

PAPER 3:

BREADFRUIT DIVERSITY IN FIJI

Manoa Iranacolaivalu & Kalolaini Colaitiniyara

Horticulture Section of the Research Division, Ministry of Agriculture, Fiji

EXTENDED ABSTRACT

Breadfruit (*Artocarpus altilis*) is an important crop in Fiji as a staple food as well as its traditional significance. The tree crop is tolerant to climate extremes and recovers early especially during the post cyclone rehabilitation phase as a source of food for the communities. This is evident for the people of Natewa, known as the breadfruit hot spot in the Northern part of Fiji, who consumed breadfruit all year round due to the wide genetic diversity with its overlapping cropping season.

A breadfruit survey conducted in 2015 found 15 varieties in four villages, Natewa, Muana, Sese, and Naboutini. These varieties were identified, characterized, and 8 varieties were analyzed in the laboratory. The breadfruit descriptor developed by Diane Ragone, 2003, was used in the characterization of 10 fruits for each variety: mainly on the leaves and fruit morphological features. The varieties were divided into two categories: seeded (12 varieties) and non-seeded (3 varieties).

Table 1. Fruit characteristics of non-seeded varieties

VARIETY	KARO-KARO	BALEKA-NA DINA	UTO VATU	BALEKA-NA SAMOA	BOKASI	COKA	VIROA-SOLA	LASA-WA	UTO DINA	VUNI-DAWA	OQO	UTO VULA
FRUIT SHAPE	Round	Round	Round	Oblong	Round	Round	Round	Round	Oval	Oval	Round	Round
FRUIT SKIN TEXTURE	Rough – sand papery	Smooth	Rough	Smooth	Rough sand papery	Smooth	Rough, sand papery	Rough	Rough skin	Smooth	Smooth	Rough irregular raised.
FRUIT WEIGHT (grams)	396	422	475	758	1223.5	1434	1517.4	1733	1774	1904.7	2080.2	2458
FRUIT CIRCUMFERENCE (cm)	30.5	29	46	35.14	40	45	51.2	47.4	45.5	50	54.2	55
FRUIT LENGTH (cm)	10.25	10.625	12.3	13.75	14.75	16	18.7	17.3	19	18.93	17.3	19.5
FRUIT DIAMETER (cm)	9.5	10.5	10	10.75	14	14.5	12	15.25	14.25	15.2	16.25	17
FRUIT COLOR	Light Green	Light Brown	Green	Light Yellow	Light Yellow	Light Green	Light Green	Light Green	Light Green	Greenish Yellow	Light Green	Light Green
LENGTH OF PEDUNCLE (cm)	7.25	4.625	6.75	6.25	7.75	5.5	7.5	8.7	8	7.83	8.7	8.5
COLLAR NECK (cm)	2.25	4.5	2.55	4.5	3.25	4	2.5	2.5	2.25	3.5	4	4
PEDUNCLE INSERTION (cm)	1.5		1	1.75	2.25	2	1.5	1.5	1.5	2.1	1.75	2
LATEX (No latex, light, heavy)	light	none	none	light	heavy	heavy	Light	Light	Light	heavy	Light	Light
WIDTH AT MIDPOINT (cm)	5	5.5	4.4	5	7.25	7	6.25	7.5	7.25	8	8.75	8.75
WIDTH AT SHOULDER (cm)	6.5	5	6.7	5	10	9.5	7.25	7	7.75	8.6	9	8.25
LENGTH OF CORE (cm)	5.5	7	4.25	9	8.75	9	8.5	6.75	11.25	10	7.25	10.25
WIDTH OF CORE (cm)	2.25	3	2.75	2.75	4.5	4	2.75	3.25	3.25	2.83	3	3.25
FLESH COLOR (white, creamy, light yellow, yellow)	Light yellow	Light Yellow	Creamy	Light Yellow	Light Yellow	Light yellow	Light yellow	Light yellow	Light yellow	Creamy	White	Light yellow

Table 2. Fruit characteristics of seeded varieties

VARIETY	SAVISAVI	LIVA	WELESI
Fruit shape	Round	Oval	Oval
Fruit skin texture	Smooth	Smooth	Rough, sand papery
Fruit weight (grams)	672	700	1831.5
Fruit circumference (cm)	36.5	46.6	52.5
Fruit length (cm)	12	15.8	18
Fruit diameter (cm)	11.25	10.5	15.75
Fruit color	Light green	Light yellow	Light green
Length of peduncle (cm)	4.75	7.25	8.5
Collar neck (cm)	3.25	2.5	3.5
Peduncle insertion (cm)	1.75	1.75	2.25
Latex	Light	Light	Light
Width at midpoint (cm)	3	5.5	8.25
Width at shoulder (cm)	8.25	7.25	9.75
Length of core (cm)	6.25	6.25	11.5
Width of core (cm)	3.25	3.25	5.25
Flesh color	Light yellow	Light yellow	Light yellow

Table 3. Laboratory Analysis

Varieties	Total Ash (%)	Nitrogen %	Protein %	Brix %	Iron (mg/kg)	Manganese (mg/kg)
Balekana ni Samoa	1.6	0.21	1.29	12	38.5	14.4
Uto Vula	1.29	0.17	1.03	8.5	52.8	12.1
Viroasola	1.74	0.14	0.87	23.8	44.1	7.54
Lasawa	1.64	0.16	1	13.4	47.3	8.86
Uto Karokaro	0.7	0.3	1.89	9.1	56.9	12.8
Oqo	1.63	0.17	1.06	12.5	68.2	5.64
Liva (seeded var)	1.79	0.18	1.14	10	71.8	9.04
Balekana Dina	1.5	0.18	1.1	10.4	69	8.28

Characterization data showed that majority of the varieties are non-seeded. There are also variations within the categories in terms of fruit sizes and weight, which can be classified into three categories: i.e. small (396 to 758g) with 6 varieties; medium (1223.5 to 1904.7g) with 7 varieties; and large (2080.2 and 2458g) with 2 varieties. Fruit characteristics showed that small varieties generally has short fruit circumference, length, and diameter, followed by medium fruits and large fruits, except for Liva and Bokasi varieties.

The laboratory analysis showed an interesting data on the nutrient content of the varieties, especially the high iron content of the Liva variety with 71.8mg/kg. The characterization data also showed that there are similarities on the leaf characteristics amongst the categories as well as diversity within the categories.

Future activities will focus on the following:

- Tissue culture – conservation purpose and production of planting materials
- Yield mapping of each variety
- DNA fingerprinting of varieties
- PGR conservation - Establishment of formal orchard at the village
- National breadfruit survey – Reconfirmation of the distribution of varieties
- Awareness and promotion on food and nutrition security

Keywords: Fiji, breadfruit, morphology