

Bananas in New Caledonian Kanak Society: Their Socio-Cultural Value in Relation with their Origins

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Abstract

The introduction of bananas into New Caledonia is directly linked with the arrival of various peoples on the islands of the Pacific. The genetic characterisation of bananas cultivated in Asia and in the Pacific (Carreel 1993, 1994, Lebot *et al.* 1993) has enabled their relation with wild species to be demonstrated which in turn can be used to put forward strong hypotheses concerning the various migrations of people in the Pacific area and to better understand the socio-cultural role that the banana cultivars Maoli and Popoulou occupy in New Caledonia's Kanak society some 3500 years after their introduction. At the present time there are still "true" bananas and "others". The former which were introduced by the first people to arrive have a sacred ancestral value as well as a social role, while the latter, introduced during the period of colonisation have gradually become revenue generating crops.

Abstract in Xârâcûu language

Kè pè jati nâ rè pwi tò xû nei a Calédonie, è gè wâ ké fadè rè dèèri mē ba tōwā mīi wā nei bwa tò Pacifique. Wâ kè bwarè nè rè, pwâ rè mē kwiō wâ pwi dobwa è nâ nâu rè tò nèpwé kètè Asie mē Pacifique (Carreel 1993, 1994, Lebot *et al.* 1993) fa ba gwéré kè nâ bwa rè pwi è nâu mē pwi bwa è tuè cicōō. E dù kè té gwéré kè fadè nâ rè dèèri tò nèpwé kètè Pacifique, nè dù kè té xwaé tēpe rè pwi Maoli mē Popoulou tōwā muru rè ka ngūrū kè Calédonie, 3500 xwâda nêdûù ké toa nâré pwi. Nâmwâ è xwî nâ « dôpwi » mē pwi pwângara. « Dopwi » ù pè mē nâ rè ké dèèri bwa ri toa mât nâ tò xû nei a, è baa nâ kwiō sègû mē tēpe rè tò wâ xwâ sègû rè kaa ngūrū. Mīi pwi dè, è toa nâ wi rè ka pwângara, è nâ pwâwâ nâu rè ri nâ kè xwiri ngè pwâ rè.

Introduction

The introduction of bananas into New Caledonia is directly linked with the arrival of various peoples on the islands of

the Pacific. The genetic characterization of bananas cultivated in Asia and the Pacific (Carreel 1993, 1994, Lebot *et al.* 1993) has enabled their relation with wild species to be demonstrated which in turn can be used to put forward strong hypotheses concerning the various migrations of people in the Pacific area and to better understand the cultural and/or socio-economic roles that bananas have in today's Kanak society.

Origins of the Banana in the Pacific

The original peopling in the Pacific islands

It has been shown that the peoples living in Oceania originated in South East Asia (Sand 1989). Both the languages and the alimentary resources introduced by man, with the exception of the sweet potato, originate in that area.

About 40,000 BC during the quaternary ice age, sea levels were lower than they are today. New Guinea, Australia and Tasmania made up a single continental land mass, called Sahul by prehistorians. It was separated from Asia

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by a marine trench, Wallacea, several hundreds of kilometers wide. By means of navigation from island to island across this strait (island hopping) Sahul was populated in a few millennia. The present day descendants of these first occupants of Sahul are Papuan of New Guinea and the Aborigines of Australia. By 30,000 BC, some islands just to the east of New Guinea, notably the Solomon Islands, were occupied. Towards 10,000 BC the gradual rise in sea level led to the separation of New Guinea, Australia and Tasmania, thus pushing the people of New Guinea to occupy the eastern mountains where they began to practice horticulture (Sand 1989).

From about 3,500 BC, the north coast of New Guinea, which was already inhabited saw the arrival of new waves of people from South East Asia, the Austronesians, some of whom settled in the northern Melanesian islands (Sand 1989).

Similar pottery has been discovered in archaeological excavations in the Solomon Islands and New Caledonia. This could mean that there were relations between the two archipelagos dating from about 1,600 BC, as radiocarbon dates made on Gifford and Shuttler's material excavated in New Caledonia in 1956 have shown. From New Guinea and the Solomon Islands these Austronesians settled in the islands of central and southern Melanesia (including New Caledonia) founding small communities. New Caledonia was an important relay point in the eastwards progression of the first Oceanians. Some pirogues traveled further in the Pacific. New villages were built, new canoes departed. All the large islands in the western Pacific, as far as Samoa and Tonga, were populated by the end of the second millennium BC (Sand 1989). After Fiji and the Marshall Islands, the whole of Polynesia was reached, as far as Easter Island and Hawaii (about 200 AD), and then, by a south westerly movement to New Zealand which was peopled by 900 AD.

From the middle of the first millennium BC relations between the islands of the western and eastern Pacific began to decline. Two geographical groups evolved, each developing its own cultural and economic characteristics. The gradual separation between the east and west did not mean that voyages between the two no longer occurred (Sand 1989).

The Austromelanesians who populated New Caledonia during this period traveled with their food plants. It could be supposed that everyone brought three or four clones of each species. Fertile plants could then have given rise to new varieties of clones in fallow areas that were discovered by the horticulturists who multiplied them; this is true of yams, taros and sugar cane. Plants producing vegetatively, which are often sterile, would have had some of their clones widely distributed and these would have remained unchanged in fallow areas even after thousands

years of shifting cultivation (Leenhardt 1932, Barrau 1954, Haudricourt 1964).

Ever since European discovery of New Caledonia numerous ethnologists, ethnobotanists and botanists have described the species of bananas supposed to have been introduced at the time of the original peopling of the archipelago (Barrau 1954, 1959, Dubois 1975, Haudricourt 1964, Jeanneney 1891, Leenhardt 1932, Vieillard & Deplanche 1862). These bananas belong, as far as is known, to the two subgroups Popoulou and Maoli. Despite searches during fieldwork, no diploid *Musa acuminata* Colla has been found outside cultivation, a few *Musa balbisiana* Colla plants, probably introduced at the same epoch, are still present in the north of the island. Other bananas have been introduced during the European era: installation of missionaries (from 1843), installation of French settlers (from 1853), the coming of Asia groups [Chinese, Indians, Indonesians, Japanese and Vietnamese] (from 1874), as well as West-Indians, Tahitians, 'uveans (Wallis Island) and the other peoples of Oceania. The recently introduced bananas are mainly dessert types in the Cavendish, Figue-Pomme or Silk, and Mysore subgroups.

The genetic diversity and origin of the Popoulou and Maoli bananas

All bananas which are cultivated for their fruit are parthenocarpic, that is to say that their fruit is fleshy and develops without fertilization. They have their origin in bananas with seed, called wild bananas. These are found in damp, but well drained, valleys and glades in low and middle altitude forests, in the intertropical zone of southern and South-East Asia and in the Pacific, from the Indian peninsula to the islands of Samoa.

All bananas cultivated in the world are descendants of the wild species *Musa acuminata* (section *Eumusa* $2n=2x=22$) in a monospecific way or, more often, in association with *Musa balbisiana* (section *Eumusa*, $2n=2x=22$). The bananas cultivated in New Caledonia are triploid. Some of these bananas have a monospecific origin AAA. They belong to the Cavendish sub-group which in the Pacific, as in all banana producing regions, are cultivated mainly for sale and for export. Other bananas found in the Pacific are of type AAB. Among these, morphological and molecular characters distinguish the dessert type subgroups (Figue-Pomme or Silk, Mysore) from the cooking type subgroups (Plantain and **Popoulou/Maoli/Iholena**).

The ancestral bananas **Maoli** and **Popoulou** which are also called Pacific Plantains (and make up part of the subgroup AAB) can be easily differentiated morphologically from South East Asian plantains. All the same the term Plantain is hardly an error for they have much in common with the South East Asian Plantains at the molecular level, as much nuclear as cytoplasmic. The cultivars mak-

ing up this subgroup are known by their Hawaiian names **Popoulou**, **Maoli** and **Iholena**. They distributed throughout the south, east and central Pacific as well as Hawaii and were first described by Pope in 1926 (Pope 1926, Daniells 1990, Lebot *et al.* 1994). The distribution of these cultivars is intimately linked with the aboriginal populations of these islands.

The cultivar **Iholena** is not present on New Caledonia. On the other hand a great morphological diversity exists among the **Maoli** and **Popoulou** cultivars. These last have morphological and physiological characters in common: quite erect fronds, a weak inhibition of suckers which can be tall at the moment of harvesting, relatively short stout fruit with obtuse apices in **Popoulou** and truncated apices in **Maoli**.

Genetic diversity in **Maoli** and **Popoulou**

Morphological taxonomic descriptions (Daniells 1990, Sharrock 1990, Simmonds 1954, Stover & Simmonds 1989, Tezenas du Montcel 1990, 1991) of **Popoulou** and **Maoli** demonstrate the great morphological diversity observed within these cultivars. However the study (Lebot *et al.* 1993) of the genetic diversity of the bananas (563 clones) through enzymes (malate dehydrogenase MDH, phosphoglucose isomerase PGI and phosphoglucomutase PGM) has shown, no matter where the material was collected (Hawaii, French Polynesia, Samoa, Tonga, New Caledonia, Vanuatu or PNG), an absence of polymorphism among the various clones of the same subgroup **Maoli** or **Popoulou**, despite the existence of much morphological variation. The study shows how to differentiate between the **Popoulou** and **Maoli** subgroups using PGI. The distinction **Popoulou**/ **Maoli** has also been found during a molecular study by Restricted Fragment Length DNA (RFLP) (Carreel 1993) in particular at the level of the mitochondrial genome in some varieties. Only some bands distinguish between them at the nuclear level and they have exactly the same chloroplast profile. A larger scale study will be put into effect during the next two years with the aid of nuclear markers of the Sequence-Tagged Microsatellite Site (STMS) which are more discriminatory.

The origin of **Maoli** and **Popoulou**

Little polymorphism has been found up to now in the species *Musa balbisiana* at either the morphological or molecular levels. On the other hand there is great variability in *Musa acuminata* due to proliferation and differentiation into subspecies following periods of geographically variable isolation. The molecular study of over 240 parthenocarpic bananas, monospecific or interspecific and of different types (dessert or cooking) has shown that no matter which clone is studied it is related to the wild bananas *Musa acuminata* ssp. *banksii* (occurring in PNG) and/or to *Musa acuminata* ssp. *errans* (occurring in the Philippines). What is more, Simmonds (1962) reported the existence of *Musa acuminata* ssp. *banksii* in which the fruits

had an unusually high proportion of flesh/seed. Thus the first area of domestication corresponding to the selection of fleshy fruits that can be described as partially parthenocarpic would be that of the Philippines-PNG.

The interspecific hybrids originated in crossings between semi-sterile and partially parthenocarpic *Musa acuminata* and *Musa balbisiana*. These bananas are to be found side by side in the geographical region situated bounded by India, southern China, the Philippines and PNG (Stover & Simmonds 1989). The crossings and natural hybrids then led to greater variability in the diploids and to the creation of the subgroup of triploids which are natural hybrids between the diploids AA, AB and BB with some exceptions.

The study of the nuclear genomes by RLFP (Carreel 1994) shows that triploid dessert bananas have several A genomes and have a pluri-intraspecific origin. In particular, as is the case with all cultivated bananas, they are related to *Musa acuminata* ssp. *banksii* but they are also related to *Musa acuminata* ssp. *malaccensis* (occurring in Malaysia) and in some cases to *Musa acuminata* ssp. *zebrina* (occurring in Indonesia). Thus their origin is very complex and they would be a later development more likely to have occurred on the Asian continent than on the islands. This would explain their recent introduction into the Pacific.

Studies or both zymograms and RFLP profile show that the cooking bananas **Popoulou**, **Maoli**, Plantain and **Laknao** all have their two A genomes related to *Musa acuminata* ssp. *banksii/errans* from PNG-Philippines rather than to *Musa acuminata* of South East Asia. The nuclear genome of the **Popoulou** is very close to that of the **Maoli**, but they are all also very close to that of the Plantains.

In more details, the study of the cytoplasmic genome A by RFLP has revealed the potential and preferential relation of the **Popoulou** and **Maoli** with *Musa acuminata* ssp. *banksii* from PNG by the presence of the same chloroplast genome (of maternal origin). On the contrary, at the level of the mitochondrial genome (of paternal origin), the **Maoli** which seem to be rather more related to the *Musa acuminata* ssp. *errans* (from the Philippines) is distinguished from the Plantains and the **Popoulou** which would be themselves related to *Musa acuminata* ssp. *banksii* from PNG.

No AAB cultivar which could belong to the group of Pacific Plantains has ever been described from Asia or the Philippines, while cultivars showing zymotypes identical with those of the **Maoli** cultivars exist in PNG. Thus the hypothesis of a New Guinea origin is reinforced. Conversely no cultivar showing a zymotype identical with that of the **Popoulou** cultivar has been found in PNG. However this cultivar is widely distributed in Vanuatu and New Caledonia. **Popoulou** could be the result of a somatic mutation of **Maoli** which was then selected by man: it could thus be of Melanesian origin (Lebot 1993). As shown above the

Popoulou and the Plantains have their two A genomes related to *Musa acuminata* ssp. *banksii* from PNG and thus could have originated in this region. Little data exists on the B genome. The New Guinea origin of *Musa balbisiana* is very controversial and two hypotheses are possible :

- people brought *Musa balbisiana* to PNG
- people took *Musa acuminata* ssp. *banksii* from PNG to Philippines or to neighbouring islands.

After this the Plantains would have travelled westwards and the **Popoulou** eastwards. If this were the case, the latter could not have originated as a mutation of the **Maoli**.

As far as **Maoli** are concerned exchange between the Philippines and New Guinea would have had to have occurred. Then the Papuans would have left with some partially parthenocarpic *Musa acuminata* spp. *banksii* for the Philippines where crossing with and AB (*errans Xbanksii*) took place. The formation of these cooking bananas necessitates, none-the-less, fewer crossings and migrations than that of the dessert bananas in which the origin is more recent and occurred in the eastern part of the area where bananas have their origin.

So, some questions remain which we hope to answer by further studies and fieldwork. Collections of *Musa balbisiana* and *Musa acuminata* ssp. *errans* need to be extended and studies undertaken by analyses using more polymorph STMS markers.

If these data concord with present knowledge about the peopling of the Pacific islands, they would allow us to consider population migrations and the various exchanges through the chronology of the domestication of these bananas. But apart from making a contribution to prehistory, the origin of these bananas gives us a greater understanding of their importance in Kanak society in New Caledonia.

The Importance of the Banana in Kanak Society in New Caledonia

The first arrivals would have brought with them a great deal more than the food plants necessary for their survival. They would have brought and cultivated everything which represented their identity. Traditional Kanak society is marked by attachment to the land, and their horticultural techniques and socio-cultural customs are linked to the myth of the land which nourishes. Even though it comes second to yams and taros, the banana is never-the-less a subsistence plant anchored in Kanak traditions.

Even today, two classes of bananas are distinguished from each other :

- autochthonous, or “true”, or “ancient” bananas, which include the **Popoulou** and **Maoli**, which were intro-

duced during the original peopling of New Caledonia. These bananas have different vernacular names according to the linguistic areas. They are called **Do pwi** in the **Xârâcùù** language.

- the “other” bananas, introduced since European contact with the island, called **Pwi pwagara** in the **Xârâcùù** language (White men’s bananas). These are the “dessert” type bananas of the subgroups Cavendish, Figue-Pomme or Silk, and Mysore.

Ancestral “sacred” value

In Kanak society, the bond with the land is very important. Melanesians are, above all, a people of place : their identity is inherited through the bond with places of origin and it is strengthened by a constantly maintained relation with them (Bonnemaison 1989). Place represents the land of ancestors, the myths, the tradition. Melanesian subsistence horticulture is a shifting horticulture required by soil exhaustion. The soil is perceived as the identity of a group, the living space of a family community. Each group preserves the record of its travel in oral tradition. The “true” banana represents the reincarnation of the spirit and the body of the ancestors.

A real hierarchy exists among these “true” bananas. Some **Maoli** which have a pseudostem colored black or red, the colors symbolizing wealth, are considered to have a superior cultural value to the other **Maoli** and in particular to **Popoulou**. They are highly regarded and are the object of special care and attention, being an integral part of Kanak social and spiritual life. Each clan appropriates several clones with recognized morphological identities : this is the identity of their ancestor and therefore of themselves. As such, the presence of these “true” bananas is profoundly felt in daily life. Melanesian people’s working days are entirely devoted to the production of food crops: yams, taros, bananas and sugar cane. Each person is limited by the necessity to produce food. It is a necessary custom because food plants are the basis of life and even their harvest is conditioned by ancestral or totemic propitiation. Thus one finds bananas with a symbolic or magic function planted in places of worship (altar, rain, births and totem emplacements). Sacred “banana” stones are buried in banana gardens in order to invoke the gods to arrange the conditions necessary for a good harvest. Planted nearby, the “true” bananas protect places of habitations, yam gardens and taro terraces. In horticultural tradition the line of “true” bananas indicates the male side of a mound (airy and dry) for yam planting.

Bananas leaves are used to make incubators for newborn babies during the first 15 days of their lives (B.Wedoye pers. comm.), or serve to line the bath hollowed out in the earth for the newborn. Apart from their role of protection and fortifying (blood, the sap is the nourishing liquid which brings life, strength), the leaves are plaited together so

finely that they can hold liquid, and their softness guards the baby against possible injury. Also, still in its role of life for a newborn, a banana pseudostem is sculpted into the form of a doll to accompany a mother who dies in giving birth while her child lives. The figurine is placed on the mother's breast and she holds it in her crossed arms. Like that she believes that her child is still with her (B. Wedoye, pers. comm.). Banana plants used in this way, in relation with the newborn, were extremely carefully chosen.

In Melanesian culture turning away the head and the eyes is a mark of respect towards Chiefs, gods, powers, old people and between men and women. Certain plantations which were seen by strangers could become etiolated and die (Métais, 1988). This is why certain gardens of precious bananas are to be found in secluded places. Then, again as a mark of respect, the bunches of fruit of certain sacred bananas are harvested with the head turned away and thrown into the void so that they rolled far down the mountainside remaining unseen. Alongside their mythic roles, these bananas play a very important part in all customary exchanges.

The importance of exchange in social life

In Kanak society exchanges play a considerable role as much in the economy of the traditional society as in its socio-political functioning : exchange of produce of the land against those of the sea between fishing and non-fishing clans, exchange of women between allied clans, exchange of gifts in the customary ceremonies which mark the social life of each individual. At the times of alliances, suckers from "true" bananas are offered on the occasion of marriages partly to provide the necessary plants for the survival of the family but partly for the ancestral symbol that they represent. In the latter case, the suckers are thought of as children claiming particular attention.

Food crops intended for customary exchange are grown in specially reserved gardens, surrounded by numerous taboos. Women cannot go there and it is the head of the family who looks after the crops. In 1932, Leenhardt reported that the elders authorised visits to the banana plantations by the future wives of their grandsons, as a sign of acceptance. Only the "true" yams, the "true" taros and the "true" bananas are present in this garden. During customary ceremonies bunches from certain "true" bananas which have been reserved uniquely for the occasion, are cut (whether they are ready or not) and are presented with the yams and the taros (Leblic 1993). Certain morphotypes of chiefly bananas (**Maoli**) are reserved for people with a well defined social title. Bananas intended for the chief must not touch the ground. The offerings are therefore made of whole bunches or, as is sometimes the case, carefully arranged bunches are attached to a long bamboo pole to be offered. These "true" bananas are very often reserved for customary ceremonial feasts.

These "true" bananas, thought of as the life of ancestors and considered as food for chiefs, have been forbidden, by the chief, to be sold. Poygnéna (1993) found, as oral tradition at Gomen that only the **Poingo** cultivar of the subgroup Popoulou was authorised to be sold along with other introduced produce. Should one suppose that the **Poingo** banana is not a "true" banana but that it is a later introduction? The distinction between **Maoli** and **Popoulou** exists at a genetic level and a deeper knowledge might be able to explain the hierarchic difference between the two cultivars. It is true that the denomination of chiefly banana is reserved exclusively for the **Maoli** and that, curiously, the **Poingo/Popoulou** banana is one found most frequently today in the commercial markets, becoming gradually integrated alongside the "other" revenue generation crops.

The role of the "other" bananas

The "other" bananas, introduced much later, are cultivated apart without particular attention and have a primary role as food and a secondary economic one. The "other" bananas are planted in isolated tufts of in small parcels, both within the tribal living area and along the tracks that lead to the gardens. Bananas are everywhere in the New Caledonian landscape. They are eaten daily, at any time, and constitute the best of the gathered food. Anywhere a Melanesian travels he can obtain half-ripe or fully-ripe bananas by gathering them along the track (whether he is the owner or not) and he eats them grilled at his workplace. Gathering along the track for personal uses as food is accepted customarily. The banana is serving as a "snack" both for those working in their gardens and for children at anytime of the day. Today these "other" bananas have gradually become revenue generating crops of considerable importance to Melanesians. Whether they are sold at the roadside or enter into recognized commercial circuits, they bring in a far from negligible income to Kanak families. They are still today the most important of the bananas commercialized by the Kanaks, although during the last ten years, the **Poingo (Popoulou)** bananas have also found a place in commerce.

Conclusion

As has been shown, in New Caledonia there are "true" bananas and the "others". They can be distinguished by their prehistory and by their date of introduction into New Caledonia. Molecular markers show that the "true" bananas, or cooking bananas, are very probably among the first triploid bananas created. Very ancient, they originated in the Philippines-PNG area. Thus they could have come very early to the Pacific where somaclonal variations gradually appeared which were selected and maintained by man. (Their "brothers", the South East Asia Plantains, must have been created at the same time but traveled westwards in Africa where they too became very diversi-

fied through mutation). The “other” bananas, of a dessert type, have a more complex and more recent origin in continental Asia. They are of much later introduction into New Caledonia.

Knowledge of the origin of **Maoli** and **Popoulou** bananas through scientific work in archaeology and genome studies helps to explain the importance of these bananas, which have lasted in cultivation for 3,500 years after their introduction, in Kanak society. Even in some rituals have now disappeared, the symbolic nature of the “true” bananas remains very strong indeed. Customary practices follow clonal classifications which vary from one clan to another. The “true” bananas still represent a clan’s identity and have a privileged position in the family food garden which, even if changes have occurred, still conserves the major components of the traditional system.

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