076, PVNH; S. Seoule 38, 12th August 1982, PVNH, NOU and P; R. Clarck 13, by Ms G. Bourdy, 9th May, 1987, PVNH.

On Erromango, *Calamus* sp. has been collected many times by Schmid. On 12th May, 1970, 3272, NOU; by the Royal Society Expedition, 3rd October, 1971, 118, PVNH; by P. Cabalion, 3038, 16th November 1985, PVNH, NOU and P. On this island, *Calamus* sp. is found in the forest at about 250-300m. (Schmid, 1973, Phaner. NH: 51), common in the forest on basalt in the south-east and centre at about 200-300m (Schmid 1974, Erromango: 50)

*Calamus* is not reported from Tanna (Kajewski 1930).

On Espiritu Santo, in forest on the plains surrounding Big Bay, where it is sparse and not forming any obstacle in the undergrowth (Sarlin 1950). It is not harvested.

On Pentecote, *Calamus* sp. is noted by Schmid (1974): as an armed climbing palm, common in forest at 300m; *Calamus* (*rotang*) was collected by Phillippe Morat, 25th April, 1977, 5470, NOU; a *Calamus* sp. by Pierre Cabalion, 3rd October, 1980, 1153, known as ROTIN, KAULA and KAUKAULA (T 31), NOU, is similar to Schmid specimens 3271 and 3272.

On Motalava, Mrs. D. Bourret collected at 300m a *Calamus* sp., 216, NOWOL (T 5), May 1978, NOU: in the Banks Group, B. Vienne collected in 1972 a *Calamus* sp. NOU.

### Utilization:

#### Medical Use: Ointment

At Lolong, in the north of Pentecote, the sap from the stem is used as an ointment to calm ear irritations when there is no presence of pus (P. Cabalion 1153). This resembles the utilization of physiological serum in modern medicine, with no apparent healing objective.

**Non-Medical Use: Fibres, Sap, Timber**

Still at Lolong, the spines, present under the leaves of *Calamus*, are used for fishing hooks to catch flying fish. They are attached to the fishing line with a yellow thread made from spider-web, commonly found throughout Vanuatu near habitations. The spider is known as MANGARU at Lolong (T 30). The local name reflects the palms' utilization: GARU-FUALAI (T 30), means hook plant, ROTIN in local French and LAIKEN or LAWYER CANE are used in bichlamar and local English.

The stems are used for the construction of houses and huts. The sap of *Calamus* is appreciated whilst in the forest to quench the thirst. One only needs to sever a stem and drink, similar to the stem of *Entada phaseoloides* (Mimosaceae). In the interior of Pentecôte, the fibres stripped from the stems are used for the fabrication of cord used to secure the handles of tools and facilitate their control (P. Cabalion and A. Walter, 28th Sept. 1984, Enkul Village).

On Erromango, this palm is not consumed, but used in the preparation of cord for construction (P. Cabalion, 10th Nov. 1985).

The fibres of variety TRU NORMA (the small one) are used because they do not break readily whereas the variety TRU MORENI (the large one) breaks easily (P. Cabalion and G. Bourdy, 3028, Happy Land, 10th Nov. 1985 and Ipota, 10th Nov. 1985). The vernacular name TRU (T. 161) covers two botanical species. *Calamus* sp. is considered the male whilst *Flagellaria indica* (Flagellariaceae) (P. Cabalion 1719) is considered the female. Both are climbing plants which possess leaves and organs which become attached to anything that comes across their path, either by hooks (as with *Calamus*) or tendrils (as with *Flagellaria*). The name *Calamus* in local bichlamer is LOYAKEN (P. Cabalion, 19th June, 1982).

Another use for *Calamus* stems has developed recently in Vanuatu, and now there are workshops where rattan-cane furniture is constructed and sold locally. Armchairs, beds, chairs and tables are made in small quantities and at present does not endanger the natural population of *Calamus*. Possibly, if the exportation of these articles becomes more important, it may be necessary for the Service des Forêts de Vanuatu to take action before it is too late.

In conclusion, the genus *Calamus* in Vanuatu is in need of study by palm botanists, although they usually prefer to work with less prickly problems and unarmed genera. The traditional utilization does not endanger the genus; we will be able to continue to drink from time to time the sap of this palm in the forest, or use it as an ointment. The people of the villages will continue to use the fibres to make cord and the spines to make fishing hooks. The only potential danger could come from the excessive collection of stems for the manufacture of rattan-cane furniture.

**GULUBIA*****Gulubia cylindrocarpa* Beccari**

This species has been collected on Vanua Lava, Malekula, Erromango and it can be supposed to be well represented on most of the islands of the archipelago.

On Malekula, at south-West Bay, the fruit, about 2cm long and 0.7 - 0.8cm in diameter, ripen in mid-November. At this particular location, the infructescence appeared to bear only limited fruit (Cabalion 1819, 15th November, 1982).

**Utilization:**

The 'heart' of *Gulubia cylindrocarpa* is consumed and the fruit is eaten by children. (Malekula, specific mention).

**Vernacular Names:**

At South-West Bay, in the Benour and Lembinwen languages (T 115 and 116 (1976)), this species is known as NIULIP, the derivation 'NIU' meaning palm (Malekula, specific mention).

**VEITCHIA**

*Veitchia arecina* Beccari is known from Tanna (Schmid 363) and Nguna (P. Cabalion 1360). In his Phanerogams of Vanuatu (Schmid 1973) he mentions its location on Tanna as being south of the volcano. *Veitchia joannis* Wendland is mentioned by Guillaumin in his Compendium (1948). His reference is to Seemann who lists it in his Flora Vitiensis (1873).

*Veitchia macdanielsii* Moore was collected on Espiritu Santo by MacDaniels (9108 and probably 3108) on 29th December 1949. The type is at BH. The formal description was completed by H.E. Moore Jr. (1957).

*Veitchia metiti* Beccari is a species from Vanua Lava. Its traditional uses are not known. It is mentioned by Beccari (1925), Guillaumin (1927) and H.E. Moore Jr. (1957).

*Veitchia montgomeryana* Moore is another species described by Moore (1957).

*Veitchia spiralis* Wendland was first collected on Anatom by MacGillivray (Seemann, 1873: 2670) and then by Kajewski (Guillaumin, 1932) and described under the synonymous name *Kajewskia aneityensis*. T.C. Whitmore lists a specimen on Efate (fruit at PVNH and K) which extends the distribution of the species toward the centre of the archipelago. This species is mentioned in passing in articles by Guillaumin (1948), Burret (1932), H.E. Moore Jr. (1957) and Schmid (Flora of Anatom, 1970). A.C. Smith made an implicit allusion to the specimen of Kajewski (1979).

*Veitchia winin* Moore was another species described by Moore. There are at least five specimens; on Malekula (MacDaniels 3093 and 3076, and RSNH 306), on Erromango (RSNH 16263) and possibly on Pentecote (P. Cabalion 2592).

#### Notes:

It is of interest to add to the above species some undetermined specimens mentioned by Schmid in his diverse Floras and other authors. On Efate . . . 'an Arecaceae, *Veitchia*, with tall, slim trunk up to 20m tall, appears to be distributed throughout the entire forested areas. It is most common on the crests and visible from far away, the palms taller than the surrounding forest . . .' (Schmid, Vegetaux Superior, Efate, 1973).

(An attempt at germination of seeds collected from a specimen from 550m alt on Efate (P. Cabalion, 1274) resulted in failure. Numerous *in situ* germinations of a *Veitchia* sp. have been observed on Nguna, on the slopes of the volcano in protected areas where humidity is constant and moisture maintained by temporary creeks. Less evidence of germination was noticed near the summit at 500 to 593m alt. It is apparent that this species is left standing during land clearance on the island. (P. Cabalion, 1360.)

Another *Veitchia* sp. with less elongated fruit grows at low altitude according to Schmid (Vegetaux Superior, Efate, 1973).

On Tanna, the indigenous people distinguish two species of *Veitchia*, known as NA FUA and NA PUA. NA FUA has 7-9 leaves about 2m long, with the petiole naked for about 40cm.; annular rings are not prominent, much elongated in shady areas. Both species occur in the forests in the interior of the island, although NA FUA is found in the Lenakel area on coral platforms and around Port Resolution. The distinguishing characters of the two species have yet to be studied (Schmid, Flora of Tanna, Supplement I, 1970).

In Phanerogams of Vanuatu (Schmid, 1973), a *Veitchia* (cf. *V. arecina*?) is mentioned as occurring on Tanna . . . 'on slopes south of the volcano' . . . It is surely NA FUA mentioned in 1970, as located on the slopes of the volcano.

On Anatom . . . a tall palm, only encountered in a small population in upper Umeç, south-east of the island . . . (Schmid, Flora of Anatom, Supplement II, 1971).

#### Utilization:

According to Sheila Gowers (1976), the endosperm has a consistency of gel and is edible. This has not been confirmed for *V. arecina* on Nguna (P. Cabalion, 28th September, 1979) nor for the three specimens collected on Pentecote (Annie Walter 80 and P. Cabalion 2592). The apical bud of the latter sample is edible, having an agreeable flavour similar to ripe, fresh hazel nuts. It is regrettable that such magnificent palms are cut down for this purpose (Pentecote, 28th September, 1984).

On Maewo, according to Genevieve Bourdy (708), there is a *Veitchia* sp. collected at 350m alt near some gardens, which has an edible fruit consumed when immature and still green; this species changes from yellow to red at maturity.

On Vanua Lava, the trunk of a *Veitchia* sp. is used for planks. This is the specimen P. Morat 7447. It is certainly indigenous to the island, and not introduced, as it occurs only in primary forest (P. Cabalion, Vanua Lava, 14th June, 1983).

On Erromango, there is a *Veitchia* sp. referred to as WAEL COCONUS (wild coconut) because of the basic resemblance to that palm. The apical bud is consumed, the trunk split for use in the construction of partition walls in huts and the leaves used in the fabrication of baskets. It is still very common on Erromango, being a magnificent tall palm (P. Cabalion, 2264, 25th July, 1983).

It appears that the leaves of *Veitchia* are as much appreciated as those of the coconut palm for the fabrication of baskets as well as being considered superior to those of *Clinostigma harlandii* (P. Cabalion, Efate, 8th June, 1985).

#### Vernacular Names:

WOGHA MI IR – On Vanua Lava, the dialect from near Sasar language No. 8, P. Cabalion, 14th June, 1983, from P. Morat (7447).

TOTOU GAT UTU – literally 'tree of the pigeons', on Maewo, Saritamata, either languages Nos. 20, 21, or 22, Genevieve Bourdy 708.

NAPUPUA or NAPUA – On Nguna, language No. 152, P. Cabalion, 28th September, 1979 and 31st December, 1981.

NIVFAL – On Erromango, Sie, language No. 161, P. Cabalion, 2264.

NIVAL – On Erromango, Sie, language No. 161, P. Cabalion, 10th November, 1985, Chanel Sam 247 and Genevieve Bourdy 218.

### CARPOXYLON

*Carpoxylon* was listed by Schmid as occurring in the forests in the interior of Anatom (Flora of Anatom, 1970). That author expressed doubt about the distribution of the genus by marking it with a '?', and correspondingly there is no herbarium numbers allocated by Schmid to *Carpoxylon*.

It is with interest that I was recently notified by Mr. John Dowe of his rediscovery of this genus elsewhere. (See page 106 of this volume)

### CLINOSTIGMA

#### *Clinostigma harlandii* Beccari

Two recent collections are known from Vanuatu.

– From Vanua Lava, 11th June 1983, Phillipe Morat 7419; above the sulphur mines on the left bank of the Chelva River at about 550m alt. parts preserved at PVNH, NOU and P; determination by John Dransfield, July 1983 as *Clinostigma* cf. *harlandii*.

– From Efate, 8th June 1985, Pierre Cabalion 2722, Mt. MacDonald at 600m alt., near the point marked 636m on the 1/50,000th map. The species appeared at 500m alt., below which it is replaced by a *Veitchia* sp. Inflorescences (four) crowded with fruit (P.C. 2712), spathe 1m to 2m; palm about 15m tall, 15cm in diameter, leaves 2m long, with petioles 50cm. Germination was attempted but without success. Conserved at PVNH, NOU, BISH, P and K. Quoted by John Dransfield in a letter from P.S. Green, 5th December 1985 to the author.

#### Taxonomic Notes:

Moore and Fosberg placed in synonymy all the species of *Exorrhiza* under *Clinostigma* in Gentes Herbarum 8: pp. 458-466, although, in 1956, Burret maintained the separation.

Another case of synonymy is to be noted for *Clinostigmopsis* of which one species had been described by Pichi-Sermolli for Vanuatu. Burret maintains this genus as *Exorrhiza* although it is synonymous with *Clinostigma*.

It appears that all is still not resolved as Willis, ed, (1985) mentions two species of *Clinostigmopsis*, one from Vanuatu and one from Fiji. They are sometimes included in the genus *Exorrhiza* (p. 262) although only one species of *Exorrhiza* exists (p. 45) – the one from Fiji. This confusion indicates the need for a revision of the genus.

#### Utilization:

The palm-heart and fruit are consumed from this species, although the quality is inferior to that of *Veitchia* spp. and the coconut palm.

### *Clinostigma* spp.

Several undetermined specimens of *Clinostigma* are known from Vanuatu. Collections by researchers from Noumea indicate that this genus is well distributed throughout the archipelago.

On Anatom, Schmid noted the presence of *Clinostigma* sp. (Supplement to the Flora of Anatom, 1976). It is described as a tall palm resembling the coconut palm, but having leaves with a horizontal arrangement, numerous adventitious roots up to 60cm long and very small fruit; collected west of Ougapnaerek at about 400-500m alt., locally abundant but known from only one location, situated in a secondary range parallel to the main range on the island. The same observations were also included in Phanerogams of Vanuatu (Schmid, 1973) – *Clinostigma* sp. western Anatom, Ougapnaerek, in forest about 400-500m alt. The specimen Schmid 3794, 16th May 1971 would probably be for the above reference. At NOU, and inflorescence of *Clinostigma* sp. is displaced, and is possibly from Schmid 3794. Many other parts are also conserved at NOU.

A second specimen is Schmid 3795, 14th May 1971; Juvenile *Clinostigma* sp., west of Ougapnaerek. It is conserved at NOU.

On Erromango, in his Flora of Erromango, Schmid notes that there occurs what appears to be the same *Clinostigma* sp. as is found on Anatom and Pentecote (Schmid, 1974). He indicates that the *Clinostigma* sp. from Erromango is a tall palm with a robust trunk, the base surrounded by adventitious roots 1-2cm in diameter, inflorescences with many branches, thin and stiff, and with very small fruit; growing in forest on basalt, inland at about 450m alt. There are two collections by Schmid which correspond to the description.

– Schmid 4777, 26th June, 1973, central Erromango at about 400m, parts conserved at NOU.

– Schmid 4778, July 1971, central Erromango at about 500m, one part conserved at NOU.

One other collection also appears to have been used in his floras, although the generic determination is a little in doubt. It is:

– Schmid 3273, 12th May, 1970, south-east Erromango, *Physokentia* or *Clinostigma*, one part conserved at NOU. In his Flora of Pentecote, Schmid notes (p.2) the presence on the island of "... different palms with at least one species, *Physokentia* sp. found at about 500m and belonging to a genus which does not appear to be represented farther south..." Erromango is farther south than Pentecote Island. Accordingly, Schmid 3273 could be *Clinostigma*.

On Pentecote Schmid notes "... at over 600m there is a stunted forest which is locally dominated by tall palms (*Clinostigma*) (Schmid, Flora of Pentecote, Jan, 1974). On the following page he states that "... *Clinostigma* is most frequent at relatively high altitude..." On page 24, Schmid describes *Clinostigma* sp. from the sample which he collected as: "... large palm with the trunk at the base surrounded with a thick cone of adventitious roots which act as stilts. The trunk is 30cm in diameter, leaves held horizontal, regularly pinnate. The inflorescences are composed of many branches, arranged in groups, with small fruit less than 1cm wide, a beige elongate spathe. It was observed at more than 500m alt., abundant on crests. It appears identical to the *Clinostigma* of Anatom and Erromango..."

The sample collected by Schmid on Pentecote is as follows: – Schmid 4696, 17th June, 1973, Pentecote 500-800m, one part with fruit at NOU (Locality inexact, but 'Bavaret sector', from his Flora, p.2) This locality is near the airplane runway, south of Melsisi.

On Espiritu Santo, an ethno-nutritionist collected a palm described as *Clinostigma* sp. for Mrs. Dominique Bourret and the author, for their research. It is:

– Igor de Garine, 21st Nov, 1977, Santo, Buria, conserved at Port Vila.

For Vanuatu in general, Van Steenis et al mention in 1966, the presence of the genus *Clinostigma* in Vanuatu (pp. 146-147), whilst A.C. Smith mentions it in 1979 (p. 429)

#### Utilization:

On Espiritu Santo, the fruits, as large as marbles and containing an 'almond' are consumed. It is known as OLO-OLO PATUB in the interior of the island (Igor de Garine, 40). On Pentecote, the *Clinostigma* sp. collected by Schmid (4696) is named KOLKOL (Schmid, Flora of Pentecote, 1974) This is most likely Seke language, listed as 32 by Tryon (1976).

## CYPHOSPERMA

### *Cyphosperma* cf. *balansae*

First collected on the Cumberland Peninsula, Espiritu Santo, this species has been determined by Dr. Natalie Uhl to be *Cyphosperma balansae*, although considered endemic to New Caledonia. Further collections and examination should be undertaken to verify the determination (see page 145, this volume).

If in fact this species proves to be *Cyphosperma balansae* one can imagine, with some reservations, that it may have been introduced into Vanuatu more or less recently. Many Ni-Vanuatu people have worked in New Caledonia and the species could have been noticed by one of the workers . . . only one seed would have been necessary.

## PHYSOKENTIA

### *Physokentia tete* (Beccari) Beccari

This species was first collected on Vanua Lava by Harland (sometimes spelt Harlandt) and mentioned by Guillaumin in 1927 and 1948 with no indication of traditional uses. Maurice Schmid has also collected it on Pentecote and mentions it in his Flora (1974). He also mentioned the presence of a *Physokentia* sp. in the south-east of Erromango (Phanerogams of Vanuatu, 1973). This is probably his sample 3273, conserved at NOU and labelled as '*Physokentia* or *Clinostigma*.'

The distribution of this genus will be clarified with further collections. For the time being, the presence of *Physokentia tete* on Vanua Lava and Pentecote is certain, and possibly on Erromango, and wide spread throughout the archipelago.

## COCOS

### *Cocos nucifera* L.

It appears that botanists did not bother to collect this species, presuming that the agronomists had volunteered. From my research, it appears that there is only one specimen preserved in Paris (P), it being: Lequerre (Admiral), sometime prior to 1927, at Port Vila, according to Guillaumin (1927).

Nevertheless, the presence of *Cocos nucifera* in Vanuatu is mentioned in several articles.

On Anatom, the coconut palm is one of four palms observed by MacGillivray in Nov. 1853 (see *Caryota*)

On Efate, Guilfoyle was surprised to find a coconut palm in a village in the interior of the island " . . . the coconut will seldom grow well far away from the sea, although on the island of 'Vate', one of the 'New Hebrides' I found several fine specimens in a village about nine miles from the coast . . ." (Guilfoyle, 1969). Perhaps it is the palms near Port Havannah mentioned for their beauty, " . . . groups of palms and tree-ferns of great beauty . . . gave to the landscape a peculiar charming effect, such as I had not previously witnessed in other islands, but in parts of 'Vate' . . ." (p. 131)

The locations where Guilfoyle found many villages are today entirely uninhabited, but the disturbed vegetation and sometimes rows of stones around a level surface, indicate previous inhabitation by man; for example around Mt. Erskine and on the hills above the Matoua and Teouma Rivers.

On Efate, Guilfoyle once again mentions coconut palms growing amongst the coastal vegetation of the Bay of Pango (p. 133).

On Protection and Deception Islands, also known as Moso and Lelepa Islands, in the Bay of Havannah, Guilfoyle observed several coconut palms used as a substitute for water.

" . . . during my rambles upon these islands, I did not meet with a drop of water. As a substitute for water, the natives use the milk of the coconut which may be had in abundance . . ." (p. 132).

The production of copra was the first industry developed in the archipelago (Guillaumin, 1954). It is of interest to note that cattle were first introduced into Vanuatu as a means of clearing the plantations of excessive undergrowth, but nowadays beef production far exceeds the value of copra production. The coconut plantations have passed their most productive years and the maintenance and introduction of high quality varieties of coconut palms have not eventuated (Coconut Research Station, 'IRHO',

Santo). It appears that the copra industry is in such a state of decline that one could say that King Copra has abdicated his throne, possibly never to receive it back again.

On Espiritu Santo, John Baker noted the presence of coconut palms up to 1400 feet alt. at a location north of Mt. Tabwemasana (Baker, 1935).

On the northern islands of Vanuatu, the 'wild' coconut palm is a source of copra which is sold to traders. "... quite a lot of wild coconuts are gathered and made into copra by the natives and this is picked up by cutters and small schooners ..." (Kajewski, 1930). The description as 'wild' may not be entirely true. In fact, in many local plantations, the palms are rarely planted in lines and therefore does not mean that their presence is due to coincidence.

On the southern islands of Vanuatu, the coconut palm is abundant, although on Tanna in the vicinity of Yasur volcano, great numbers were killed in early 1988 due to its eruption. On Erromango, the coconut palm is less abundant and grows only in numbers sufficient for local consumption and not for copra production. On this island, one of my colleagues, Peter Lomo, planted a coconut palm on Mt. Fedmoghum at 758m alt. in commemoration of our visit to the area. I wish to mention this to avoid later confusion in regards to the true distribution of the species.

The role of the coconut palm in Vanuatu and its exact distribution throughout the islands of the archipelago deserves a detailed study, which unfortunately, exceeds the plan of this present article. A thorough research was initiated in 1985 by Mr. Barry Weightman, ex-Chief of Agricultural Services, Port Vila. Previously, research findings have been published by Jacques Barrau in 1954, according to Guillaumin.

#### Traditional Utilization:

All parts of the coconut palm have a traditional use; for timber, fibres, diverse extracts and the consumption of its fruit and heart.

Many aspects of everyday life in the villages throughout Vanuatu depend more or less on the coconut palm. The trunk is used as is other species of trees; the leaves used to create diverse objects, usually of a 'throwaway nature', such as baskets for transporting fruit, vegetables and animals; for making roughly woven hats; for temporary fences during special occasions and fetes and even torches of dried leaves. The multitude of uses could fill an entire chapter.

On the island of Erromango, the chiefs announced their presence on the battle field by attaching, to their upper arms, hollowed coconuts into which are inserted erect stems of a grass, *Imperata cylindrica* (NAMKAI, P. Cabalion 2085, PVNH, NOU, and P.) This display allows the 'Big Men' to be more easily seen and noticed (Ipota, 21st July, 1983).

The floss of the coconut is used to spin threads which are then woven to produce strong though short cords. This in turn is used to make strong, elegant and functional combs - the small cords bind together the teeth which are the lignified parts of tree fern trunks.

Throughout Vanuatu, the custom of 'Pig Ownership' is very important. Coconut palms are an important ingredient in the preparation of pig food. For example, on Erromango, the leaves and bark of *Tylophora aneityensis* (Asclepiadaceae) are crushed together with grated coconut endosperm to be given to pigs for fattening (Ipota, 25th July, 1983).

As human food, the heart of a young coconut palm is preferred to that of *Clinostigma harlandii* (Efate, 8th June, 1985).

#### Rituals and Magic:

Parts of the coconut palm are often used in medicine or in magic philtres, administered according to the symptoms which the patient displays. On Pentecote and Ambae, the liquid from the coconut seed is the materialization of the action of the healer or the one who knows the necessary incantations. According to Codrington (1891) "... on Pentecost and Leper's Island, the juice of a very young coconut, on which the doctor has blown, with a charm muttered or sung, is drunk by the patient or rubbed upon him ..."

Also on Pentecote, the smoke from burning dried coconut serves as a conductor for treatments. From Codrington (1891), "... On Pentecost, if a man is delirious they say a mae, that snake of mysterious nature, is in his stomach. A doctor will then breathe his charm into a dry coconut husk which he has set on fire; the patient sits over the smoke, and the snake, which is a ghost or spirit, is driven out ..."

On Tanna, an example is given by Guiart (1956) "... at the time of planting the crop of ignams (yams) ... they are sprinkled with the milk of young coconuts, then with seawater and then with water in which the juice of a certain (determination unknown?) plant has been squeezed ... in the temple, temporarily set up in the middle of the field, plaited coconut leaves are laid down upon which are placed the shells of coconuts and over which the concoction is sprinkled ..." Guiart (1956). This is a further example of the coconut palm being used as an indirect support or materialization of the magic action which will ensure the protection and success of future harvests.

On Erromango, an interesting example of the coconut palm used as a symbol of healing bone fractures is noted. Expressly for the purpose, a germinating coconut is planted in the ground, the first leaves being surrounded by a bundle of stems of a species of Poaceae, *Chrysopogon aciculatus* (Retz.) Trin. Apparently, when the palm commences to grow, the bone is healed (Peter Lowo and James Atnelo, Erromango, 25th July, 1983).

#### Medicine:

In these examples, the coconut palm enters the preparations as either an active or passive element.

On Tangoa, I obtained two recipes to prepare a remedy for 'pis-pis yellow.' This symptom corresponds to a colouration judged abnormally strong of the urine, the result of many causes, such as gonococcus, etc.

For the preparation, it is necessary to use a 'visible' equivalent, that is a variety of coconut palm with yellow fruits. In the first recipe, roots taken from such a palm are cut into pieces, softened by exposure to heat (fire) then crushed with a knife. The juice, obtained by squeezing, is drunk at the rate of one glass per day per adult, until the symptom clears (Efate, 14th March, 1979). In the second case, a section of the external part of the trunk, either fresh or dried, the latter form usually kept in the hut for such events, is boiled in water until obtaining the colouration of tea. (In Vanuatu, the comparison is usually made to tea of Sri Lanka (Ceylon Tea), which is very red). The preparation is then conserved and for effect it is necessary to drink one or two bottles: 50 to 65ml. (Efate, 10th November, 1981)

On Erromango, an aphrodisiac/medicine is prepared by mixing the ashes of the bark of *Pemphis acidula* (a Lythraceae which grows on windy shores) with the ashes of the bark of *Casuarina equisetifolia*, the filao, (which grows on windy shores but farther back from the shoreline) and crushed coconut endosperm (Ipota, 25th July, 1983.) It is obvious that the ingestion of the mixture is useful in one way at least. The ashes come from two plants containing mineral salt in noticeable quantities. This is an interesting point, as the local food is very bland and rarely spiced. *Pemphis acidula* and *Casuarina equisetifolia* also play a symbolic role. The former grows in rather difficult conditions, on emergent reefs, and filao, the latter, is one of the hardest timbers in Vanuatu, and in French is known as ironwood. The crushed coconut does not appear to have any benefit other than to aid the ingestion of the medicine.

Also on Erromango, a preparation against ringworm is made in a similar way, but for external use only. The bark of *Citrus macroptera*, *Pterocarpus indicus* and another undetermined species are crushed, extracts obtained and incorporated into a crushed coconut mixture. The ointment is applied to the skin with a chicken feather (Ipota, 25th July, 1983).

Another preparation used on Erromango is a remedy against the sickness SEVE, probably corresponding to Bancroft's filariosis. Once again, crushed or grated coconut is mixed with the juice of the crushed medicinal plant (Ipota, 25th July, 1983).

In conclusion the role of the coconut palm in Vanuatu is essentially to furnish useful materials for everyday life in the villages, to furnish an edible heart and most importantly as raw material in the production of copra and oils. It would appear that any medicinal uses are relatively unimportant; being used as a sweetener in diverse preparations, particularly as a remedy for diuresis. More importantly, its uses in this field are strictly symbolic. From previous studies of this species, it is obvious that there is little chance of the discovery of new medicines. Of further interest would be the continuance of the ethnobotanical studies based upon the ideas and thoughts of the Ni-Vanuatu and other inhabitants of the archipelago.

## CARYOTA

The first mention of this genus in Vanuatu appears to be by MacGillivray (1854) "... four palms occur, *Cocos*, *Caryota*, *Areca* and *Sagus*; the last three are rare and are only found near habitations ... " It is possible that this genus was introduced to Anatom, about that time, by a merchant, Mr. Paddon, who had opened a business in 1844 (O'Reilly, 1957) and was interested in the local flora. Also, according to O'Reilly, Mr. Paddon had taken, in 1852 or 1853, an exhibition 'Hebridais', to the Sydney Botanic Gardens, where he displayed plants from Vanuatu.

It is not known if MacGillivray collected samples in Vanuatu, but the genus has been reported on Tanna by Schmid, "... *Caryota* sp; Palm with single trunk, leaves over 3m long (18 pairs of pinnae, 20 pairs of pinnules), abundant in forest on steep ferrallitic slopes; north of the island at about 150-250m." (Schmid, Flora of Tanna: Supplement, Dec. 1970)

Also "... *Caryota* sp. Tanna, north, in the forests on the slopes above the river at 100-200m. There is doubt about it being indigenous." (Schmid, Phanerogams of Vanuatu, Jan. 1973)

These indications probably correspond to the specimen Schmid 3630 conserved at NOU, 8th Dec. 1970, from Tanna at 100-200m.

Two other specimens of *Caryota* sp. have been collected on Tanna:

- Phillipe Morat 5863, Feb. 1978, Tanna, white-Grass, conserved at NOU and P.
- Igor de Garine, without number, no date. (*Sagus?*), probably 2nd or 3rd Dec. 1977, Tanna, Loanatom, Imeneka; conserved at Port Vila, but determined by Jean-Marie Veillon at Noumea in 1977 as *Caryota* sp. and then by the author on 12th May, 1984 at Port Vila.

One of several species of *Caryota* could have been imported into Vanuatu by Mr. Robert Lambert, nurseryman of Melema, near Devil's Point, up until 1985, prior to the sale of his business to New Zealanders. Mr. Lambert had travelled many times to Central America, particularly to Panama. He told me that he had brought back palm seeds which included *Caryota*. A.C. Smith confirmed the presence of *Caryota* in Vanuatu in 1979.

### Utilization:

The palm-heart is consumed on Tanna (Morat, 5863). De Garine does not elucidate more about his '*Sagus*.' The vernacular name is NIP (T. 171)

According to Mr. Robert Lambert, a *Caryota* sp. in his garden causes a skin allergy and any contact with the fruit should be avoided. Possibly this could only be a personal reaction.

In conclusion, it would be interesting to ascertain which species of *Caryota* are growing in Vanuatu; to compare those from Tanna, Anatom and Efate and to note their uses, whether they be for ornamentals or consumption.

## ARECA

### *Areca catechu* L.

Codrington (1891) reports that the Mbua or Areca nut is sought after by the people of the Solomon Islands living in the Torres Group for use as a hunger suppressant. There appears to be no narcotic effect on the people who regularly use Mbua which can explain the immunity which they have developed. The active principles in Mbua being alcaloides from tetrahydronicitinic acid; the principle one being arecoline (Paris 1967).

The use of Mbua as a masticatory is unusual in Vanuatu, the only group of people regularly using it are those from the Solomon Islands. I observed its use only once in Port Vila (28th Sept. 1980). Its use appears restricted throughout the archipelago, although Madame D. Bourret noted that (1978) on Motalava the seeds of *Areca catechu* were used as masticatory and worming tablets. These two indications are perfectly in accordance with accepted pharmacology.

The distribution of the genus *Areca* in Vanuatu is unknown as is the origin of the seeds used as masticatory (chewing). This is an ethnobotanical problem and it appears that the habit of betel and of kava are mutually excluded; we could not find any kava cultivated in the Solomons nor any *Areca catechu* being cultivated in Vanuatu.

## ROYSTONEA

*Roystonea oleracea* (Jacq.) O.F. Cook

The presence of (*Areca oleracea* Forster non L.) *Roystonea oleracea* was reported in Vanuatu, on Tanna and Malekula (1774) by Forster (1786). This indication was reported again by Seemann (1868) and Guillaumin (1927) who states in his compendium of 1948 that "The presence of *Areca oleracea* was reported in Vanuatu without precision by Forster; it is evidently not that species of palm" (1948).

After his voyage, MacGillivray reported the presence of *Cocos*, *Caryota*, *Areca* and *Sagus* (*Metroxylon*) on Anatom (Nov. 1853), the last three genera being rare and only near habitations (MacGillivray 1854). The same species of *Areca* is also reported on the island of Futuna by the same author (23rd Dec. 1953).

## LIVISTONA

Only one reference to *Livistona* is known, it being from Guilfoyle (1869), where he notes that on the island of Anatom it is abundant in the interior.

## CHAMBEYRONIA

*Chambeyronia* sp. aff. *macrocarpa* Vieill.

One species of this genus is reported to have been collected from Vanua Lava by S.F. Kajewski (428, 6th July, 1928) . . . a palm up to 15m tall. According to Guillaumin, it appears to be *Chambeyronia* sp. aff. *macrocarpa* Vieill. (Guillaumin, 1932), with an illustration of the fruit cut lengthways, p. 112

This description is found again in two other articles by Guillaumin, 1948 and 1954. The fruit is edible according to Guillaumin (1932 and 1954)

## CYPHOPHOENIX

Two references indicate the presence of *Cyphophoenix* in Vanuatu. From Guillaumin (1932 and 1948), the sample Kajewski 465 collected on Vanua Lava, could be of this genus, whilst samples collected on Espiritu Santo by Ina Baker (318 and 361) appear similar to the genus. A revision is necessary.

No traditional uses have been recorded for the specimens.

## BASSELINIA

One species of *Basselinia* is noted as occurring on Tanna by the ethno-nutritionist, Igor de Garine, whilst passing through Loanatom on December 1977. According to this researcher, his assessment places a species known as NAWUBUK (T. 171) to be a species of *Basselinia*. Its uses are not recorded and there is mention of a lost sample of the species.

## UNDETERMINED PALM SPECIES

A number of samples remained undetermined at the time of the compilation of this article. Furthermore, the ethnobotanical studies indicate to us that there may be other species, which are indicated by vernacular names. but grouped together in the bichlamar language.

For example, on Erromango, there occurs the NIVAL which has been placed in *Veitchia* and the NOKIMPAT which is abundant in the Rantop Peninsula at 837m alt in the eastern part of the island. The latter palm has undivided leaves (i.e. not split into leaflets) but fruits which resemble the former (*Veitchia* P. Cabalion 2264). The apical bud of both species is consumed. Other palms with vernacular names include the NOKI (most likely *Cocos nucifera*), *Metroxylon* which has several names, the two species of *Calamus* and finally the YARPAT which should also be attempted to be collected. There is evidence from the ethnobotanical studies which indicates that separate species may be represented by the NOKIMPAT and the YARPAT.

Concerning *Metroxylon*, there is ambiguity on the islands of Erromango and Malekula where we found the NATANGURA being referred to as NUWAURIET (P. Cabalion, 16th November, 1982). It is distinguished from another species, the NINDRU AMBIH (P. Cabalion 1844) which has a tall trunk, longer leaves and which takes a longer time to bear fruit. Could it be *M. warburgii* or *M. salomonense*? The precise distribution of these two species should be established to allow a better understanding of the relationship between them.

An undetermined palm collected on Vanua Lava produces new leaves which are edible (J.-M. Veillon, 5567). It is known as N'GUP OU HUUP (language similar to SASAR, T8). It is possibly *Pelagodoxa henryana*.

Another, also collected by J.-M. Veillon (5512), is used in the fabrication of poison arrows. A point of human bone or fish bone is impregnated with poison derived from a decaying carcass. This is then affixed to a stem from the particular palm and this is then extended with a thatch from a species of Poaceae. As the point of the arrow penetrates the victim, the stem of the palm is broken because of the weight of the thatch and the violent reaction of the victim and the point remains intact and not able to be extracted.

In conclusion, it must be noted that a complete systematic study of the palms of Vanuatu has yet to be undertaken, and further study of their uses needs to be initiated to establish efficient methods of conservation and protection.

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Publication Fund, Palm and Cycad Societies of Australia

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