Notes on the Uses of *Metroxylon* in Vanuatu

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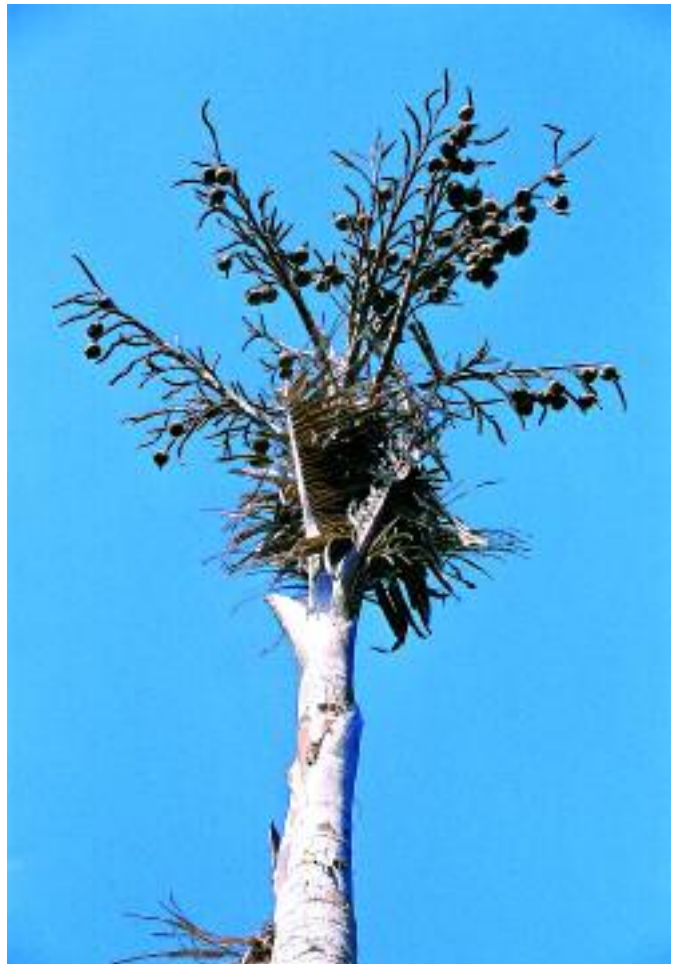


1. As members of *Metroxylon* section *Coelococcus,* both *M. warburgii* and *M. salomonense* flower only once and die after the fruit crop is mature (Anatom island).

Sago palms of the genus *Metroxylon* play an important role in the daily life of the inhabitants of these islands. Their primary use is in the making of roofing material for traditional dwellings from the huge leaflets as. The secondary use as a foodstuff is becoming increasingly rare.

Vanuatu is an archipelago composed of more than 80 islands, stretching over 850 kilometers on a southeast to northwest line. Situated in the southwestern Pacific Ocean, Vanuatu is a neighbor of the Solomon Islands to the northwest, New Caledonia to the southwest and Fiji to the east. Its total surface area is 12,189 km2, and the eight biggest islands represent 87% of that surface (Weightman 1989).

The Genus *Metroxylon* in Vanuatu

There are two indigenous species of the genus *Metroxylon* in Vanuatu: *M.warburgii* and *M. salomonense* (Dowe & Cabalion 1996). They belong to the section *Coelococcus*, do not produce suckers and are monocarpic, i.e. they flower only once and die after the fruit crop is mature of (McClatchey 2002) (Fig. 1).

The trunk of *M. warburgii* is rarely taller than 8 meters and has a diameter of 30–40 cm at chest height. The pinnate leaves can be over 4 meters long with leaflets measuring 50–80 cm long and 6–8 cm wide. The petioles are armed with short and rigid spines (Fig. 2).

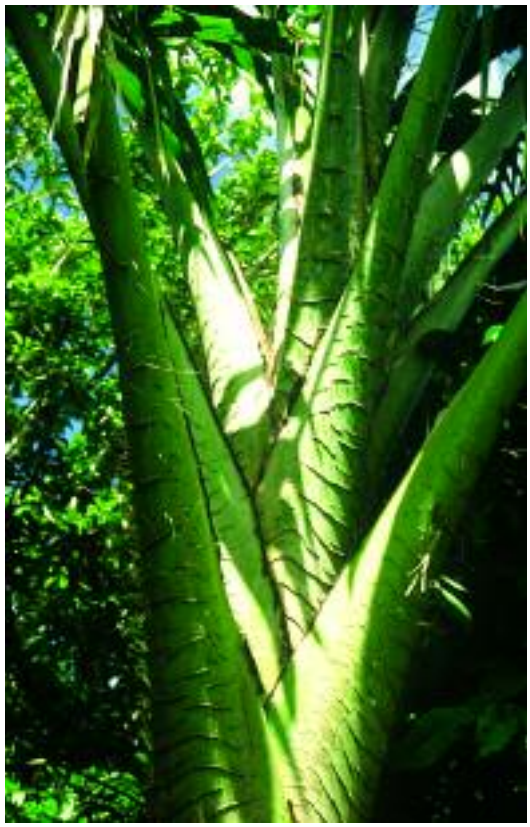
Metroxylon salomonense is a much more imposing palm. At full maturity the trunk can exceed 15 meters in height with a diameter of 60–80 cm at chest height (Fig. 3). The leaves can be more than 6 meters long with leaflets 100–190 cm long and 14–19 cm wide. The petioles have long and flexible spines (Fig. 4).

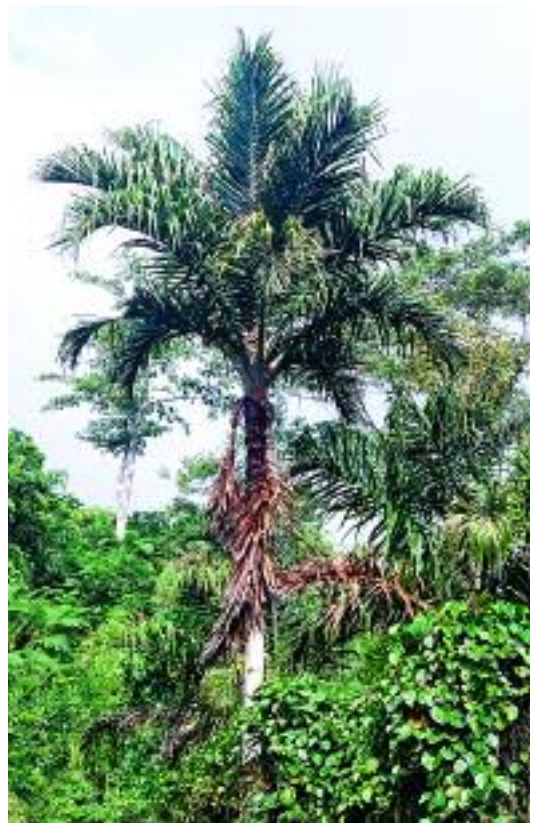
Varieties of *Natangura* Palms

Metroxylon warburgii is known as *Natangura* throughout the archipelago. This palm is highly polymorphic and inhabitants differentiate and name several varieties. The variety *Ato*, indigenous to the south of Espiritu Santo, is often taller than 15 meters (Fig. 5), whereas the varieties *Kifacta* of Tanna and *Nuput* of Anatom, in extreme south of the archipelago, rarely produces stems taller than 5 meters (Fig. 6). Both these varieties have spiny leaflets, whereas others found in the northernmost islands do not. Differences in the color of juvenile leaves – red or yellow – are also apparent and are unrelated to the amount of light received by the plants.

In the village of Wala, (northeast Mallicolo) *Niat Dowir* or "Cock-feathered *Natangura*" refers to two cultivated varieties with long leaflets, *Kifacta Black* and *Kifacta White,* which are indigenous to Tanna. The young leaflets of the "*black*" variety are red, and those of the "*white*" variety are yellow. The use of these

2 (left). The petioles of *Metroxylon warburgii* are armed with short and rigid spines (Tanna).
3 (right). *Metoxylon salomonense* is an imposing palm with a trunk that can exceed 15 m at maturity.





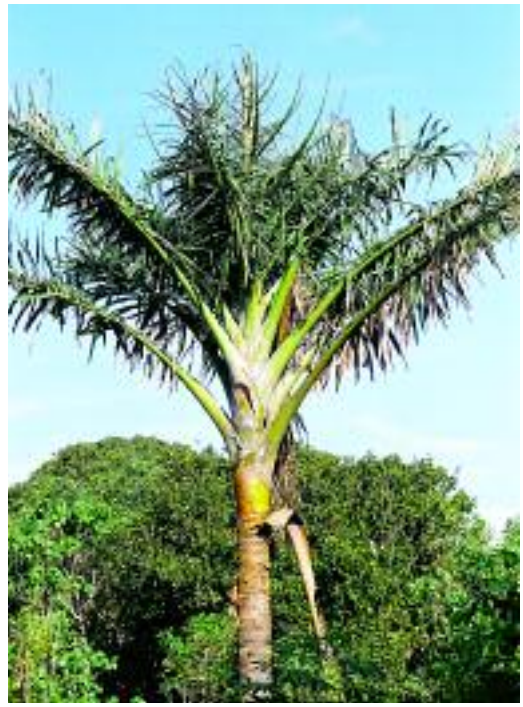
4 (left). The base of the leave and petioles of *Metroxylon salomonense* are very distinctive (Tongoa island).
5. (right) The *Metroxylon warburgii* variety *Ato,* is often taller than 15 meters (South of Espiritu Santo.)

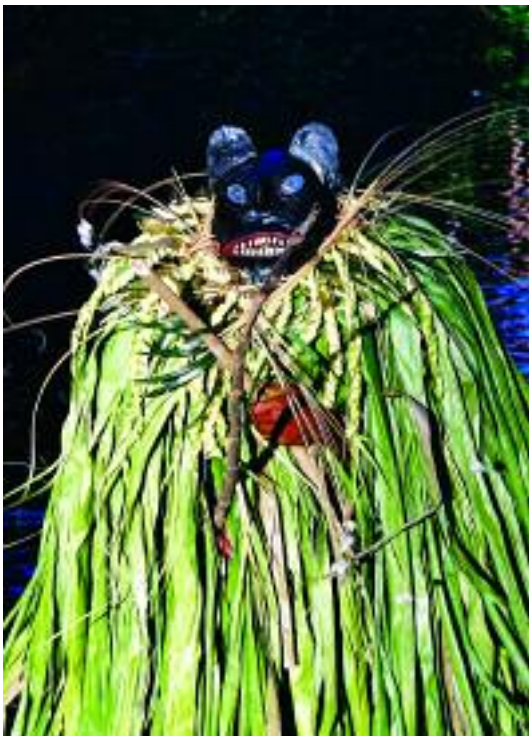
English terms suggests that the varieties were introduced during the colonial period. This idea is further backed up by many local people who claim that *Kifacta Black* originates from the north of Vanuatu.

The origin of palms is also revealed by the local common names. The inhabitants of Anatom differentiate between *Nuput* and *Nuput Santo*. The latter would seem to have been introduced either from Espiritu Santo or another neighboring island. Muller et al. (1999) noted that the people of Mele (Efate Island) recognized two types of *M. warburgii*, *Tenibi Maori* and *Tenibi Itonga*. "*Maori*" means "natural," as in native to a particular place. "*Itonga,*" which originates from another island, is not thought to be a reference to the island of Tonga.

Several other varieties of *Metroxylon* are known to the inhabitants of the various islands, based on the morphological characteristics of the plant, particularly the leaflets. A distinction between "male" and "female" plants is frequently made. Trees with long slender leaflets are considered to be male, and those

6. The varietiy *Nuput* rarely produces stems taller than 5 meters (Anatom island).





7 (left). The large leaflets of *Metroxylon salomonense* are used for making the *Topor* traditional costumes (Gaua, Banks Islands). 8 (right). The trees were felled just as they were beginning to flower, as at this stage the starch levels in the pith are at their highest (South of Espiritu Santo).

with shorter, wider leaflets are said to be female. It is important to note that the naming of local *Metroxylon* varieties in Vanuatu does not or no longer makes any reference to the color of the pith or the quality of the sago extracted from it, as it does in certain areas of Papua New Guinea.

Ecology

Metroxylon warburgii is common to all the islands of the archipelago, either spontaneously or cultivated. We have seen spontaneous populations in the south of Espiritu Santo and in Gaua. The *Ato* variety of *M. warburgii* grows in forests at low to middle altitudes in the south of Espiritu Santo. In Gaua and more specifically the zone to the east of the island, dense populations of this palm can be found almost everywhere, from the coast to the shores of the lake in the center of the island.

Metroxylon salomonense is found mainly in the north of the archipelago, on Banks Island (Vanua Lava) and Torres Island (Loh). The foliage is used for making traditional dance costumes (Fig. 7) as well as interior and exterior walls in some dwellings. Its quality as a construction material is, however, inferior to that of *M. warburgii,* a fact which may explain its limited distribution on the islands.

I have found several isolated trees of *M. salomonense* on Tongoa and in the south of Espiritu Santo, but these were cultivated purely for ornamental value. Muller et al. (1999) recorded this palm in the north of Pentecost Island and in the east of Ambae. Ehara et al. (2003) noted two stations on Mallicolo Island (northeast and south) and one on Gaua. Photographs in a work by Bonnemaison (1996) show the use of the foliage for costumes in Maewo.

Populations of *M. salomonense*, all probability spontaneous, can be seen in the extreme north of Vanuatu and on Torres and Banks Islands. They are found mainly in coastal marshlands immediately inland from the mangrove zone. Elsewhere they are cultivated ornamentally and are found close to habitations.

Sago in Vanuatu

According to Guiart (1956) sago was extracted only in the most isolated parts of the islands. Barrau (1956) observed this practice among the inhabitants of Pentecost and Tanna Islands. Ehara and al. (2003) noted reports from inhabitants of Gaua (Banks Island) where

sago was widely consumed up until the 1950s. More recently, Dowe and Cabalion (1989) described sago extraction in the center of Espiritu Santo.

Most of the islanders that I interviewed were unaware of the nutritional uses of sago, probably due to the decline of traditional culture or the existence of very isolated dietary variations. It is more than likely that sago has never really been a universal foodstuff among the traditional populations of Vanuatu. In fact, the elders of the Paama Islands, to the north of Ambrym, have no knowledge of the ancestral uses of sago.

Today, in times of natural disaster, such as the passage of a cyclone, sago is undoubtedly used as a subsistence crop. The people of Tanna turned to *Caryota ophiopellis* (another sago palm) as a source of nourishment after cyclone Uma destroyed their gardens in 1987. My contacts tell me that sago has been used elsewhere under similar circumstances, notably in Ureparapara and Mere Lava (Banks Island).

Extraction and Preparation of Sago

I was able to witness two instances of sago extraction from *Metroxylon*. The first at Loh, Torres Island, in September, 2003, and the second in the south of Espiritu Santo, in November, 2003. Both extractions used the same method. The trees were felled just as they were beginning to flower, as at this stage the starch levels in the pith are at their highest (Fig. 8).

The trunk was cut into logs of about 1 meter long then split open lengthwise. The pith inside was then pounded with an adz (in Espiritu Santo) or a bamboo hammer (in Loh). This procedure is a vital step in the process as the pith must be ground into very fine powder for optimal starch extraction. The powder is then transported to the extraction plant, always close to an abundant water supply, which is essential for is operation. In Loh, the extraction was done close to a family home with a water pump; whereas in Espiritu Santo, it was carried out in the bed of a stream.

The starch in a water suspension is then filtered to remove the fibers and pith. In Espiritu Santo the filter was made from fern leaves; in Loh, from a piece of jute cloth. The filtered liquid is slowly decanted either into a vessel, in Loh, or a hollow in the bed of the stream lined with *Heliconia indica* leaves in Espiritu Santo. Within half an hour all the starch settles to the bottom, and the water can be drained from the vessel or left to pass slowly through the *Heliconia* leaves. The starch can be either used immediately or left to dry in the sun for later use.

In Loh, apart from the actual cutting of the palm, which was done by men, the work is a

9. In Espiritu Santo, the extraction of starch is an exclusively masculine operation.

10 (left). *Metroxylon* is a potential source of vegetable salt (South of Espiritu Santo). 11 (right) The salt is separated from the ash with water. This saline solution is used for seasoning food and the preparation of sauces (South of Espiritu Santo).

family affair, but in Espiritu Santo, the work is exclusively masculine operation (Fig. 9). This is said to be due to the feeling of insecurity and fear in the forests as a result of continued clan warfare.

Among the people of Loh, southern Espiritu Santo and Tanna (in the case of *Caryota ophiopellis*), sago is not in fact consumed in its natural state. The starch is mixed with other ingredients, such as bananas, paw paws (fruits of *Carica papaya*) and coconuts, before cooking to give it a better consistency.

On Anatom Island, a different method of extraction was explained to me by a tribal chief of the village of Umej. I was told by the elders that *Metroxylon warburgii* had in fact been cultivated for its starch, but I was unable to witness the extraction process. Here the tree is first slit at the base to allow the sap to drain away and felled several days later. The trunk is cut into logs and stripped of its bark, retaining only the pith before being cooked for two more days on stones in a fire pit. The starch is then removed by beating the cooked pith.

It is noteworthy that on Anatom and Tanna, the use of *Metroxylon warburgii* leaves as a roofing material was unknown until quite recently. These islanders preferred coconut palm leaves or stalks of *Miscanthus* species (Poaceae) for thatch. One can reasonably assume that *Metroxylon warburgii* was mainly used as a food source.

Salt

Metroxylon is a potential source of salt ; or more accurately, vegetable salt (Fig. 10). Certain parts of the plant, mainly leaves and petioles, produce ashes rich in salt, which is separated from the ash with water (Fig. 11). This saline solution is then used both for seasoning food and the preparation of sauces. Some traditional societies in the center of Espiritu Santo still use these ashes, and according to my correspondents, this practice was at one time their only method of obtaining salt, as access to the sea was often forbidden in times of local warfare. Some other species, such as banana trees (*Musa* spp.) and tree ferns (*Cyathea* spp.) are also used in the extraction of vegetable salt.

Horticulture

There are two types of traditional gardens on Vanuatu. One is created after cutting and burning the existing vegetation and is used

primarily for growing yams (*Dioscorea alata*, *Dioscorea esculenta*). The other, an irrigated garden, is usually for the cultivation of taro (*Colocasia esculenta*). The lifespan of a garden is highly variable, ranging from one single growth cycle, after which the garden is subsequently abandoned, to several generations of farmers if the garden is well maintained.

Metroxylon palms are often associated with both types of garden. In the first instance, they are often found around the edges of the garden, the central part being reserved for growing the yam crop. I also observed them in irrigated gardens near the village of Olpoï in north west Espiritu Santo, planted in the surrounding dikes to combat erosion and landslides. When these palms are introduced into other cultivated areas their culture is necessarily of short duration. The rapid growth and invasive root system render all other cultivation impossible. All *Metroxylon* must be cut down and roots allowed to degrade during a two to three year period before any new culture can be undertaken.

In Vanua Lava, *Metroxylon warburgii* is occasionally planted alongside coconut palms (*Cocos nucifera*). The two species are planted at the same time, but whereas *Metroxylon warburgii* rapidly becomes productive, leaves being usable in two or three years, the coconut palms do not produce fruit for ten years, at which time the *Metroxylon* palms have reached full maturity and are felled. The density of the plantations is often a compromise between maximum exploitation of the surface available and quality of production. On Loh and Vanua Lava, *Metroxylon* palms are given 6–10 m^2 per plant. A higher density would adversely affect the quality of the foliage. Leaves too close together would become damaged and unusable.

Metroxylon warburgii and *M. salomonense* are both very easy plants to grow, their demands can be summed up by moist soil and plentiful exposure to the sun. They can grow in shady forest conditions, but speed and quality of growth are severely restricted. They require very little attention, and an abandoned plantation can remain in good condition for many years. This situation can be seen clearly in Gaua, where an extensive population of *Metroxylon* remains today.

In the south of Espiritu Santo, the *Ato* variety of *Metroxylon warburgii* grows spontaneously in sparse forests and bush land, it seems to be perfectly suited to this forest ecosystem and thrives without any human intervention. It must be said however that this environment is heavily influenced by the actions of man, such as wood cutting and fruit picking, which are possibly beneficial to the survival of the *Metroxylon*.

Metroxylon salomonense and *M. warburgii* do not produce suckers at their base, they reproduce only from seed and cannot be reproduced vegetatively, as with *M. sagu*. The ideal seeds are produced by older trees which have had good quality leaves and are already germinated when collected. In the Torres Islands the seeds are buried to protect them from the voracious coconut crabs, but in Paama they are simply scattered around gardens and by roadsides. The growth is rapid and more vigorous than the competing vegetation, although occasional weeding and thinning may be carried out in the first year.

Conclusion

The use of palms of the genus *Metroxylon* for sago production is exceedingly rare and can only be found in the most isolated regions of the archipelago. It is also completely unknown as a dietary staple; yams, taro, cassava and imported rice are much preferred. Cyclones and other natural disasters have in some cases led to renewed efforts and interest in sago where the older islanders were able to pass on their knowledge to a new generation. Further studies are necessary if we wish to have a better understanding of the traditional uses of *Metroxylon* and other indigenous palms in Vanuatu.

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