

REPORT ON BANANA GERMPLASM COLLECTING MISSION TO PNG

27/2/88 - 22/3/88

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1. INTRODUCTION

This banana germplasm collecting mission was the first of three missions to be made to PNG during 1988. The aims of the IBPGR project supporting these missions are:

1. a. To collect indigenous diploid AA banana cultivars.
b. To collect wild *Musa* species and gain some knowledge of the genetic diversity within these species.
2. To tissue culture and disease index the collected germplasm.
3. To distribute the germplasm to IBPGR designated genebanks and to banana breeding programmes.

1.1 Background

Bananas and plantains are an important basic food crop in large areas of Africa and South East Asia and a valuable export crop for many countries. Disease control measures however are expensive and beyond the means of many small producers. The recent introduction of black Sigatoka disease into Latin America and Africa has therefore stimulated interest in banana breeding. Although no new varieties have yet been bred which combine disease resistance with adequate yield and fruit quality, sources of resistance to the Sigatoka pathogen and some *Fusarium* races are known and the prospects for breeding new varieties with desirable disease resistance are good.

At an International Workshop held at Cairns, Australia in 1986, it was recommended that further collections should be made of the primary gene pool existing in the wild *Musa* species to be found in Papua New Guinea. The workshop also emphasised the dangers inherent in the movement of germplasm, particularly in relation to bunchy-top disease (BBTV). There is as yet no reliable indexing method for BBTV and material has to be observed for visual symptoms of the disease over several months. In co-operation with INIBAP the QDPI agreed to act as the quarantine centre for any *Musa* germplasm collected in PNG.

1.2 Bananas in PNG

a. Cultivars

Bananas are a major food crop in PNG. They form the staple diet in many areas and rank second in importance after sweet potato. The most popular banana cultivar in PNG is a black Sigatoka resistant cooking type with a long post-harvest life known as **Kalapua**. **Kalapua** encompasses a group of triploid and tetraploid (ABB/AABB?) bananas which are given the same name on the basis of fruit taste and quality. One hand of **Kalapua** bananas can fetch up to 6 kina (US\$7.00) in the Port Moresby markets and they may be used as part of a "bride price". Bananas are grown predominantly for home consumption or local market sale, the fruit is not exported and only two commercial plantations exist. These plantations produce Cavendish bananas

for local markets and institutions such as hospitals and schools, but both have a problem controlling the fungal pathogen black Sigatoka (*Mycosphaerella fijiensis*) to which Cavendish types are susceptible.

The unique feature of banana cultivation in PNG is that it is the only country in the world where diploid bananas are agriculturally significant. There may be as many different diploid clones growing in PNG as in the rest of the world combined (Stover and Simmonds, 1987). These diploids are generally less hardy and bear fewer and smaller fruit than triploids. They are grown purely for fruit quality and taste regardless of poor yield and disease susceptibility. Vigorous triploid clones are however, now invading the country and replacing the diploids in permanent sites along roadsides and around the houses. It is only in the banana gardens of areas like the Gazelle peninsular (East New Britain) that a large diversity of diploids is still to be found.

The present situation in PNG must be similar to that of Malaysia thousands of years ago with poor yielding primitive diploid cultivars being replaced by more vigorous and productive triploid clones. It is therefore important that these diploid clones be collected and conserved before they are lost forever.

b. Wild Species

Within the family *Musaceae*, two genera are known in PNG - *Ensete* and *Musa*. Only one species of *Ensete*, *E. glaucum* has been found, while nine *Musa* species were recorded by Argent (1976) after three years of studying the wild bananas of PNG. These species come from three of the five sections of the genus *Musa*, the sections *Rhodochlamys* and *Callimusa* are not represented.

In the section *Eumusa* ($2n = 2x = 22$), the section from which all cultivated bananas originated, three species have been found in PNG. These are *Musa balbisiana*, *M. banksii* and *M. schizocarpa*.

The section *Australimusa* ($2n = 2x = 20$), within which the Fehi group of edible bananas important in the Pacific Island region originated, is represented by five species: *M. maclayi*, *M. boman*, *M. peekelii*, *M. bukensis* and *M. lolodensis*.

Finally, within the section *Ingentimusa*, a new section created by Argent (1976) where $2n = 2x = 14$, one species, *M. ingens*, exists in PNG.

2. ORGANISATION OF THE MISSION

The organisation of the mission within PNG was carried out by Mrs R. Kambuou, the PNG IBPGR representative. Mrs Kambuou contacted the provincial DAL offices and Agricultural Research Stations in the relevant provinces who provided transport and guides in each collecting area. Mrs Kambuou also organised transport in Port Moresby and introduced us to the Secretary of the Department of Agriculture and Livestock (DAL) and other officials within the DAL.

3. BANANA GERmplasm COLLECTING TEAM

The team consisted of the following members:-

3.1 Miss Suzanne Sharrock IEPGR Intern.

Responsible for liaising with PNG Department of Agriculture and Livestock, tissue culturing of germplasm and ensuring all disease indexing is carried out before transfer of material to genebanks.

3.2 Dr David Jones QDPI Senior Plant Pathologist

Responsible for carrying out a disease survey of bananas at the collection sites, with particular reference to BBTv and any other diseases of importance to quarantine.

3.3 Mr Bruce French Consultant specialising in PNG food crops. Fluent in Tok Pisin. Responsible for interpreting, obtaining information from farmers and explaining the aims of the mission.

3.4 Dr Hugues Tezenas du Montcel CIRAD/IRFA banana breeder and taxonomist, based in Guadeloupe FWI. Funds for his participation in the mission were provided by INIBAP. Responsible for identification of bananas to be collected.

4. GERmplasm COLLECTION SITES

4.1 East New Britain Province - Gazelle Peninsular

An important area for banana cultivation, a great diversity of diploid cultivars can be found here.

4.2 Marobe Province - Lae

Banana cultivation in the Markham Valley is based primarily on triploids, but the lower Markham Valley and coast east of Lae are important areas for wild bananas.

4.3 West Sepik Province - Vanimo

The border area is only 30 km east of Jayapura where Indonesian plant pathologists claim BBTv has been present since 1983. It was therefore important to carry out a survey of bananas growing in this area for symptoms of BBTv.

4.4 East Sepik Province - Wewak

An important area for wild bananas and also some diploid cultivation.

A detailed itinerary is given in Appendix 1 and a map showing the location of the collection sites in Appendix 2.

5. METHOD OF COLLECTION OF GERMLASM

5.1 Cultivars

For the collection of cultivars we visited gardens that had been previously selected by the provincial DAL officers for the range of cultivars known to be maintained. Conversations with farmers and banana sellers at markets led to further cultivars being found and collected.

A minimum of three suckers per accession were collected. These were cut from the mat using a bush knife and spade and always leaving the parent plant and at least one follower intact. Permission from the owner was always obtained before removing suckers and a small payment made.

In some areas the use of traditional bunch covers and the practise of removing the male bud led to difficulties in identification of the cultivars.

5.2 Wild Species

Wild bananas generally grow in areas of cleared ground and roadsides provide an ideal habitat. We were therefore able to find and collect wild species without having to walk for long distances into the bush.

It was not necessary to obtain permission before taking suckers from wild species and if mature seed was available, fruit containing the seed was also collected.

5.3 Treatment of Suckers

The average size of sucker collected was approximately 10 cm diameter at the junction of corm and pseudostem with approximately 8 cm each of shoot and corm tissue above and below the central meristem. Smaller suckers would not survive the 2-3 weeks storage required of them and larger suckers caused problems in transport. After collection all diseased and damaged tissues were removed from the suckers which were then allowed to dry for 1-2 days before being wrapped in newspaper. Individual suckers were labelled with masking tape and suckers from the same plant packed in labelled bags. The suckers collected during the first week of the mission were sent back to Port Moresby, where they were collected by Mrs Kambuou and stored in an air-conditioned laboratory at Laloki Agricultural Research Station. The suckers collected later in the mission were carried with the collecting team.

At the end of the mission all the suckers were again cleaned, outer decaying layers of tissue removed and the suckers dipped in a fungicide mix of Dithane M45 0.4 gl^{-1} and Benlate 0.6 gl^{-1} . The suckers were allowed to dry before being wrapped in newspaper and packed into boxes for transport.

It was decided that duplicates of each accession should be also sent to the INIBAP plant tissue culture laboratory in Montpellier, France for culturing and disease indexing. This would reduce the risk of losing accessions during the tissue culture stage.

5.4 Treatment of Seed

Seed was extracted from the fruit as the fruit matured. In most cases the fruit remained green and firm until the end of the mission and was taken back to Australia for seed extraction. The fruit was kept in quarantine until the seed had been removed and the remaining flesh was destroyed due to the danger of importing exotic types of fruit fly. Where the fruit became mature during the mission, the seed was extracted, cleaned and allowed to dry in an air-conditioned room in PNG.

5.5 Accession Numbers

Each clone collected was given an accession number, starting from 001 with the prefix PNG. For example the first cultivar collected is known as PNG 001 etc.

6. QUARANTINE REQUIREMENTS AND DISEASE INDEXING

QDEPI are providing facilities for the disease indexing in quarantine and the tissue culturing of the collected germplasm.

The procedure to be followed for the introduction and disease indexing of the material was outlined as follows.

6.1 Importation of germplasm as deleafed suckers and their establishment in pots in post-entry quarantine glasshouse, Eagle Farm, Brisbane.

6.2 Establishment of meristems in tissue culture at Maroochy Horticultural Research Station, to eliminate risks from fungal, bacterial and nematode pathogens.

6.3 Destruction of the original imported material, clones maintained in tissue culture only.

6.4 Re-establishment and growth in quarantine of representative plantlets from each tissue cultured meristem for visual screening for Banana Bunchy Top Virus (BBTV) and indexing for Cucumber Mosaic Virus (CMV).

6.5 The release from quarantine of all material derived from that meristem if screened plants deemed free of disease.

In practise, in order to remove all the damaged corm tissue, particularly that resulting from banana borer attack (*Cosmopolites sordidus*) the majority of suckers were cut too small to establish in pots and instead were initiated directly in tissue culture.

7. THE PNG BIOLOGICAL FOUNDATION'S BANANA COLLECTION AT LALOKI, PORT MORESBY

The PNG banana germplasm collection was started in the early 1970's, when Dr George Argent was recruited by the PNGBF and given the task of "assembling as many as possible of the wild and cultivated banana strains growing in PNG as a genepool collection and as source material for PNG and world programmes in the culture of bananas as a food crop" (PNGBF Research Review 1981).

The PNGBF funded the maintenance of the collection until 1982, and since then it has been supported by the PNG Department of Agriculture and Livestock (DAL). At present the collection is maintained out of funds allocated for banana research.

The collection was originally planted at Lae, but during 1979-81 the whole collection was duplicated at Laloki Agricultural Research Station, a site only 20 km from Port Moresby, making it more convenient for supervision and maintenance. The original collection at Lae is no longer maintained and all that remains of it are a few clones of which *M. balbisiana* was the only one identifiable.

The banana programme at Laloki is headed by Mrs Rosa Kambuou, who is assisted by four labourers. They are responsible for maintaining the collection and carrying out all research on bananas in PNG. Mrs Kambuou is keen to see the collection maintained at Laloki, although the site is not ideal for bananas, being in one of the few areas of PNG with a severe dry season. There is a river nearby which provides ample water for irrigation but despite this clones have been lost during the dry season and flooding occurs in the wet season.

7.1 Wild Species

The only wild species represented in the collection are *Musa naclayi* and *M. balbisiana*. Both of these were collected by the Japanese root crops and banana collecting mission to PNG in 1986. No examples of the indigenous *M. banksii* or *M. schizocarpa* exist in the collection.

7.2 Cultivars

The original collection contained 675 cultivar accessions, but this had declined to 396 by May 1978 and Shepherd and Ferreira list 221 in their report on a visit to the collection in 1982. During the present visit we saw 196 cultivars. Some of these were reclassified by Dr. Tezenas du Montcel into different genomic groups to those in which they had been placed by Shepherd and Ferreira.

Table 1 gives a summary of the cultivar collection at present.

Chromosome counts have been carried out by Dr Shepherd on a number of the cultivars, thus confirming their diploid or triploid status. Of the diploids, 34 clones have been confirmed to possess 22 chromosomes, although three of these cultivars are now missing from the collection. In the triploids, 11 AAA and 6 AAB clones are confirmed triploids and one tetraploid has also been confirmed.

The whole of this collection has now been duplicated in the Phillipines, where it is at present being grown in the quarantine area.

The banana collection also contains 38 accessions collected by Japanese collecting missions in 1986 and 1987. Many of these are still too small for accurate classifications to be made, but they include 8 AA diploids, 7 AAA, 4 AAB and 7 ABB triploids as well as the two wild species mentioned earlier.

Mrs Kambuou has also recently added 36 further accessions collected by herself, but these were also too young to be classified.

None of these recent additions have been duplicated in the Phillipines.

All the accessions collected during this and future collecting missions will be returned to PNG for planting in the collection once they are established in tissue culture.

Table 1. Summary of Banana Cultivar Collection at Laloki Agriculture Research Station, PNG.

Genotype	No. of accessions listed by Shepherd and Ferreira (1984)	No. of accessions seen during present visit	No. of accession re-classified by Dr Tezenas du Montcel	Total No. of accessions now remaining
AA	63	54	15 - AAA	40
AAA	55	47	1 - AA	62
AAB	48	40	1 - AB	45*
AB	-	-	-	1
ABB	32	31	-	31
AAS ¹	5	5	2 - AS	3
AS	-	-	-	2
AAAA	1	1	1 - AAA	0
AAAB/AABB	11	9	3 - AAB	6
ABBE	1	1	-	1
ABBS	3	3	-	3
AAAT ²	1	1	-	1
ABBT	1	0	-	0
Total	221	192		195

* 3 cultivars not on Shepherd and Ferreira's list also included.

¹S = *M. schizocarpa*

²T = *Australimusa* - cultivars classified on the basis of shiny green bracts typical of this section of the genus *Musa*.

7.3 Pests and Diseases at Laloki

Foliar diseases recorded in the collection were black Sigatoka (*Mycosphaerella fijiensis*) black cross (*Phyllacora musicola*) cordana leaf spot (*Cordana musae*) and freckle (*Guingardia musae*).

Cordana leaf spot commonly occurred as a secondary pathogen infecting the lesions caused by the black Sigatoka and black cross pathogens.

Freckle was common and often severe on the ABB clones, which appeared to be more resistant to black Sigatoka than many of the AA, AAA and AAB clones.

Symptoms of a possible virus infection were observed in some clones. Mrs Kambuou was advised to seek the advice of PNG plant pathologists on the necessity to destroy these clones.

A disease survey of the entire collection was carried out by Dr David Jones and details of the disease status of each accession are given in his report.

Two major pests cause problems in maintaining the collection. These are banana borer (*Cosmopolites sordidus*) and the burrowing nematode (*Radopholus similis*). In order to reduce the damage caused by these pests the collection is replanted every two years.

8. GERMPLASM COLLECTION SITES

8.1 East New Britain Province - Gazelle Peninsular

The gazelle peninsular is an area of relatively high population and is intensively cultivated. Practically no primary forest and very little secondary forest remains. Cash crop production is of cocoa and coconut with bananas and taro providing the staple food. Along the roads and in permanent sites around houses triploid AAB and ABB cultivars are grown, the most common being **Kalapua**, **Tukuru** and **Yawa**. In newer garden sites diploid bananas are grown as temporary shade for cocoa. Bananas are grown as a staple food crop and therefore a range of cultivars have to be maintained to satisfy the diverse needs of a family group. These needs include main meals, desserts, childrens food, quick snacks, festival food and beer production. More details of the farming systems in this area are given in Appendix 3.

8.1.1 Wild species

Two wild *Musa* species were found in the Gazelle Peninsular. The first of these, **Ensete glaucum** was found as a single plant, with a few seedlings nearby, growing in an area of secondary forest. This species apparently used to be common in this area but is now rare.

The second wild species, *M. balbisiana* was found growing in open roadside grassland. The surrounding area used to be natural grassland and *M. balbisiana* was common. Now however much of this land is being cultivated and this species is becoming rare. No mature seed was available but suckers were taken from this plant. The leaves of *M. balbisiana* are still used by local people for wrapping wild pig meat after a hunt.

M. banksii, *M. schizocarpa* and *M. maclayi* were not found in the Gazelle Peninsular.

8.1.2 Cultivars

In a garden near to where *M. balbisiana* was found, we were shown a cultivar which appeared to be of BB genotype. According to Simmonds (1962), no pure *M. balbisiana* cultivars exist. However, this clone had no "acuminata" characteristics, was parthenocarpic and female fertile, producing occasional seed but no pollen. Suckers were taken from this clone, called **Auko**, accession number PNG 034.

The other cultivars collected in this area were predominantly AA diploids although this will have to be confirmed by chromosome counts. A total of 34 cultivars were collected and for each one a description was written, a photograph taken and a disease assessment made. These details are given in Appendix 4.

The fruit of many of these cultivars were plantain-like, ie long fingers and few hands, but the compound tepal of the male flower was usually white or cream, not the yellow/orange colour associated with plantains. Many also had the green/yellow bracts and male bud and pseudostem colouration characteristic of *M. banksii*.

Of the 33 AA/AAA/AAB? cultivars collected, 12 appeared to be male fertile and 20 showed a resistant reaction to black Sigatoka.

One enormous ABBB cultivar, **Yawa 2** (PNG 072) was collected by Dr Tezenas du Montcel as well as two Fe'i cultivars (PNG 070 and 071) derived from *M. maclayi* (*Australimusa*).

8.1.3 Disease and Pests

Scab moth (*Nacoleia octasema*) is particularly prevalent in this area and in some cases causes the destruction of virtually the whole bunch. The larvae feed on the female flowers and young fruit, and at best leave unsightly scars and cracks at bunch maturity. There is no cultural control of this pest and insecticides are not used.

The common foliar diseases seen were black Sigatoka, black cross and cordana. Of the 34 cultivars collected, 20 showed a resistance reaction to black sigatoka, while cultivar **Auko** (BB/BBB?) was immune to the disease. Rust (*Uredo musae*) was seen on one AA cultivar, **Pitu** (PNG 003). Freckle (*Guignardia musae*) was seen on the cultivar **Kokor** (PNG 033) and the wild *M. balbisiana* was affected by speckle (*Veroniceae musae*). Symptoms of infectious chlorosis caused by cucumber mosaic virus (CMV) were seen on the foliage of the cultivar **Pisang rajah** when it was found growing amongst cucurbits in one location.

8.1.4 Lowland Agricultural Experiment Station (LAES), Keravat, ERB

The last day in East New Britain was spent visiting LAES. This is the major low altitude experimental station in PNG and is the largest agricultural research establishment in the South Pacific Region. The emphasis at LAES is on cocoa and coconut based farming systems research, using a range of traditional food crops, fruits, nuts and vegetables.

A *Musa textilis* (Abaca) collection is maintained at LAES. This contains the Abaca collection from the Phillipines which was brought to LAES in 1935 and which was subsequently destroyed in the Phillipines during World War II. The collection also contains a range of *M. textilis* hybrids with other *Australimusa* species, many of which were introduced from Trinidad. Unfortunately as no research has been conducted on Abaca since the early 1960's, the collection has not been well maintained and no accurate field plan exists.

8.2 Morobe Province (Lae)

The first area visited in this province was the Markham Valley. This is an area of seasonally dry grassland with gardening plots of mainly ABB Kalapua bananas. Small fertile hollows were devoted to diploid bananas and five diploids were collected. All of these were similar in having persistent male bracts, which were green in two of the cultivars. One of these diploids was resistant to black sigatoka, while the other four were susceptible.

Wild *M. banksii* and *M. schizocarpa* were found growing occasionally along the roadside between Lae and Nadzab and collections were made from three stands of *M. banksii* and one of *M. schizocarpa*. Mature seed was obtained from one *M. banksii* and from *M. schizocarpa*, and suckers were taken from all four clones. There appeared to be little variation between the *M. banksii* collected, all having small, rather bottle necked fruit, shiny green pseudostems and green male buds. It was noted that the *M. banksii* was particularly susceptible to attack by beetle borer.

The second area visited was along the coast east of Lae. This is a banana/taro gardening systems area with a range of AAB plantain - type bananas predominating. Many of these triploids had been brought from the Sepik area and Dr Tezenas du Montcel collected suckers from seven of them. Suckers from two diploids were also collected here.

More details of the farming systems in this area are given in Appendix 3.

Along the roadside wild *M. maclayi* (*Australimusa*) was abundant and collections of seed and suckers were made of this species.

M. schizocarpa was also seen a little further inland and two collections of seed and suckers were made from roadside stands.

All the wild *Musa* species found in this area were growing in mixed roadside grass and bushland on the edge of cultivated land or forest. *M. banksii* and *M. schizocarpa* were growing as scattered individual plants or small clumps found over a wide area, whereas *M. maclayi* was abundant in the one area where it was seen. No leaf spot diseases were seen on any of the *M. banksii* or *M. schizocarpa* clones found, but speckle was present on *M. maclayi*.

The absence of foliar diseases is possibly more attributable to the scattered population than to any particular disease resistance in the wild bananas.

One unusual banana seen in this area was a huge tetraploid said to have been introduced originally by German missionaries. This particular stand was eight years old and the mature pseudostems were 7-8 m tall with a circumference at the base of 1-5 m. It is possible that this clone, called **Siassi** (PNG 085) has some *M. schizocarpa* in its genome - ABBS?

Argent (1976) and Simmonds (1956) both reported finding *M. balbisiana*, *M. banksii* and *M. schizocarpa* in the Lae area, either in the Markham Valley and/or in the Wau-Bulolo area. No *M. balbisiana* was found in this area and during a morning spent on the Wau-Bulolo road no wild *Musa* species were seen at all. Villagers along this road did report having seen wild bananas in gullies in the forest, both those with erect bunches (*M. macclayi*) and those with pendant bunches and green male buds. There was insufficient time however to find any of these wild bananas.

8.3 West Sepik Province (Vanimo)

The farming system in this area is based on Sago (*Metroxylon sagu*) as the staple food crop, grown with a range of secondary staples including banana, yam, taro and cassava. Of these banana is probably the most important. More details of the farming systems are given in Appendix 3.

The first day in Vanimo was spent driving along the coast road to the Indonesian border. *M. banksii* was seen occasionally growing along the roadside on the edge of dense forest in stony chalky soil. Suckers were collected from one plant and mature seed from another. No diseases were seen on these wild bananas.

Cultivated bananas growing around Wutung near the Indonesian border were carefully checked for symptoms of BBTv by Dr Jones and Dr Derek Tomlinson, a PNG plant pathologist who accompanied us during this part of the mission. If this disease were to spread from the Jayapura area of Irian Jaya it is most likely to be found first in this area where there is a constant movement of people across the border. No infected bananas were seen either here or later by Dr Tomlinson during a visit to a refugee camp for people from Irian Jaya.

On the second day in Vanimo we drove inland, into the Bewani-Torricelli chain of mountains. In a possibly abandoned garden site on the roadside the cultivated diploid **Pisang Mas (Sucrier)** was found. This clone was also seen in other areas and always showed a resistant reaction to black Sigatoka. This is surprising as the clone is known to be highly susceptible to yellow Sigatoka (*Mycosphaerella musicola*). Suckers were taken from this clone.

Further inland wild *M. banksii* was found in several locations. Again it was growing amongst mixed roadside grasses on the edge of dense forest and in this area the soils were of heavy wet clay.

Three collections of *M. banksii* were made near the village of Sosi, and each appeared to be different. The first, **Sosi No. 1** (PNG 053) was different to previous *M. banksii* seen in having spreading rather than erect leaves and purple streaks on green male bracts. It produced only a small amount of pollen and the fruit, which were small, bottle-necked and badly filled, contained only a few seeds. This plant was resistant to black Sigatoka but susceptible to freckle. The second collection **Sosi No. 2** (PNG 054) was more typical of *M. banksii* with 11-12 hands of well-filled rounded fingers, erect leaves and green bracts which had purple margins. The fruit contained many seeds, unfortunately not mature, and the male flowers were full of pollen.

The third *M. banksii* collected, **Sosi No. 3** (PNG 055) differed in having angular, bottle-necked fruit and a rounded tip to the green male bud. It also had many hands and plenty of seed which again was not mature.

The diversity in the *M. banksii* seen in this area may either represent variability within the species or some hybridization with other *Musa* species and/or cultivated diploids. This is discussed in more detail in Section 9.

Musa boman (*Australimusa*) was locally abundant between Sosi and Kilipau and seed was collected from two plants. This species is very tall and robust, and identifiable by its large, round, cream-coloured male bud.

Argent records seeing *M. banksii*, *M. schizocarpa*, *M. banksii* x *M. schizocarpa*, *M. lolodensis*, *M. boman* and *M. boman* x *M. lolodensis* in this area. This is an important area for studying wild bananas as it is here that any hybridization or introgression with different species or sub-species growing in Irian Jaya would be found.

8.4 East Sepik Province - (Wewak)

The farming systems in this area were, as in the West Sepik, based on Sago, with bananas being grown as a secondary staple.

8.4.1 Cultivars

The cultivated bananas in this area were predominantly plantain-type AAB clones. Three of these were collected by Dr Tezenas du Montcel, two of which were true horn plantains, i.e. having no male axis. Several plants of the cultivar **Soman1** (PNG 064) were seen in one garden. This cultivar had horn plantain type fruit and the various plants showed a range of bunch characters varying from 5-6 hands with a normal male axis to 2-3 hands with no male axis. Stages in between showing degeneration of the male axis could also be seen.

One other diploid cultivar (PNG 063) which was immune to black Sigatoka was also collected here.

8.4.2 Wild species

Suckers were collected from a wild *Musa* which was found growing on the edge of a garden near Hawain Agriculture Station (PNG 058). This species was common in the area and many seedlings were seen growing in the surrounding bush. The fruit of this plant were small, angular and bottle-necked and the male bud somewhat rounded at the tip. These are *M. schizocarpa* characteristics and it is possible that although this was originally identified as *M. banksii*, it could in fact be *M. schizocarpa*.

Along the road west of Wewak, both *M. banksii* and *M. schizocarpa* were seen growing as scattered, individual plants in grassland on the edge of cultivated areas. Three collections of *M. banksii* were made, two of which were from plants with typical *M. banksii* - type rounded fingers, while one had more angular bottle-necked fruit.

Cordana leaf spot was present on all four of the plants from which suckers and/or seed were taken and freckle was present on three of them. Black Sigatoka and black cross were absent.

One day in East Sepik province was spent prospecting along the Wewak-Maprik road. Near Passam a plant which looked like *M. banksii* with a purple male bud was found. The male flowers contained only a small amount of pollen and the fruit only a few seeds, which were small like those of *M. banksii*. The fingers were rounded and well filled and the plant obviously female fertile and parthenocarpic. The scarcity of pollen and seeds produced by this plant suggest that it is not a truly wild species. This could possibly be a hybrid between *M. banksii* and a cultivated diploid. Suckers and seed were collected from the plant (PNG 062) which was growing in clay soil on the roadside.

Further along the Maprik road at Japaraka No. 1 *M. banksii* was again found growing in roadside grassland in stony clay soil. Two plants were found growing within a few hundred yards of each other. Both had dark purple male buds and some red colouration on the petioles and midribs. The first of these (PNG 065) had very small fruit with undeveloped seed inside. It appeared that the basal flowers had not been pollinated and the fruit not being parthenocarpic had failed to develop. The male flowers contained pollen and the plant was therefore both male and female fertile.

The second plant (PNG 066) had longer, angular fingers, but again, although the male flowers contained pollen, the seeds were undeveloped and presumably had not been pollinated.

It is known that *M. banksii*, although normally self-pollinating can fail to develop functional stamens in some and occasionally in all the hands of the bunch (Argent 1976). This may be the case with the purple-bracted *M. banksii* seen at Japaraka, which would therefore require an external source of pollen to produce viable seed.

In some areas along the Wewak-Maprik road wild bananas were abundant. A population of *M. banksii* was seen growing amongst coffee on soil very rich in organic matter. Here growth was very vigorous, the population contained many tall, robust plants and plenty of seedlings. No diseases were evident and the population appeared to be a uniform stand of plants with typical *M. banksii* characteristics.

Along the banks of the Nagam River, *M. banksii* and *M. schizocarpa* were seen growing together and seed was collected from mature fruit of *M. banksii* at Paliama.

9. NOTES ON THE WILD MUSA SPECIES, *M. BANKSII* AND *M. SCHIZOCARPA*

9.1 *M. banksii*

This is the most widespread *Musa* in PNG, with its range extending into Queensland, Samoa and possibly the Philippines. Some variation exists in characters such as bract colour and fruit shape. This was noted by Argent (1976) who was unable to correlate these variants with geographical distribution.

Simmonds (1956) reduced *M. banksii* to a sub-species of *M. acuminata* and suggested a cline linking *M. banksii* with a Malayan form of *M. acuminata* existing in Irian Jaya. This would explain the variation in the species. However, little is known of the *Musa* species growing in Irian Jaya and as was noted by Argent, there is no evidence of hybrids having been produced between the *M. banksii* and *M. acuminata ssp malaccensis* which are growing in close proximity in Lae botanical gardens.

Argent records *M. banksii* as a separate species and suggests that gene exchange with some diploid banana cultivars might explain the variability in the species. As mentioned earlier (8.4.2), although *M. banksii* is normally self-pollinating functional stamens do sometimes fail to develop in the basal hands and therefore hybridization can occur.

M. banksii is common as a roadside plant in mainland PNG, generally occurring in clumps in disturbed lowland situations. It was not found in New Britain.

9.2 *M. schizocarpa*

M. schizocarpa is less common than *M. banksii*, but it is found growing in similar situations. It is distinctive in that the fruit split open at maturity and differs from *M. banksii* in its bottle-necked, angular fruit, larger seed and rounded tip to the male bud. Little variation seems to occur within this normally self-pollinating species, although Argent records two variants. Var. A, found along the north-eastern coastal area (Morobe and East Sepik provinces) and Var. B, found near the Irian Jaya border (West Sepik province). Var. B differs from Var. A in its pale green fruit, smaller stature and more waxy appearance.

9.3 *M. banksii* x *M. schizocarpa*

Hybrids between these two species are known to occur (Argent, 1976) and these are intermediate in character between the two parents. They form a distinct taxonomic entity and were not observed by Argent to intergrade with either parent. However, the occurrence of *M. banksii* with bottle-necked angular fruit may indicate a limited introgression of *M. schizocarpa* genes.

An attempt has been made in Table 2 to classify the *M. banksii* and *M. schizocarpa* which we collected using the characteristics that distinguish the two species. It can be seen that in some cases the original classification may be wrong.

Accurate classification however can only be made when all the clones are grown together under uniform conditions. When this is done it will be possible to see how much of the variability is due to differing environmental conditions in the wild and how much due to diversity within the species.

Table 2 Characteristics of the *M. banksii* and *M. schizocarpa* collected

Accession No.	Original classification and name	Fruit shape (1)	Apex of male bud (2)	Seed Size (3)	Scarious margin to petiole (4)	Tentative margin to re-classification
PNG 041	<i>M. banksii</i> No. 1	small, angular bottle-necked	rounded	intermediate, few	yes	<i>M. banksii</i> x <i>M. schizocarpa</i> ?
PNG 042	<i>M. schizocarpa</i> No. 1	angular, bottle-necked	rounded	large	no	<i>M. schizocarpa</i>
PNG 046	<i>M. schizocarpa</i> No. 2	angular, bottle-necked	rounded	large	no	<i>M. schizocarpa</i>
PNG 047	<i>M. schizocarpa</i> No. 3	angular, bottle-necked	?	?	no	<i>M. schizocarpa</i>
PNG 048	<i>M. banksii</i> No. 2	immature	rounded	?	yes	<i>M. banksii</i> ?
PNG 049	<i>M. banksii</i> No. 3	small, angular	pointed	?	no	<i>M. banksii</i> x <i>M. schizocarpa</i> ?
PNG 050	Yako (<i>M. banksii</i>)	?	pointed?	?	yes	<i>M. banksii</i>
PNG 051	Mushu (<i>M. banksii</i>)	angular	rounded?	large	?	<i>M. schizocarpa</i> ?
PNG 053	Sosi No. 1 (<i>M. banksii</i>)	angular, bottle-necked	pointed	intermediate, slight few		<i>M. banksii</i> x ?
PNG 054	Sosi No. 2 (<i>M. banksii</i>)	rounded	pointed	?	yes	<i>M. banksii</i>
PNG 055	Sosi No. 3 (<i>M. banksii</i>)	angular, bottle-necked	rounded	?	?	<i>M. schizocarpa</i> ?
PNG 058	Hawain No. 1 (<i>M. banksii</i>)	angular, bottle-necked	rounded	?	no	<i>M. schizocarpa</i> ?
PNG 059	Hawain No. 2 (<i>M. banksii</i>)	rounded	pointed	small	yes	<i>M. banksii</i>
PNG 060	Parom (<i>M. banksii</i>)	rounded	pointed	small	yes	<i>M. banksii</i>
PNG 061	Kapun (<i>M. banksii</i>)	angular, bottle-necked	pointed	intermediate	?	<i>M. banksii</i> x <i>M. schizocarpa</i>
PNG 062	Passam (<i>M. banksii</i>)	rounded	pointed (purple)	small	?	<i>M. banksii</i> x ?
PNG 065	Japaraka No. 1 (<i>M. banksii</i>)	small angular	pointed (purple)	no	yes	<i>M. banksii</i> x ?
PNG 066	Japaraka No. 2 (<i>M. banksii</i>)	small angular	pointed (purple)	no	yes	<i>M. banksii</i> x ?
PNG 067	Paliama	rounded	pointed	small	yes	<i>M. banksii</i>

Key to Table 2

1. Fruit shape - angular, bottle-necked = *M. schizocarpa*
 - rounded = *M. banksii*
2. Apex of male bud - pointed = *M. schizocarpa* ↘
 - rounded = *M. banksii* ↙
3. Seed size - large (6-7 mm diam.) = *M. schizocarpa*
 - small (4-5 mm diam.) = *M. banksii*
 - intermediate with many undeveloped ovules = *M. schizocarpa* x *M. banksii*
4. Scarious margin - absent = *M. schizocarpa*
 to petiole - present = *M. banksii*

10. GENERAL POINTS

10.1 Many of the cultivars collected are *banksii* derivatives and these have numerous characters in common with the plantains. This raises the question: is *M. banksii* the acuminata parent of the plantains and if so, where did the plantains originate?

10.2 *M. balbisiana* was found only in New Britain, although both Argent (1976) and Simmonds (1956) report finding it in mainland PNG. Simmonds considers it to be "truly native" to PNG, whereas Argent suggests that it may have been introduced either as a wild species whose leaves were used as a wrapping material or as a primitive diploid parthenocarpic cultivar which later reverted to the wild non-parthenocarpic type.

M. balbisiana certainly is not as widely distributed and well adapted as the other indigenous *Musa* species, *M. banksii* and *M. schizocarpa*.

10.3 Natural hybrids occur between *M. schizocarpa* and *M. banksii* and Shepherd recognised several AAS and AS clones in the Laloki collection. It is therefore likely that *M. schizocarpa* was involved in the origin of certain PNG cultivars.

11. CONCLUSIONS

11.1 A total of 61 cultivars were collected. These consist of:

AA	- 37)	
AAA	- 6)	
BB	- 1)	Genotypes to be confirmed.
AAB	- 13)	
ABBB	- 2)	
Fe'i	- 2)	

In addition Dr Tezenas du Montcel also collected 13 cultivars from the Laloki collection.

Six wild species were also collected. *M. banksii* (15 accessions), *M. schizocarpa* (3 accessions), *M. balbisiana* (1 accession), *M. maclayi* (1 accession). *M. boman* (2 accessions) and *Ensete glaucum* (1 accession).

11.2 It is possible that some duplication may have occurred in the cultivars collected. It will be important for all the accessions to be grown under uniform conditions so that accurate descriptions and classifications can be made. Such characterization will also be important for the *M. banksii* and *M. schizocarpa* collected, to assess the degree of variability within these species.

11.3 The important foliar disease seen in PNG were black Sigatoka, black cross and cordana. ABB clones seemed to be resistant to black Sigatoka and resistance was also seen in some AA cultivars. Of the 37 AA cultivars collected, 25 showed a resistance reaction to black Sigatoka.

These fungal disease do not cause significant losses in yield due to the small scale on which bananas are grown and the range of cultivars maintained.

Banana borer and nematodes were present in some areas and scab moth is a major pest in East New Britain.

Panama disease, Moko and EBTV were not seen and these diseases have never been confirmed in PNG.

12. FUTURE COLLECTING MISSIONS

A great diversity of banana cultivars were found during this first collecting mission and it is probable that much more diversity will be found in future missions.

Further investigation of the wild species is also necessary to determine the extent of variation within these species. It would be interesting to know which wild species grow in Irian Jaya and assess the degree of hybridization and introgression with PNG species.

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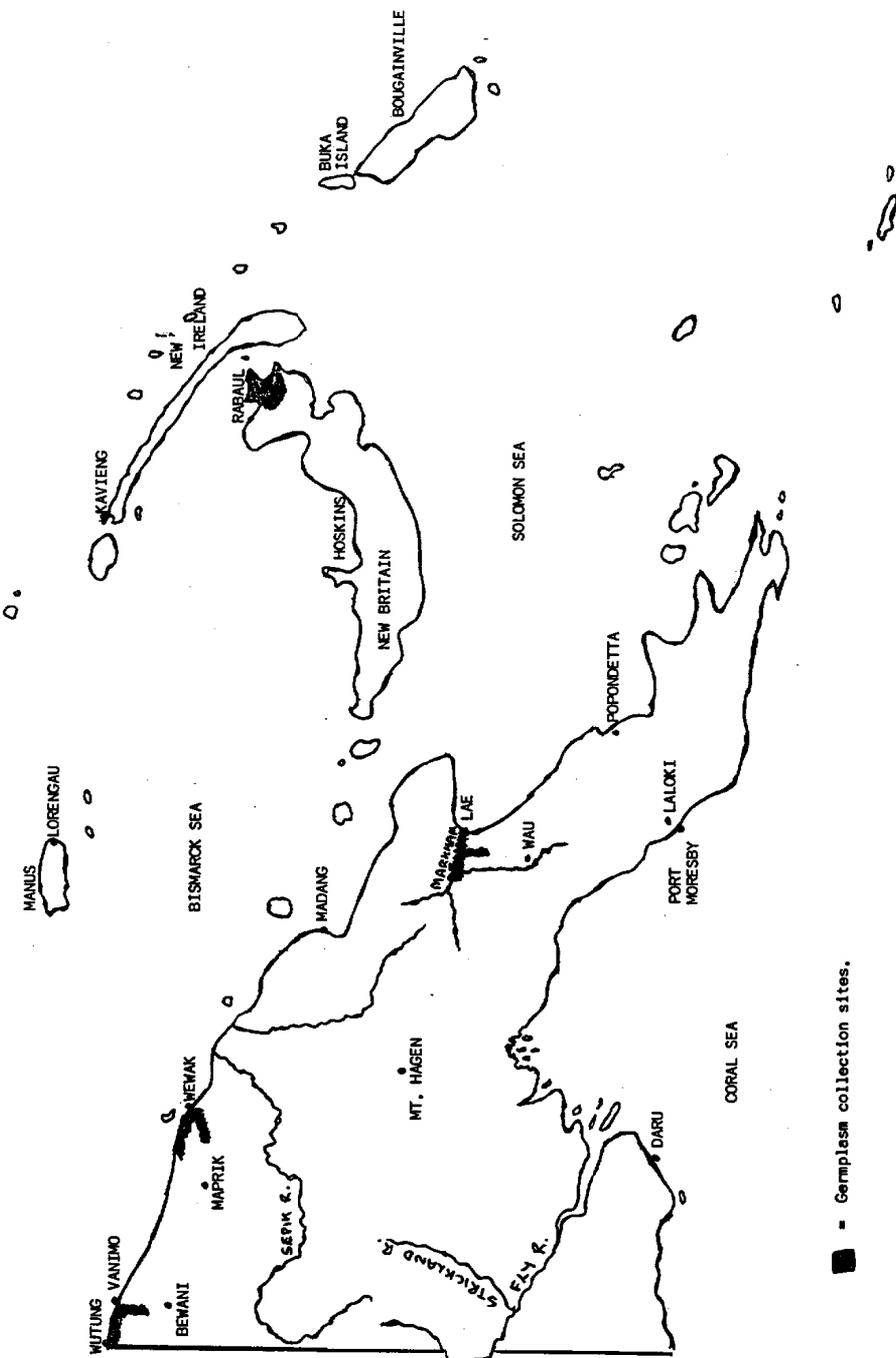
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- Simmonds, N.W., 1956. Botanical Results of the Banana Collecting Expedition 1954-55. Kew Bull. 11: 463-489.
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ITINERARY

- 27/2/88 Brisbane - Port Moresby
Discussions with Mrs Kambuou
- 28/2/88 Port Moresby - Inspection of bananas at Koki and Gordon
markets. Visit to Botanical Gardens.
- 29/2/88 am. To PNG Department of Agriculture and Livestock (DAL)
Meetings with: Director Crop Research - Mr B. Hadfield
Deputy Director - Crop Research -
Mr G. Kula
Secretary, DAL - Mr N. Beangke
- pm. Discussions with PNG DAL Plant Pathologists:
Dr. Muthappa and Dr D. Tomlinson
- 1/3/88 am. To PNG Banana Germplasm Collection, Laloki Agricultural
Research Station.
Meeting with OIC, Mr Tony Bernabe.
- pm. Visit to banana collection.
- 2/3/88 am. Banana collection, Laloki
pm. Port Moresby to Rabaul, ENB.
Discussions with Mr D. Low, OIC, LAES Keravat.
- 3/3/88 Visit to banana gardens in Vunapalading and Kasaska (15
cultivars collected).
- 4/3/88 am. Meeting with Deputy Assistant Secretary, DPI Rabaul:
Mr P. Lululai.
- pm. Visit to banana gardens in Vunalir (6 cultivars
collected).
- 5/3/88 am. Inspection of bananas at Rabaul Market.
pm. Visit to banana gardens in Rapirok and Korere (8
cultivars collected).
- 6/3/88 Rest day - Rabaul.
- 7/3/88 Visit to banana gardens at Vunapope, Kokopo, Tingenavadu and
Ulaulatava (6 cultivars and 2 wild sp. collected).
- 8/3/88 am. Visit to LAES and M. Textilis collection.
pm. Preparing suckers to be sent back to Port Moresby.
- 9/3/88 am. Rabaul - Lae.
pm. Visit to Bubia Agricultural Research Station, Provincial
DAL office and Lae botanical gardens.
- 10/3/88 Prospecting in Markham Valley (5 cultivars and 2 sp.
collected).

- 11/3/88 Prospecting in Singaua and Situm (2 cultivars and 3 sp. collected).
 Discussions with Mr G. King, OIC, Bubia ARS.
- 12/3/88 am. Prospecting in Markham Valley and along the Wau-Bulolo road (2 sp. collected).
 pm. Lae - Wewak.
- 13/3/88 am. Wewak - Vanimo.
 pm. Discussions with Mr J. Dees, Project Co-ordinator W. Sepik Development Project and Mr L. Kindiwa, DAL Provincial Food Crops Officer.
 Prospecting along Coast Road to Wutung (Indonesian border) (2 sp. collected).
- 14/3/88 Prospecting along Bewani Road to Kilipau Village (1 cultivar and 5 sp. collected).
- 15/3/88 am. Vanimo - Wewak.
 pm. Prospecting along Coast Road, Wewak - Dagua (4 wild sp. collected).
- 16/3/88 Prospecting along Wewak - Maprik Road (2 cultivars and 4 sp. collected).
- 17/3/88 am. Preparing suckers for transport to Port Moresby.
 pm. Wewak - Port Moresby.
- 18/3/88 -
 21/3/88 Laloki Agriculture Research Station.
 Visiting banana collection and preparing suckers for transport to Australia.
- 22/3/88 Port Moresby - Brisbane.

PAPUA NEW GUINEA



■ - Gempleasm collection sites.

Information in this Appendix is provided by Mr B. French.

1. Gardening in the Gazelle, ENB

This area is under fairly intensive cultivation and gardening is becomingly increasingly sedentary, but without any intensification of the system in terms of fertility improvement by composting or use of artificial fertilizers. Where land is available a cropping sequence of *Colocasia taro*/diploid bananas is followed by *Xanthosoma taro*/triploid bananas and/or cocoa. Some triploid bananas are grown under coconuts and at times *Xanthosoma taro* is put under cocoa/coconuts or in gaps in cocoa plots.

Cash crop production is based on cocoa and coconut and bananas (diploid, triploid and to a lesser extent fehi) are the staple food. Taros (*Xanthosoma sagittifolium*, *Colocasia esculenta*, and *Alocasia macrorrhiza*) are secondary staples and it is likely that some 50-60 cultivars are maintained in the area. *Colocasia esculenta* however is subject to severe genetic erosion due to *Phytophthora* leaf blight, *Alcmae/Babonae* virus disease, Papuana spp. taro beetle and declining soil fertility. Some of these taro cultivars were collected recently by the IBPGR Japanese Rootcrops and Banana Collecting Mission.

Other root crops grown in this area include sweet potato (*Ipomoea batatas*), greater yam (*Discorea alata*), lesser yam (*D. esculenta*) and cassava (*Manihot esculenta*).

Saccharum edule as a vegetable, "pitpit" is significant and a range of cultivars are grown, while a number of green leaf vegetables are also eaten. These include "valanguar" (*Polyscias verticillata*), grown as a hedge around houses, and aibika (*Abelmoschus/Hibiscus manihot*) which is very common. Some of the cultivars of this have been collected by IBPGR missions. Other edible leaves of lesser importance are: *Solarum nigrum*, "karakap", *Amaranthus* spp. and *Ficus copiosa/F. wassa*. Significant amounts of *Ipomoea aquatica* "kangkang" and *Oenanthe javanica* are sold in the markets.

The main nut crop is *Barringtonia novae - hibernae* of which a range of cultivars are maintained, and significant diversity is also found in the betel-nuts (*Areca catechu*). Seeded breadfruit and canarium almonds are also grown.

Fruits grown in this area include mango, papaya, citrus-orange, West Indian lime and pomelo, guava, and some rambutan. *Burckella abovata* or "bukbuk" is a fruit often ignored, but also significant.

2. Gardening in the Lae area (Morobe province)

a. Markham Valley

This is an area of seasonally dry grassland where little cash crop production has been developed, although some significant area is under grazing by Brahman cross cattle and buffalo. Peanuts are the main village - level cash crop and maize and sorghum for pig and poultry feed are grown on a larger mechanised scale.

The gardening pattern seen consisted mainly of triploid *Kalapua* bananas with small fertile hollows devoted to diploid bananas. Aibika (*Abelmoschus/Hibiscus manihot*) and amaranth (*Amaranthus spp.*) were said to be the main edible greens grown, but little evidence of them were seen. Unless the local people have other more distant gardens in the foothills, the predominance of only one banana cultivar (*Kalapua*) would mean that the diet would be narrowly based and not easily able to meet the diverse social, cultural and dietary needs of a family group. The severe drought which occurred last year (1987) may have caused a reduction in the diversity of planting material available.

Stands of coconut were seen in this area and mangos are common.

b. Coastal area east of Lae

This is a banana/taro gardening system area.

One block visited was owned by a family from the Maprik Sepik area, who are traditionally yam growers. Some greater yam (*Discorea alata*), lesser yam (*D. esculenta*) and potato yam (*D. bulbifera*) were maintained, but generally the flat terrain and high soil moisture made it unsuitable for good yam production. The gardening system was therefore based on taro/banana intercropping as a prelude to cocoa establishment. A range of AAB plantain type cultivars had been brought from the Sepik and some local cultivars were also grown.

A range of *Colocasia* taro cultivars were also maintained, partly intercropped with the bananas. It is probable that aibika and amaranth were planted as a rotation preceding the banana/taro crop. In other gardens in this area the cropping sequence was completed with a crop of pitpit (*Saccharum edule*) before the land was allowed to revert to bush fallow.

Other crops seen in this area include:

- Fruits:- Mango (*Mangifera indica*)
 - Malay apple (*Syzygium/Eugenia malaccensis*)
 - Avocado (*Persea americana*)
- Nuts:- Okari (*Terminalia kaernbachii*)
 - Breadfruit (*Artocarpus altilis*)
 - Pau (*Barringtonia novae-ibericae*)

Peanuts and beans are also grown in this area.

3. Gardening Systems - Vanimo Area

Sago (*Metroxylon sago*) is the staple food here and it is grown as a cultivated crop with suckers being transplanted into new swamp areas. Spiny and spineless cultivars are maintained. One cultivar is primarily for roof thatching material and cultivation of sago grubs due to its poor starch yield. Fishtail palm (*Caryota rumphiana*) is also used to cultivate sago grubs.

A range of secondary staples are grown, of which banana is probably the most significant. Others include lesser yam (*D. esculenta*), greater yam (*D. alata*), Chinese taro (*Xanthosoma sagittifolium*), cassava (*Manihot esculenta*) and taro (*Colocasia esculenta*).

In coastal villages, fishing is significant and in inland villages hunting of wild animals (pigs, cassowary, possum, birds etc) remains an important activity.

Probably the most important edible greens grown are the young leaves of the Indian coral tree or "balbal" (*Erythrina variegata*). Three cultivars are maintained and these are grown by cuttings in almost all gardens. Other edible greens eaten are aibika, *Amaranthus* spp. *Ficus wassa* and "tulip" (*Gnetum gnemon*).

Nuts commonly seen included coconut, seeded breadfruit, pao, which is a new introduction from the Gazelle Peninsular, and Java almond (*Terminalia catappa*).

Fruits included papaya which grows wild, guava, malay apple, fig fruits of *Ficus wassa* and a fig similar to *Ficus dammaropsis*. Fruits of golden apple (*Spondias cytherea*) were seen in the market.

Other vegetables such as peanuts, pitpit and chillies also occurred in gardens.

The gardening pattern, as in many Sago staple area, was not an intensive activity, but a considerable diversity of plants were maintained in somewhat casual clearances near the villages.

Several deficiency symptoms were observed on the highly calcareous soils near Wutung at the Indonesian border. Symptoms occurred on bananas, cassava, chinese taro and aibika and were possibly zinc and magnesium deficiencies.

DETAILS OF CULTIVARS AND MUSA SPECIES COLLECTED

Acc. No.	FNG 001	FNG 002	FNG 003	FNG 004
Genotype	AA	AA	AA	AA/AAA?
Local Name	Kekiau	Gulum	Pitu	Vudu Papua
Language Group	Kuanua	Kuanua	Kuanua	Kuanua
Location	Vunepelading Block 826	Vunepelading Block 826	Vunepelading Block 826	Vunepelading Block 826
Nearest Town	Rabaul	Rabaul	Rabaul	Rabaul
Province	ENB	ENB	ENB	ENB
1 ♂ Fertile	-	-	+	-
Seeds	-	-	-	-
Use	Cooking	Cooking [Firm flesh]	Cooking	Dessert
2 Diseases:				
Black Sigatoka	Resistant	Resistant	Resistant	Resistant
Black Cross	+	+	-	+
Cordana	+	+	-	+
Others			Rust (Uredo Musae)	
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	♂ bud-yellow/green Long pendant fingers 2-3 hands.	Suckering inhibited ♂ bud yellow/green Bracts roll before lifting. Long, yellow pendant fingers 2-3 hands.	Robust, tall, 7-8 hands. Fruit shaped like Marau (AAA) o bud purple	Extensive black blotches on pseudostem. ♂ bud purple with green stripes.
Comments	= Al tenga (Baining language)	Simmonds: Gulum = Kiekiau		Introduced from Papua
Photo No.	2/3, 2/6, 2/7	2/4, 2/5	2/8, 2/9	2/10

Acc. No.	PNG 005	PNG 006	PNG 007	PNG 008
Genotype	AA?	AA/AAA?	AA/AAA?	AA/AAA?
Local Name	Mangara	Gorop	Tengemor	Lagun
Language Group	Kuanua	Kuanua	Kuanua	Kuanua
Location	Vunapalading Block 828	Vunapalading Block 828	Vunapalading Block 828	Vunapalading Block 828
Nearest Town	Rabaul	Rabaul	Rabaul	Rabaul
Province	ENB	ENB	ENB	ENB
♂ Fertile	-	-	+	-
Seeds	-	-	-	-
Use	Cooking	Dessert	Cooking	Cooking
Diseases:				
Black Sigatoka	Resistant	Tolerant	Susceptible	Susceptible
Black Cross	+	+	-	+
Cordana	+	+	+	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Long, yellow pendent fingers. Green/yellow ♂ bud. Pale coloured pseudostem.	♂ bud yellow/purple. Punduncle - purple Dorsal side of young leaf - purple. Long, pendent round-tipped fingers.	Red colouration on pseudostem, petioles margins and midribs ♂ bud purple. Fruit small, curving upwards.	Long, pendent yellow fruit ♂ bud red/green.
Comments			Red Mutant of Karakum?	Fruit tastes the same as Kekieu. Badly affected by nematodes.
Photo No.	2/12	2/13, 2/14	2/15	2/16

Acc. No.	RNG 008	RNG 010	RNG 011	RNG 012
Genotype	AA	AA	AA	AA/AAA?
Local Name	Rengalka	?	?	Tamai
Language Group	Baining	"Spiral"	"DTP"	Kuanus
Location	Vunapalading Block 669	Vunapalading Block 669	Vunapalading Block 669	Vunapalading Block 669
Nearest Town	Rabeul	Rabeul	Rabeul	Rabeul
Province	ENB	ENB	ENB	ENB
♂ Fertile	+	-	-	-
Seeds	-	-	-	-
Use	Cooking	Cooking	Cooking	Cooking
Diseases:				
Black Sigatoka	Resistant	Resistant	Resistant	Resistant
Black Cross	+	+	+	+
Cordana	+	+	+	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Bracts and neutral flowers - persistent. Long pendent fingers. 2 hands. ♂ bud purple/yellow.	Bracts and fruit in one continuous spiral ♂ bud purple. Long, yellow fingers.	Orange tip to compound tepal ♂ bud green with purple edge to bracts. Stamens pink. Long fingers.	Long, curved pale yellow fingers ♂ bud purple/yellow. Stigma black at tip.
Comments	Badly affected by nematodes.	Simmonds: Spiral = Ulongan Japanese: Spiral = Mangra	{DTP = Orange tip to perigone}	Badly affected by nematode Tamai = Gurnisi?
Photo No.	2/17	2/18	2/18	2/20

Acc. No.	FNG 013	FNG 014	FNG 015	FNG 016
Genotype	AA	AA	AAA?	AA
Local Name	?	Nevaradum	Beo	Katuel
Language Group		Baining	Kuanua	Kuanua
Location	"Kasaska" Kasaska (Bainings)	Kasaska	Kasaska	Vunilir
Nearest Town	Rabeul	Rabeul	Rabeul	Rabeul
Province	ENB	ENB	ENB	ENB
♂ Fertile	-	+	-	?
Seeds	-	-	-	-
Use	Cooking + Dessert	Cooking + Dessert (cooked when unripe)	Dessert	Sweet
Diseases:				
Black Sigatoka	Susceptible	Susceptible	Susceptible	Resistant
Black Cross	-	+	+	+
Cordana	+	0	+	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Persistent bracts and neutral flowers. Very pointed red ♂ bud. 6 stamens, some ♂ flowers fused together. Long pendent fingers	Persistent bracts and neutral flowers. ♂ bud purple/yellow. Style very short. Long, curved fingers.	Very round, shiny fruit. Persistent neutral flowers. Orange tip to compound tepal. Bunch sub-horizontal. 7-8 hands.	Good suckering. Large, pete pendent fingers. 4 hands.
Comments		= Taputuput? Very susceptible to banana borer.	Badly affected by nematodes.	
Photo No.	2/21	2/22	2/23	2/24

Acc. No.	PNG 017	PNG 018	PNG 019	PNG 020
Genotype	AA	AA/AAA?	AA	AA
Local Name	Marakudu	Lagun (VunLir)	Muruk	Aivip
Language Group	Kuanua	Kuanua	Kuanua	Kuanua
Location	VunLir	VunLir	VunLir	VunLir
Nearest Town	Rabeul	Rabeul	Rabeul	Rabeul
Province	ENB	ENB	ENB	ENB
♂ Fertile	-	-	-	?
Seeds	-	-	-	-
Use	Cooking	Cooking	Cooking	Cooking
Diseases:				
Black Sigatoka	Susceptible	Resistant	Resistant	Resistant
Black Cross	+	+	+	+
Cordana	+	+	+	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Sucking inhibited, long curved, round-tipped fingers. ♂ bud purple/yellow somewhat imbricate.	Tall plant, long curved green fruit. Stamens - slightly pink.	Green pendent fruit ♂ bud green. Suckers very small.	Yellow/green pendent fruit. Peduncle petioles and margin red. Bracts bright red.
Comments		= Madang	= Mariaga Tastes like Kekiau	Red mutant of Lagun
Photo No.	2/25	3/1	3/2	3/3

Acc. No.	FNG 021	FNG 022	FNG 023	FNG 024
Genotype	AA	AA	AA	AAA?
Local Name	Lalalur	Kabia Malum	Tamolo	Bulu
Language Group	Kuanua	Kuanua	Kuanua	Kuanua
Location	Rapitok No. 3	Rapitok No. 3	Rapitok No. 3	Rapitok No. 3
Nearest Town	Rabeul	Rabeul	Rabeul	Rabeul
Province	ENB	ENB	ENB	ENB
♂ Fertile	+	?	?	-
Seeds	-	-	-	-
Use	Dessert	Dessert	Cooking	Dessert
Diseases:				
Black Sigatoka	Resistant	Susceptible	Resistant	Resistant
Black Cross	+	-	+	+
Gordana	+	+	+	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Round-tipped long, pendant fingers. Suckering inhibited. Purple peduncle persistent bracts Purple/yellow ♂ bud. Red dorsal face of young leaf.	Rounded fruit with pointed tips, pale green and sub-horizontal.	Green shiny pseudostem. Well-filled green shiny fruit, curved and sub-horizontal.	♂ bud purple/yellow Red colour on petioles. Stigma - tip orange, ovary green. Fruit small curved, sub-horizontal.
Comments	= Palakour		Simmonds: Tamolo Baining = Ulunga	Poor plant.
Photo No.	4/2	4/3	4/4	4/5

Acc. No.	RNG 025	RNG 026	RNG 027	RNG 028
Genotype	AAA	AA/AAA?	AA	AA/AAA?
Local Name	Marau	Karakum	Taputuput	Paga tau
Language Group	Kuanua	Kuanua	Kuanua	Kuanua
Location	Rapitok No. 3	Rapitok No. 3	Rapitok No. 3	Korara
Nearest Town	Rabaul	Rabaul	Rabaul	Rabaul
Province	ENB	ENB	ENB	ENB
♂ Fertile	+	?	+	+
Seeds	-	-	-	-
Use	Cooking	Cooking	Cooking	Cooking and Dessert
Diseases:				
Black Sigatoka	Tolerant	Resistant	Resistant	Susceptible
Black Cross	-	-	+	+
Cordons	+	+	+	+
Others			Speckle (<i>Veronica musae</i>)	
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Robust, many hands, fruit shaped like Pitu - pointing vertically in S. Suckering inhibited ♂ bud purple.	Fruit yellow, thin, curved sub-horizontal.	♂ bud green. Suckering inhibited. Persistent bracts. Style short and stigma flattened. Ovary greenish.	Fingers green, round tipped. Extensive black blotches on pseudostem. ♂ bud purple.
Comments	Widely distributed throughout areas visited in RNG.	Affected by nematodes. Yellow var. of Tangamor?	Affected by nematodes.	
Photo No.	4/6, 4/7	No photo	4/8	4/14, 5/13

Acc. No.	RNG 029	RNG 030	RNG 031	RNG 032
Genotype	AA	AAA	AA/AAB?	AA
Local Name	Tapo	Papua?	Langlang	Niukin
Language Group	Kuanua	Kuanua "Kokopo 1"	Kuanua	Kuanua
Location	Vunapope	Kokopo	Kokopo	Tingenevadu
Nearest Town	Raubul	Raubul	Raubul	Raubul
Province	ENB	ENB	ENB	ENB
♂ Fertile	?	+	+	-
Seeds	-	-	-	-
Use	Ornamental	Cooking and Dessert	Cooking and Dessert	Dessert
Diseases:				
Black Sigatoka	-	Resistant	Susceptible	Tolerant
Black Cross	-	+	+	o
Cordana	-	+	+	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Small ornamental plant. Extensive red colouration on leaves and pseudostem. Red chimeric plant.	♂bud yellow/purple. Persistent neutral flowers, thin sub-horizontal fingers.	Good bunch of pale green, pendent fruit. ♂bud yellow/purple. Ovary white. 3-4 bracts persistent together. Suckers with very thin leaves like Katuel.	Very tall and robust. Many suckers. Good bunch > 10 hands of erect fingers in S. Persistent neutral flowers. ♂bud dark purple with yellow stripe, inside fading to white. Stamens pin Red colouration of roots.
Comments		= Teleair?		= Pisang Jari buaya Simmonds: P. jari buaya = Gurungurega
Photo No.	4/27	4/32, 4/31	4/33	4/36, 4/37, 4/38

Acc. No.	RNG 033	RNG 034	RNG 035	RNG 036
Genotype	AA/AAB?	BB?	BB(sp)	AA?
Local Name	Kakor	Auko	Okaoko	Jirab
Language Group	Kuenus	Kuenus	Kuenus M. balbisiense	Atjila
Location	Tingenevadu	Uleulatava	Uleulatava	Ngesawesiang
Nearest Town	Rabeul	Rabeul	Rabeul	Lae
Province	ENB	ENB	ENB	Morobe
♂ Fertile	+/little	-	+	-
Seeds	occasional	occasional	+	-
Use	Cooking and Dessert	Dessert	Wild	Cooking
Diseases:				
Black Sigatoka	Resistant	Immune	Resistant	Susceptible
Black Cross	+	+	+	-
Cordana	+	+	+	+
Others	Freckle (<i>Bulgaridia mesae</i>)	Speckle		
Source	Garden	Garden	Wild habitat	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	♂ bud green, good bunch, fingers with pointed tips, 6 stamens. Good suckering a flower-pale cream.	Similar to M. balbisiense in all characters but parthenocarpic and fruit larger than wild sp. Many hands, tall robust plant.	Typical M. balbisiense. Seed not ripe.	Bracts and neutral flowers persistent, curved, sub-horizontal fingers. ♂ flower white, 6 stamens. ♀ bud purple.
Comments	Fruit somewhat sour in taste.	In all respects like BB cultivar.	Growing in grassland. Rare.	= Wampong
Photo No.	5/1	5/10, 5/11, 5/12	5/6, 5/7, 5/8	5/22

Acc. No.	RNG 037	RNG 038	RNG 039	RNG 040
Genotype	AA	AA	AA?	AA
Local Name	Yangun Yefan	Mptajhap	Mapua	Sena
Language Group	Atjila	Wampur	Wampur	?
Location	Ngasewasiang	Markham 1	Markham 1	Ngasawampua
Nearest Town	Lae	Lae	Lae	Lae
Province	Morobe	Morobe	Morobe	Morobe
♂ Fertile	+	-	+ (little)	-
Seeds	-	occasional	-	-
Use	?	Cooking	Cooking	Cooking
Diseases:				
Black Sigatoka	Susceptible	Susceptible	Susceptible	Resistant
Black Cross	-	-	-	-
Cardana	-	+	-	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	♂ bud green with yellow apex. Persistent neutral flowers. Pseudostem green/yellow. Ovary green. Lax bunch, fruit curved, sub-horizontal.	Bracts and neutral flowers persistent. ♂ bud dark purple. Bunch lax, fruit curved, sub-horizontal.	♂ bud green/yellow. Several bracts persistent together. Fruit small, sub-horizontal.	Bracts and neutral flowers persistent. ♂ bud purple. Bracts lifting before rolling. Long fingers, pointing upwards 4-hands. ♂ flower white with pink stamens.
Comments		♀ fertile?		
Photo No.	6/1	6/8	6/9	6/9

Acc. No.	PNG 041	PNG 042	PNG 043	PNG 044
Genotype	AA(sp.)	SS(sp.)	AA?	AA
Local Name	Gainuk	?	Waimara	Hung tu
Language Group	?		Sepik (Maprik)	Bukawa
Location	M. banksii No. 1 Madzab	M. schizocarpe No. 1 Markham	Situm	Situm
Nearest Town	Lae	Lae	Lae	Lae
Province	Morobe	Morobe	Morobe	Morobe
♂ Fertile	+	+	?	-
Seeds	+	+	-	-
Use	Wild	Wild	Cooking	Dessert
Diseases:				
Black Sigatoka	-	-	Tolerant	Susceptible
Black Cross	-	-	+	-
Cordana	-	-	+	+
Others				
Source	Wild habitat	Wild habitat	Garden	Garden
Type of Sample	Sucker and Seed	Sucker and Seed	Sucker	Sucker
Main Characteristics	Shiny green pseudostem, erect leaves, tall, robust. ♂ bud green, rounded apex. Fruit v. small and bottle necked. ♂ flower white. Seed large (6-7 mm).	Shiny green pseudostem, few blotches. Tall, robust. Fruit dark green, splitting open at maturity. V. white flesh. Typical cf. Argent (1976). Seeds large (6-7 mm) v. dark brown.	Pale yellow fruit, large, curved, sub-horizontal. Yellow/green pseudostem. Pink colour on youngest leaf.	Extensive red colouration on plant and fruit. Many suckers ♂ bud purple. Bracts and neutral flowers persistent. 4 hand Pink tinge to ovary
Comments	Hybrid M. banksii x M. schizocarpe?		Very like plantain.	
Photo No.	8/4, 8/5, 8/6	8/12, 8/13, 8/14, 8/15	8/21	8/22 3

Acc. No.	PNG 045	PNG 046	PNG 047	PNG 048
Genotype		SS (sp.)	SS (sp.)	AA (sp.)
Local Name	Hung si	?	?	?
Language Group	Bukawa			
Location	M. macLayi Singaus	M. schizocarpa No. 2 Gobardek	M. schizocarpa No. 3 Gobarf	M. banksii No. 2 Highlands Highway
Nearest Town	Lae	Lae	Lae	Lae
Province	Morobe	Morobe	Morobe	Morobe
♂ Fertile	+	+	+	+
Seeds	+	+	+	+
Use	Wild	Wild	Wild	Wild
Diseases:				
Black Sigatoka	-	-	-	-
Black Cross	-	-	-	-
Cordana	+	-	-	-
Others	Speckle			
Source	Wild habitat	Wild habitat	Wild habitat	Wild habitat
Type of Sample	Sucker and Seed	Sucker and Seed	Sucker	Sucker
Main Characteristics	Tall, robust. Sap red. Erect bunch. Shiny pseudostem. Fruit orange when mature with green/yellow flesh. ♂ bud green, shiny, imbricate. Abundant	Very dark green fruit, white flesh. Tall, robust. Typical. Seeds - large, pale brown [not mature?]	V. tall, difficult to see bunch. Green shiny pseudostem. Suckers growing close to main plant. o bud green.	Shiny green pseudostem. Bunch immature, single plant.
Comments	Australimuse			
Photo No.	8/28, 8/29, 8/30	8/34	No photo	7/1

Acc. No.	RNG 048	RNG 050	RNG 051	RNG 052
Genotype	AA(sp.)	AA(sp.)	AA(sp.)	AA
Local Name	?	?	?	Yenai
Language Group				?
Location	M. banksii No. 3 Highlands Highway	M. banksii No. 4 Yako	M. banksii No. 5 Mushu	Bawari Road
Nearest Town	Lee	Venimo	Venimo	Venimo
Province	Morobe	W. Sepik	W. Sepik	W. Sepik
♂ Fertile	+	+	+	-
Seeds	+	+	+	-
Use	Wild	Wild	Wild	Dessert
Diseases:				
Black Sigetoka	-	-	-	Resistant
Black Cross	-	-	-	-
Cordane	-	-	-	+
Others				
Source	Wild habitat	Wild habitat	Wild habitat	Roadside
Type of Sample	Sucker	Sucker	Seed	Sucker
Main Characteristics	Small angular fruit. ♂ bud green and pointed at apex. No mature seed. Seedlings growing nearby. Badly affected by banana borer.	Similar to M. banksii No. 3. Fruit too old for seed.	Fruit angular similar to previous collections. Seed large (8-7 mm) dark brown.	Bright green/yellow shiny pseudostem. Small rounded fruit. ♂ bud purple, stamens red. Many suckers.
Comments		V. stony, chalky soil.	M. schizocarpa? Stony, chalky soil.	= Pisang Mas
Photo No.	7/2	No photo	7/8	7/17

Acc. No.	PNG 053	PNG 054	PNG 055	PNG 056
Genotype	AA(sp.)	AA(sp.)	AA(sp.)	
Local Name	?	?	?	?
Language Group	(Sosi No. 1) M. bankiit	(Sosi No. 2) M. bankiit	(Sosi No. 3) M. bankiit	M. boan
Location	Sosi	Sosi	Sosi	Sosi
Nearest Town	Vanimo	Vanimo	Vanimo	Vanimo
Province	W. Sepik	W. Sepik	W. Sepik	W. Sepik
♂ Fertile	+	+	+	+
Seeds	+	+	+	+
Use	Wild	Wild	Wild	Wild
Diseases:				
Black Sigatoka	Resistant	Resistant	-	-
Black Cross	-	-	-	-
Cordons	+	-	-	+
Others				Speckle
Source	Wild habitat	Wild habitat	Wild habitat	Wild habitat
Type of Sample	Sucker and Seed	Sucker	Sucker	Seed
Main Characteristics	Not typical. Leaves spreading. Little pollen and few seeds. Fruit badly filled, pulp white. ♂ flower white. ♀ bud green with purple stripes. Bunch sub-horizontal. Fruit pointing up, long pedicels. Seed small, light brown.	Typical M. bankiit. Good bunch, 11-12 hands, fingers rounded. Much pollen and many seeds - not mature. Purple margin to green bracts. Tall robust.	11-12 hands, fruit angular, bottle-necked. Much pollen and many seed - not mature. ♂ bud green, rounded apex.	V. tall, robust. Typical cf. Argent (1976). ♂ bud cream, round and imbricate. 3 scars on peduncle above the 1st hand. Fruit angular.
Comments	Soil, heavy, wet clay.	Clay soil.	M. schizocarpa? Clay soil.	Australimusa
Photo No.	7/18, 7/19	7/20, 7/21, 7/22	7/29, 7/30	7/31, 7/32, 7/33

Acc. No.	RNG 057	RNG 058	RNG 059	RNG 060
Genotype		AA(sp.)	AA(sp.)	AA(sp.)
Local Name	?	Vur Murprep	?	?
Language Group	M. baaen	Yuo Island (Hawain No. 1) M. banksii	(Hawain No. 2)	(Hawain No. 3) M. banksii
Location	Sosi	Hawain	M. banksii	Perom
Nearest Town	Vanimo	Wewak	Hawain Wewak	Wewak
Province	W. Sepik	E. Sepik	E. Weptk	E. Septk
♂ Fertile	+	+	+	+
Seeds	+	+	+	+
Use	Wild	Wild	Wild	Wild
Diseases:				
Black Sigatoka	?	-	-	-
Black Cross	?	-	-	-
Cordons	?	+	+	+
Others		Freckle	Freckle	
Source	Wild habitat	Wild habitat	Wild habitat	Wild habitat
Type of Sample	Seed	Sucker and Seed	Seed	Seed and Sucker
Main Characteristics	As for 057 with mature fruit - orange coloured skin and flesh.	Fruit small angular and bottle-necked 7-8 hands, bunch sub-horizontal. Apex of ♂bud rounded. Abundant.	Typical M. banksii, rounded fruit. Extensive blotches. Bunch sub-horizontal. Seed small (4-5 mm) dark brown.	Small plant, not growing well. Rounded fruit. Good bunch. Apex of ♂bud pointed. Bunch sub-horizontal
Comments		Clay soil. M. schizocarpe?	= Sosi No. 2?	Seed small (4-5 mm) dark brown.
Photo No.	No photo	8/11, 8/12, 8/13, 8/14	8/17	8/18, 8/20

Acc. No.	PNG 061	PNG 062	PNG 063	PNG 064
Genotype	AA(sp.)	AA(sp.)?	AA	AA/AAB?
Local Name	?	?	Wampe	Somani
Language Group	[Kapun] M. bensii	[Passem]	Bia	Horengi
Location	Kapun	Palimae	Uragebi	Mundihorengi
Nearest Town	Wewak	Wewak	Wewak	Wewak
Province	E. Sepik	E. Sepik	E. Sepik	E. Sepik
♂ Fertile	+	+	-	-
Seeds	+	Few	-	-
Use	Wild		Cooking and Dessert	Cooking
Diseases:				
Black Sigatoka	-	Resistant	Immune	Resistant
Black Cross	-	-	-	+
Cordana	+	+	+	+
Others	Freckle			
Source	Wild habitat	Wild habitat	Garden	Garden
Type of Sample	Seed	Sucker and Seed	Sucker	Sucker
Main Characteristics	Tall, robust, angular, bottle-necked fruit. Good bunch, sub-horizontal.	♂ bud purple. Good bunch, sub-horizontal Pseudostem bright green, extensive blotches. Long fingers, pointing upwards.	Bright green/yellow pseudostem ♂ bud green with purple edge to bracts. Fruit short and angular. Tall, robust.	♂ bud green with purple stripes. Some with degenerate bud.
Comments	Seeds medium size (5-6 mm) light brown.	Parthenocarpic ♀ fertile diploid?		Like Horn Plantain.
Photo No.	8/21	8/25	8/26, 8/27	8/31

Acc. No.	RNG 085	RNG 086	RNG 087	RNG 088
Genotype	AA(sp.)	AA(sp.)	AA(sp.)	AB
Local Name	?	?	?	Kala Kala
Language Group	[Japareka No. 1] M. banksii?	[Japareka No. 2] M. banksii?	[Paliana] M. banksii	?
Location	Japareka 1	Japareka 1	Paliana	Laloki Collection
Nearest Town	Wewak	Wewak	Wewak	[ex Morobe]
Province	E. Sepik	E. Sepik	E. Sepik	
♂ Fertile	+	+	+	-
Seeds	+	-	+	-
Use	Wild	Wild	Wild	?
Diseases:				
Black Sigatoka	Resistant	Resistant	-	Immune
Black Cross	-	-	-	-
Cordons	+	+ [Resistant?]	-	+
Others				
Source	Wild habitat	Wild habitat	Wild habitat	Laloki Collection
Type of Sample	Sucker	Sucker	Seed	Sucker
Main Characteristics	♂ bud dark purple. Fruit very small, seeds not developed. Not pollinated? M. banksii with purple bud?	Long fingers, no seed not pollinated? Peduncle purple. ♂ bud purple. Persistent neutral flowers - 4 hands Red on petioles and midribs.	Typical M. banksii, Long rounded fingers. ♂ bud green. Mature fruit orange.	Dark green shiny pseudostem. Many small suckers. Fruit bottle-necked, ♂ bud purple.
Comments			Seeds small, dark brown.	088 21
Photo No.	8/35	8/36	No photo	1/22

Acc. No.	PNG 088	PNG 070	PNG 071	PNG 072
Genotype		Australimusa	Australimusa	ABBB?
Local Name	Vudu Vudu	Vuro No. 1	Vuro No. 2	Yawa No. 2
Language Group	Kuenue Ensete glaucum	Kuenue Fa'ij	Kuenue Fa'ij	Kuenue
Location	Ulaulava	Malualua	Rapi tok No. 3	Ulaulava
Nearest Town	Rabaul	Rabaul	Rabaul	Rabaul
Province	ENB	ENB	ENB	ENB
♂ Fertile	+	?	?	-
Seeds	+	-	-	-
Use	Wild	Cooking	Cooking	Cooking/Beer/Desser
Diseases:				
Black Sigatoka	-	-	-	Resistant
Black Cross	-	-	-	-
Cordana	+	+	+	+
Others	Speckle (<i>Veronica musae</i> + <i>Macrophoma</i> spp.)			
Source	Wild habitat	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Typical Ensete. Fruit not mature. V. waxy.	Green shiny pseudostem, tall, erect bunch, huge fruit. Red sap. Fruit orange at maturity.	Characteristics same as Vuro No. 1. Sap turning red on contact with air. Fruit smaller than Vuro No. 1.	V. Large and robust a bud purple, imbricate with yell. apex. Many hands - up to 20.
Comments	Previously common in this area now rare.			
Photo No.	5/4, 5/5	3/10, 3/11	No photo	5/14

Acc. No.	RNG 073	RNG 074	RNG 075	RNG 076
Genotype	AAA	AAB?	AAB	AAB?
Local Name	Katur	Penup	Vaniyu	Kamolo
Language Group	Kuanua	?	Yuo	Yuo
Location	Korere	Karnaspi t	Grungrun	Hawain
Nearst Town	Rabeul	Vanimu	Wewak	Wewak
Province	ENB	W. Sepik	E. Sepik	E. Sepik
♂ Fertile	-	-	-	-
Seeds	-	-	-	-
Use	?	Cooking and Dessert	?	Cooking
Diseases:				
Black Sigatoka	Susceptible	Resistant	-	-
Black Cross	+	+	+	+
Cordana	-	+	+	+
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	♂ bud rounded purple/yellow, imbricate. Fruit round tipped shiny, dense bunch.	Round, well-filled fruit. Good bunch ♂ bud purple. Apex of bract split.	No ♂ axis. Long yellow pendant fruit 2 hands.	Large fruit. Persistent neutral flowers. Bracts purple/yellow many lifting together, ♂ bud imbricate. ♂ flower large and yellow.
Comments		Affected by banana borer.	True horn plantain.	
Photo No.	4/13	7/15	8/22	8/15

Acc. No.	RNG 077	RNG 078	RNG 079	RNG 080
Genotype	AAB?	AAB?	AAB	AAB
Local Name	Kuertu	Mugus	Wai gosi k	Markham
Language Group	Yuo	Wamper	Sepik	?
Location	Grungrun	Markham 1	Situm	Situm
Nearest Town	Wewak	Lae	Lae	Lae
Province	E. Sepik	Morobe	Morobe	Morobe
♂ Fertile	-	-	-	-
Seeds	-	-	-	-
Use	Cooking	?	?	Cooking
Diseases:				
Black Sigatoka	-	?	Susceptible	Susceptible
Black Cross	+	?	?	?
Cordana	+	?	?	?
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Large pendent fruit 1 hand.		Like French plantain.	Persistent neutral flowers. ♂ bud green. ♀ flower pale yellow. Style split.
Comments	True horn plantain.			French plantain?
Photo No.	8/23	No photo	No photo	6/20

Acc. No.	PNG 081	PNG 082	PNG 083	PNG 084
Genotype	AAB	AAB	AAB	AAB
Local Name	Guibeli	Gobusi k	Samineik	Gupulapu
Language Group	Sepik	Sepik	Sepik	Sepik
Location	Situa	Situa	Situa	Situa
Nearest Town	Lae	Lae	Lae	Lae
Province	Morobe	Morobe	Morobe	Morobe
♂ Fertile	+	-	-	-
Seeds	-	-	-	-
Use	?	?	?	?
Diseases:				
Black Sigatoka	Susceptible	Susceptible	Susceptible	Resistant
Black Cross	?	?	?	?
Cordana	?	?	?	?
Others				
Source	Garden	Garden	Garden	Garden
Type of Sample	Sucker	Sucker	Sucker	Sucker
Main Characteristics	Red colour on fruit, pseudostem and leaf margins. Some ♂ flowers joined at ovary.	Small round fruit, erect leaves.	Rounded fingers.	
Comments		Like French plantain.	Stimonds; Samineik = AA. Like French plantain.	Like French plantain
Photo No.	No photo	No photo	6/22	No photo

Acc. No.	RNG 085	RNG 086
Genotype	ABBB?	ABB
Local Name	Siasai	Hung Apu
Language Group	?	
Location	Singau	Singau
Nearest Town	Lae	Lae
Province	Marobe	Marobe
♂ Fertile	-	-
Seeds	occasional	-
Use	Cooking and Dessert	Cooking
Diseases:		
Black Sigatoka	-	?
Black Cross	-	?
Cordana	-	?
Others	Freckle	
Source	Garden	Garden
Type of Sample	Sucker	Sucker
Main Characteristics	Huge plant. Maybe some Fe'i or M. schizocarpa in genome? Introduced from Rourke Island by Germans?	V. round ♂ bud.
Comments		= Kalapus
Photo No.	6/26, 6/27	6/31

NOTE**1. ♂ Fertility**

In some cases the male bud had been removed from the plant so it was not possible to make an assessment of male fertility.

2. Diseases

Black Sigatoka - rating given as Immune/Resistant/Tolerant/Susceptible-according to rating given by Dr D. Jones.

Black cross and cordana rated as present (+) or absent (-).