AIBIKA (*Abelmoschus manihot*) GERMPLASM IN PAPUA NEW GUINEA

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ABSTRACT

Aibika, Abelmoschus manihot *(L.) Medikus, is a very important traditional leafy vegetable commonly grown throughout Papua New Guinea (PNG) and the Pacific Island Nations. Observations on the current germplasm collection at Laloki Agricultural Research Station (LARS) indicate a wide range of variations in its morphological and other characteristics. This suggests that PNG is an important centre of diversity for this species. A field germplasm of 112 accessions of Aibika is housed at LARS. Morphological description was conducted using the International Board of Plant Genetic Resources (IBPGR) descriptor list with some modifications. Documentation of the germplasm is discussed.*

Key words: Abelmoschus manihot, Germplasm, Accessions, Description, Documentation, Laloki.

INTRODUCTION

Aibika is commonly grown in the lowlands of Papua New Guinea (PNG), but can also be cultivated at higher altitudes, less than 2,000 m. In the Solomons, Fiji, Tonga, Vanuatu, Tuvalu, Kiribati and the Federated States of Micronesia, Aibika is locally known as Bele or Pele. Very few cultivars are grown in these Islands. The origin of Aibika is still uncertain (Siemonsma 1991), but the crop is thought to be native to South China (Mou 1991).

In a recent Food Crop Market Survey conducted by the Department of Agriculture and Livestock (DAL), sixteen main markets in major centres of PNG were covered. The quantity of Aibika offered for sale was 50.79 tonnes per month (DAL Agricultural Statistics, 1989). This is a yearly production of 609.48 tonnes worth 243,792 Kina. The Bureau of Statistics estimated an area of 809 hectares to be under Aibika production in 1961-62 (French and Bridle1978). Current figures of area under Aibika production are unavailable.

Fresh stem cuttings, 30-40 cm long are commonly used as planting materials but some cultivars have produced viable seeds. Aibika has been accepted as a nutritionally valuable green supplying vitamins and important minerals such as iron and calcium. It is said to be a much better quality food than many of the introduced vegetables (French and Bridle 1978; Westwood and Kesavan 1982; South Pacific Commission 1983). Studies suggest that 30% of the daily protein intake in PNG is supplied by green leafy vegetables which also contribute 4-12 percent of energy requirements (Westwood and Kesavan 1982).

The edible leaves and tips of Aibika are prepared using various methods of cooking common throughout PNG and the Pacific - boiled in coconut cream, steamed, fried, baked in earth ovens using hot stones (*Mumu or Umu*) and cooked in coconut cream using hot stones (*Aigir*).

This paper discusses the maintenance, description and documentation of the Aibika Germplasm at Laloki Agricultural Research Station.

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GERMPLASM COLLECTION

Need to Collect

Efforts have been made recently to conserve the genetic resources of the world's major food crops for future use in plant improvement programmes. Though Aibika is of less importance elsewhere, it is cultivated and consumed widely in PNG and the South Pacific. Other important centres of distribution are India, Africa, and parts of Asia (Borrsum and Van 1966; Rana and Thomas 1991)

The occurrence of a wide range of the cultivated and wild species in PNG supports the idea that PNG is a significant source of diversity (Kesavan 1986). An important contribution towards future utilization of this diversity therefore is to collect and conserve these materials. The Agricultural Research Stations have taken a leading role in conserving cultivated and genetically potential species of major traditional food crops.

Method of Collection

The methods of collecting vegetatively propagated crops are given in Hawkes (1980). Important points to note are:

1. All distinct varieties should be collected in each village or market visited. Duplicates can be identified later when collections are planted at the Agricultural Research Stations.

2. It has been suggested that collections should be made at intervals of 10-50 km. But this will vary greatly, depending on the population and frequency of villages.

3. At the time of collection full passport data for each crop should be recorded and materials labelled.

Maintenance of Collection

One hundred and twelve (112) accessions of Aibika in the collection at LARS were collected from various sources (Table 1).

Table 1. **Composition of Aibika Germplasm Collection at Laloki.**

Source (Province/Institute)	Number of Accessions
Keravat Research Station (ENB)	13
Bubia Research Station (MP)	15
Central Province	18
National Capital District	19
Oro Province	2
Morobe Province	23
Madang Province	7
East Sepik Province	11
Unknown	2
Total	112

Ten plants are maintained on un-replicated plots (10 m^2). Mature stem cuttings (30-40 cm) constitute planting materials which are planted at a spacing of 1 m x 1 m. This gives a population of 10,000 plants per hectare. The collection is replanted once every year.

DESCRIPTION AND DOCUMENTATION

The Aibika collection at LARS was started in 1983. Initial collections were from the Central Province and the National Capital District. During the past six years, materials were collected from various sources in the lowlands and maintained in the Agriculture Research Station at Laloki, with duplicate accessions at Bubia and Keravat.

Morphological character descriptions have been completed for the 112 accessions and documented using a computer data base (Table 2). Percentage distribution of leaf, stem, and flower characters are given in Table 3.

Table 2. **Description of Aibika Collection.**

Laloki Number	Province	Source	Local Name	* 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L1	CP	Kolari	Laloki 1	2	8	2	6	1	5	3	1	2	4	6	1	1	2	1	0				
L2	CP	Kolari	Laloki 2	2	5	4	4	1	3	7	3	2	4	6	2	6	2	1	0				
L3	CP	Kolari	Laloki 3	5	10	2	5	4	7	3	2	2	4	6	2	1	2	1	0				
L4	CP	Kolari	Laloki 4	4	10	3	4	1	3	0	2	2	3	6	2	7	2	1	3	1	1	2	2
L5	CP	Kolari	Laloki 5	3	3	3	5	1	4	0	1	1	4	6	1	6	2	1	0				
L6	CP	Kolari	Laloki 6	5	10	4	4	4	7	0	2	2	3	6	2	6	2	1	3	1	1	2	1
L7	CP	Kairuku	Doura 1	4	10	4	2	6	4	0	4	2	3	6	1	7	2	1	2	1	1	1	2
L8	CP	Kairuku	Doura 2	5	10	2	5	3	6	0	2	2	4	6	2	2	1	1	0				
L9	CP	Kairuku	Doura 3	5	9	2	5	1	1	3	2	2	4	2	2	2	2	1	1	1	1	1	1
L10	CP	Kairuku	Doura 4	3	10	3	1	2	4	1	2	2	5	6	2	6	2	1	0				
L11	CP	Kairuku	Doura 5	5	4	4	1	4	7	1	2	2	2	4	2	4	2	1	0				
L12	CP	Kairuku	Doura 6	5	10	3	5	1	4	0	1	2	5	4	2	4	2	1	0				
L13	CP	Kairuku	Doura 7	2	3	3	5	4	4	0	2	2	5	6	1	6	2	1	3	1	2	1	2
L14	ENB	LAES	Keravat 1	4	8	3	1	1	1	2	2	2	5	1	1	6	2	1	0				
L15	N/R	N/R	Welman	5	10	3	5	1	7	0	1	1	5	1	3	6	2	2	2	1	1	3	1
L16	ENB	LAES	Keravat 3	5	8	3	1	1	1	0	2	2	3	6	1	4	2	1	2	3	1	1	2
L17	ENB	LAES	Kerevat 4	4	8	5	1	1	1	1	2	2	3	6	2	4	2	1	0				
L18	ENB	LAES	Keravat 5	5	4	3	1	1	1	1	2	2	5	6	1	6	2	1	0				
L19	ENB	LAES	Keravat 8	5	8	2	1	1	1	3	2	2	5	6	2	6	2	1	0				
L20	ENB	LAES	Kerevat 9	4	10	3	5	5	4	2	1	2	5	6	2	6	2	1	0				
L21	ENB	LAES	Kerevat 10	3	8	3	1	1	1	3	4	2	5	6	1	6	2	1	0				
L22	ENB	LAES	Kerevat 12	5	4	3	1	1	7	2	4	2	5	6	2	6	2	1	0				
L23	ENB	LAES	Kerevat 16	1	9	4	3	1	1	1	5	2	5	4	1	6	2	1	0	1	2	1	2
L24	ENB	LAES	Kerevat 17	5	1	2	1	1	1	2	3	2	2	4	1	4	2	1	0				
L25	ENB	LAES	Kerevat 18	4	3	3	1	3	7	0	2	2	2	6	2	4	2	1	0				
L26	ENB	LAES	Kerevat 19	4	9	5	5	1	1	0	1	1	4	6	1	1	2	1	0				
L27	ENB	LAES	Kerevat 21	3	10	3	5	1	1	0	4	1	5	4	1	1	1	1	0				
L28	ENB	LAES	Kerevat 22	4	10	3	1	1	1	3	4	2	3	4	1	4	2	1	3	3	3	2	1
L29	ENB	LAES	Kerevat 23	4	8	5	1	1	1	1	4	2	3	6	2	6	2	1	0				
L30	NCD	Gordons	Naipo	5	8	3	1	1	1	2	4	2	2	4	2	4	2	1	3	1	1	2	1
L31	NCD	UPNG	UH 1	4	9	5	5	1	1	3	1	1	5	6	1	1	2	1	0				
L32	NCD	UPNG	UH 2	4	10	2	1	1	5	0	2	2	3	6	1	6	2	1	0				
L33	NCD	UPNG	UH 3	5	3	3	4	2	4	0	4	2	3	4	2	4	2	1	0				
L34	NCD	UPNG	UH 4	2	3	3	4	1	2	0	4	2	5	6	1	4	2	1	3	1	1	1	2
L35	NCD	UPNG	UH 5	5	10	3	1	1	5	0	4	2	2	4	2	4	2	1	3	1	2	1	2
L36	NCD	UPNG	UH 6	3	10	3	5	4	7	0	3	2	5	6	1	2	1	1	0				
L37	N/R	N/R	N/R	5	8	2	1	1	5	1	2	1	5	8	2	7	2	1	0				
L38	NCD	UPNG	UH 17	4	10	3	4	5	4	0	2	2	3	6	2	4	2	1	0				
L39	NCD	UPNG	UH 21	3	8	3	5	4	3	0	1	1	5	6	2	1	2	1	0				
L40	NCD	UPNG	UH 31	4	10	5	4	1	1	0	1	1	5	1	2	6	2	1	0				
L41	NCD	UPNG	UH Dorumu	3	6	1	1	2	7	1	2	2	3	6	1	6	2	1	0				
L43	NCD	UPNG	UH 26	3	3	3	5	5	4	0	1	2	5	6	1	6	2	1	0				
L44	NCD	UPNG	UH 27	3	9	1	1	1	3	0	5	5	6	6	2	6	2	1	0				
L45	Oro	PAC	Algir	5	4	3	1	1	7	3	2	2	3	6	2	4	2	1	0				
L46	Oro	PAC	N/R	5	10	3	5	1	7	0	2	2	3	6	2	6	2	1	0				
L47	Morobe	N/R	Isaeakwa	3	10	3	2	1	3	0	2	1	5	6	2	6	2	1	0				
L48	Morobe	N/R	Natakalya	5	10	3	5	1	4	0	2	2	5	6	3	1	2	2	0				
L49	Morobe	N/R	Hackwongi	3	10	3	5	1	7	0	1	4	0	6	2	6	2	1	0				
L50	Morobe	N/R	Kanawere	4	8	5	6	4	2	2	1	1	5	6	1	6	2	1	0				
L51	Morobe	N/R	N/R	5	10	4	1	1	5	0	1	2	5	6	2	6	2	1	0				
L52	Morobe	Jipa	Hiandra	5	10	2	1	1	5	0	1	1	5	6	1	6	1	2	3	1	2	1	3
L54	Morobe	N/R	Hamiwa	4	10	2	6	1	7	0	2	2	5	6	2	6	2	2	0				
L55	Morobe	N/R	Ziandi	4	10	3	5	1	5	0	1	3	3	6	2	6	2	1	0				
L56	Morobe	Hengwa	Kwangapa	5	1	2	1	3	1	2	1	2	3	6	1	6	2	1	0				

* For definitions of descriptor codes see Table 4

Table 2. **cont'd....**

Laloki Number	Province	Source	Local Name	* 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L57	Morobe	Hengwa	Jiandraka	5	10	3	5	3	4	0	2	2	2	4	3	4	2	2	0				
L58	Morobe	Damnga	Alakua	4	10	3	5	1	4	0	2	1	5	6	2	6	2	1	0				
L59	Morobe	Koke	Hamawanga	4	3	3	4	1	6	0	2	3	3	6	2	6	2	1	0				
L60	Morobe	N/R	N/R	4	10	3	5	1	7	0	2	2	3	6	2	6	1	1	0				
L61	Morobe	Koke	Yambiawang	3	10	3	5	3	5	0	1	1	5	6	2	6	2	1	0				
L62	Morobe	Koke	Aponate	5	6	3	1	1	7	0	2	2	3	4	2	4	2	1	0				
L63	Morobe	Katopai	Howyauya	4	10	5	4	1	5	0	2	2	5	6	2	4	1	1	0				
L64	Morobe	Katopai	Maningya	4	10	3	5	1	5	0	1	2	5	6	2	1	2	2	0				
L65	Morobe	Watut	Wina	5	10	3	5	1	5	0	2	2	3	6	2	6	2	2	0				
L66	Morobe	Matatio	Yambia	5	10	3	5	1	5	0	1	2	5	6	2	6	1	2	0				
L67	Morobe	Matatio	Hiamtakaka	3	10	3	5	1	5	0	1	1	5	6	2	4	1	1	0				
L68	Morobe	Matatio	Hamawanga	4	7	6	5	5	4	1	3	1	3	6	1	7	2	1	0				
L69	Morobe	Matatio	Hopawa	5	0	3	1	1	1	2	2	1	3	6	1	6	1	1	0				
L70	Morobe	Matatio	Eakuwa	5	8	2	1	1	5	1	5	2	4	1	3	1	2	1	0				
L71	Madang	Zumim	N/R	5	8	3	5	3	5	0	5	2	5	6	2	6	1	1	3	1	2	2	1
L72	Madang	Zumim	N/R	5	0	3	1	3	5	2	1	2	5	6	3	6	2	1	0				
L73	Madang	Zumim	Iran	4	10	3	1	1	5	0	1	2	5	6	3	6	2	1	0				
L74	Madang	Zumim	Antiragen	4	10	4	3	1	1	7	2	1	5	6	2	6	1	1	0				
L75	Madang	Zumim	Iris	4	3	3	5	5	7	1	1	2	3	6	1	6	1	1	0				
L76	Madang	Zumim	Busibis	4	10	3	3	3	5	0	1	2	2	6	1	4	1	1	0				
L78	Madang	Zumim	Garia	5	9	3	1	1	1	1	2	2	3	6	1	6	2	1	0				
L79	NCD	Gordons	San-I-Ret	5	8	3	2	4	1	1	4	2	2	4	1	4	2	1	3	1	1	2	5
L80	NCD	Gordons	N/R	4	10	3	1	1	7	1	2	2	3	6	1	5	1	2	0				
L81	NCD	Gordons	N/R	3	8	3	2	4	1	1	1	1	3	6	1	6	2	1	3				
L82	NCD	Gordons	N/R	4	9	1	1	2	1	1	2	2	1	6	1	5	1	1	3	1	2	1	1
L83	NCD	Gordons	N/R	4	8	4	1	1	1	0	2	2	4	6	1	6	2	1	0				
L84	NCD	N/R	N/R	5	8	3	1	4	6	1	2	2	1	6	1	5	1	1	2	1	2	1	4
L85	ESP	Wosera	Sa-angna	5	10	3	5	5	7	0	2	2	5	3	3	3	2	2	3	1	2	2	2
L86	CP	Laloki	N/R	4	10	4	1	1	5	0	3	2	2	7	2	6	2	1					
L87	CP	Laloki	L9 Seedling	5	9	3	1	1	1	3	2	2	4	2	3	1	2	1					
L88	CP	Laloki	L34 Seedling	3	10	4	2	1	1	0	4	2	3	7	1	6	2	1					
L89	CP	Laloki	L15 Seedling	5	10	3	2	3	6	0	2	2	4	2	3	2	2	2					
L90	CP	Laloki	L23 Seedling	3	9	3	3	3	1	0	4	2	5	5	1	5	2	1					
L91	Morobe	Bubia		3	10	3	2	1	3	2	2	2	5	6	1	6	2	1					
L92	Morobe	Bubia		4	10	3	3	6	6	0	2	2	3	6	2	6	2	2					
L93	Morobe	Bubia		4	10	2	1	4	7	1	2	2	3	6	2	4	2	1					
L94	Morobe	Bubia		4	7	3	1	2	7	0	2	2	3	6	2	6	2	1					
L95	Morobe	Bubia		4	1	2	1	4	3	0	2	2	3	7	1	6	2	1					
L96	Morobe	Bubia		4	10	3	1	5	7	0	2	2	2	4	2	4	2	1					
L97	Morobe	Bubia		5	10	3	1	1	6	2	1	2	2	4	2	4	2	2					
L98	Morobe	Bubia		5	10	3	1	1	6	2	1	2	2	4	2	4	2	2					
L99	Morobe	Bubia		4	8	2	1	1	3	0	2	2	1	7	2	5	2	1					
L100	Morobe	Bubia		5	3	3	1	4	7	0	2	2	1	6	2	4	2	2					
L101	Morobe	Bubia		4	8	1	1	1	6	0	1	1	3	6	3	6	2	1					
L102	Morobe	Bubia		4	10	3	5	5	7	1	3	1	2	4	2	4	2	1					
L103	Morobe	Bubia		4	4	3	1	6	5	2	2	2	3	3	3	3	2	2					
L104	Morobe	Bubia		5	10	3	1	3	5	2	1	1	3	6	2	6	2	1					
L105	Morobe	Bubia		5	8	1	1	1	6	2	2	2	4	6	3	2	2	1					
L106	ESP	Wosera	SAM 09	5	9	3	1	1	1	0	1	2	4	1	2	1	2	1					
L107	ESP	Wosera	SAM 15	4	10	4	1	1	7	0	2	2	1	5	1	6	1	1					
L108	ESP	Wosera	SAM 22	4	4	5	5	1	7	0	2	2	4	1	2	1	1	2					
L109	ESP	Wosera	SAM 23	4	4	4	1	1	5	2	2	2	4	6	2	5	1	1					
L110	ESP	Wosera	WL 1	4	4	3	1	2	7	2	3	2	1	5	2	6	1	1					
L111	ESP	Wosera	WL 2	4	4	4	1	1	7	3	1	1	4	6	2	6	1	1					
L112	ESP	Wosera	WL 3	4	4	3	1	2	5	1	1	2	4	1	2	1	1	1					
L113	ESP	Wewak	Awai	3	3	3	1	1	7	3	1	2	4	6	2	1	1	1					
L114	ESP	Wosera	Nungwaia	4	1	2	1	1	1	2	2	2	3	6	1	6	2	1					
L115	ESP	Wosera	SAM 21	5	4	3	1	1	5	2	2	2	4	6	2	6	2	1					

Table 3. **Distribution of Morphological characters in Aibika Germplasm at Laloki.**

Growth Habit	%	Leaf Shape	%	Leaf Segment Shape	%	Leaf Margin	%	Leaf Tip	%
Poor	2	Linear	3	Acicular	6	Entire	41	Acuminate	65
Sparse	5	Cordate	10	Linear	15	Serrate	5	Acute	5
Moderate	17	Hastate	5	Lanceolate	63	Dentate	4	Caudate	10
Good	35	Sagittate	1	Oblanceolate	7	Crenate	12	Aristate	11
Luxuriant	41	Deltoid	3	Elliptical	9	Sinuate	38	Cuspidate	8
		Orbiculate	1					Mucronate	1
		Pinnatisect	20						
		Pedate-digitate	9						
		Palmate	48						
Leaf Base	**%**	**Leaf Shape Variability**	**%**	**Leaf Lustre**	**%**	**Leaf Vein Colour**	**%**	**Petiole Colour**	**%**
Acuminate	29	0	58	Dull	23	Purple	3	Light green	6
Rounded	3	1	21	Shiny	77	Dark green	10	Dark green	1
Truncate	6	2	11			Red	32	Pink	1
Cordate	16	3	10			Red to green	10	Red	17
Hastate	23	4	0			Other colours	45	Purple	0
Sagittate	4	5	0					Green with splashes of pink/red/purple	75
Auriculate	19							Other colours	0
Petiole Length	**%**	**Stem Colour**	**%**	**Stem Pit**	**%**	**Stem Hairiness**	**%**	**Flowering Habit**	**%**
Short	40	Light green	11	Hollow	20	Glabrous	88	None	90
Intermediate	51	Dark green	4	Entire	80	Pubescent	12	Sparse	2
Long	9	Pink	1			Hispid	0	Profuse	2
		Red	23			Other	0	Few	6
		Purple	4						
		Green with splashes of pink/red/purple	52						
		Other colours	5						
Flower Colour	**%**	**Sepal Colour**	**%**	**Stigma Colour**	**%**	**Filament Colour**	**%**		
Sulfur-yellow with purple base	88	Green	50	Purple (clustered)	59	White	35		
White with purple base	12	Green with purple base	50	Purple (divided)	35	White with purple stripes	47		
Other colours	0	Other colours	0	Dark purple	6	Purple	6		
				Other colours	0	Purple with white stripes	6		
						Yellow	6		

The IBPGR descriptor list (Table 4) was modified and used to complete the descriptors following the priority list given below:

Table 4. **Basic descriptor list for Aibika.**

DESCRIPTOR	CATEGORIES	IBPGR CODE
1. Growth Habit	1 - Poor 2 - Sparse 3 - Moderate 4 - Good 5 - Luxuriant	3.1.0
2. Leaf Shape	1 - Linear 2 - Lanceolate 3 - Cordate 4 - Hastate 5 - Sagittate 6 - Deltoid 7 - Orbiculate 8 - Pinnatisect 9 - Pedate-digitate 10 - Palmate	3.2.1
3. Leaf Segment Shape	1 - Acicular 2 - Linear 3 - Lanceolate 4 - Obianceolate 5 - Elliptical	3.2.2
4. Leaf Margin	1 - Entire 2 - Serrate 3 - Dentate 4 - Crenate 5 - Sinuate	3.2.3
5. Leaf Tip	1 - Acuminate 2 - Acute 3 - Caudate 4 - Aristate 5 - Cuspidate 6 - Mucronate	3.2.4
6. Leaf Base	1 - Acuminate 2 - Rounded 3 - Truncate 4 - Cordate 5 - Hastate 6 - Sagittate 7 - Auriculate	3.2.5
7. Leaf Shape Variability	0,1,2,3,4 & 5	3.2.6
8. Leaf Colour	1- Light green 2 -Dark green 3 - Light/dark green with purple or red spots on upper or lower leaf surface 4 - Other (specify)	3.2.7
9. Leaf Lustre	1 - Dull 2 - Shiny	3.2.8
10. Leaf Vein Colour	1 - Purple 2 - Dark green 3 - Red to green 4 - Green 5 - Other (specify)	3.2.9
11. Petiole Colour	1 - Light green 2 - Dark green 3 - Pink 4 - Red 5 - Purple	3.2.10

(Contd.)

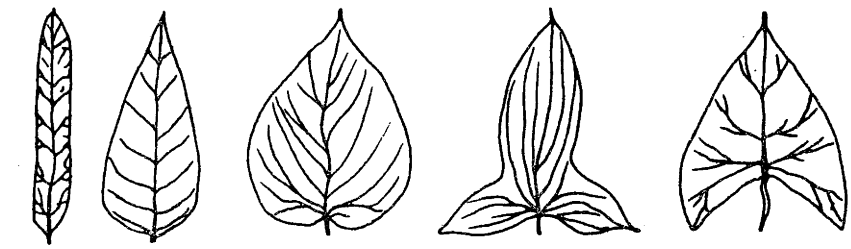
DESCRIPTOR	CATEGORIES	IBPGR CODE
	6 - Light/dark green with splashes of pink/red/purple 7 - Other (specify)	
12. Petiole Length	1 - Short (<20cm) 2 - Intermediate (21-30cm) 3 - Long (>30cm)	N/A
13. Stem Colour	1 - Light green 2 - Dark green 3 - Pink 4 - Red 5 - Purple 6 - Light/dark green with splashes of pink /red/purple 7 - Other (specify)	3.3.1
14. Stem Pit	1 - Entire 2 - Hollow	3.3.2
15. Stem Hairiness	1 - Glabrous (hairless) 2 - Pubescent (short soft Hairs) 3 - Hispid 4 - Other (specify)	3.3.3
16. Flowering Habit	0 - None 1 - Sparse (distributed) 2 - Profuse (plentiful) 3 - Few	N/A
17. Flower Colour	1 - Sulfur-yellow with purple base 2 - White with purple base 3 - Other (specify)	N/A
18. Sepal Colour	1 - Green 2 - Green with purple edge 3 - Other (specify)	N/A
19. Stigma Colour	1 - Purple (clustered) 2 - Purple (divided) 3 - Dark purple 4 - Other (specify)	N/A
20. Filament Colour	1 - White 2 - White with purple stripes 3 - Purple 4 - Purple with purple stripes 5 - Yellow 6 - Other (specify)	N/A

Abbreviations and Symbols used in Tables 1, 2, 3 & 4.

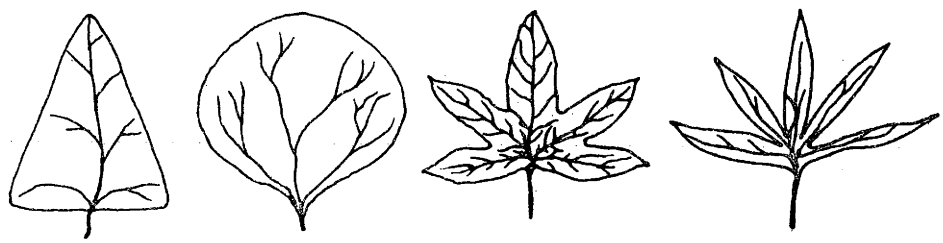
CP	=	Central Province
ENB	=	East New Britain
ESP	=	East Sepik Province
IBPGR	=	International Board of Plant Genetic Resources
L	=	Laloki
LAES	=	Lowlands Agricultural Experiment Station
LARS	=	Laloki Agricultural Research Station
MP	=	Morobe Province
NCD	=	National Capital District
N/A	=	Not Available
N/R	=	Not Recorded
PAC	=	Popondetta Agriculture College
PNG	=	Papua New Guinea
SAM	=	Saramandi
UH	=	University Number
UPNG	=	University of Papua New Guinea
WL	=	Wosera Local
%	=	Percentage

Figure 1: **Leaf Morphology (All diagrams adapted from Kesavan, 1980).**

Leaf shape *(3.2.1)*



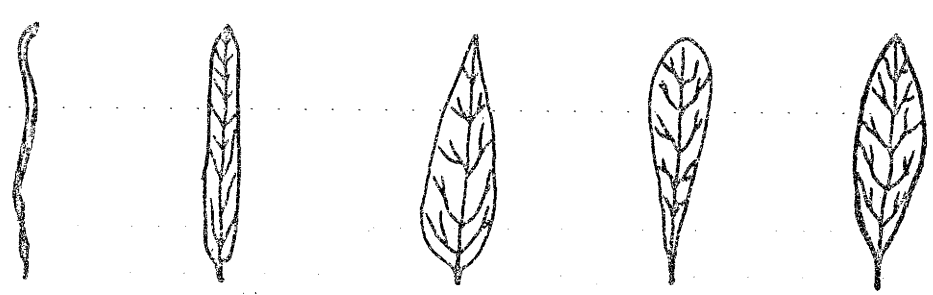
Linear lanceolate cordate hastate sagittate



deltoid orbiculate palmate pinnatisect

pedate - digitate

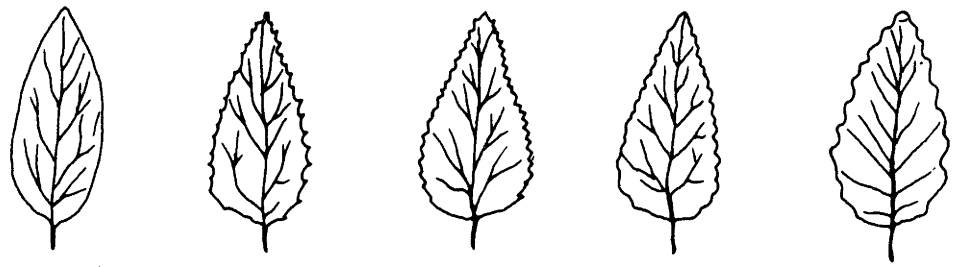
Leaf segment *(3.2.2)*



acicular linear lanceolate oblanceolate elliptical

(Cont'd.)

Leaf margin *(3.2.3)*



Leaf tip *(3.2.4)*

Leaf base *(3.2.5)*

First priority

Passport data: this includes province, source, local name, altitude, date and type of sample collected. Planting materials are usually in the form of stem cuttings but seeds may also be available at the time of collection.

Second priority

Morphological data: this includes characters and categories given in Tables 2, 3 & 4 and Figure 1.

Third priority

Evaluation data : this includes average yield in tonnes per hectare, number of marketable bundles per plant, consumer preference, days to first harvest, longevity, nutritive components and the assessment of common pests and diseases.

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