

Towards a description of the breadfruit germplasm in St Vincent

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ABSTRACT

INTRODUCTION. Identification and description of breadfruit germplasm with commercially important traits are necessary to stimulate new plantings in the Caribbean, to supply the export market with increased quantities of high quality fruits. This study was a step towards obtaining this information. **MATERIALS AND METHODS.** Two surveys were conducted throughout St Vincent. Varieties were identified by name and described using morphological, yield and eating quality characteristics. Root cuttings were collected for establishment of collections in St Vincent and Trinidad. **RESULTS.** Although 25 breadfruit varieties were reported, only 22 were described because certain names are used for trees with morphological differences. Tree and leaf morphology are highly variable. Similarly, fruits show considerable differences in external and internal features, within each of four shape groups. May to August is the main bearing period and trees may bear up to 400 fruits at the peak season. Eating quality of most varieties is 'good' to 'superb'. **DISCUSSION.** Factors such as tree age and the environment affect expression of morphological characters, therefore, varietal names based on these do not necessarily indicate genetic variation. The establishment of a germplasm collection in one location will eliminate these sources of variation and allow clearer identification and characterization using morphological descriptors and biochemical techniques.

KEYWORDS

St Vincent, *Artocarpus altilis*, germplasm.

Inventaire des variétés d'arbres à pain collectées sur l'île de Saint-Vincent.

RÉSUMÉ

INTRODUCTION. Identifier et décrire un germplasm d'arbres à pain à partir de caractéristiques commercialement intéressantes est nécessaire pour encourager de nouvelles plantations dans les Antilles et approvisionner abondamment le marché d'exportation en fruits d'excellente qualité. Cette étude représente une étape vers l'obtention de telles connaissances. **MATÉRIEL ET MÉTHODES.** Deux prospections ont été effectuées à Saint-Vincent. Les variétés, identifiées par un nom, ont été décrites pour leurs caractéristiques morphologiques, leur productivité et leur qualité gustative. Des boutures ont été prélevées pour établir des collections à Saint-Vincent et Trinidad. **RÉSULTATS.** Seulement 22 variétés d'arbres à pain sur les 25 recensées ont été décrites, car le même nom a parfois été attribué à des arbres morphologiquement différents. La morphologie des arbres et des feuilles est très variable. De même, les fruits diffèrent fortement par des caractères internes et externes, même à l'intérieur des quatre groupes définis à partir de leur forme. La période de production principale s'étend de mai à août ; un arbre peut porter jusqu'à 400 fruits lors du pic de production. La qualité gustative de la plupart des fruits a été « bonne » à « excellente ». **DISCUSSION.** Les caractéristiques morphologiques étant influencées par l'âge de l'arbre et par des facteurs d'environnement, les noms de variétés, basés sur celles-ci, ne reflètent pas nécessairement la variabilité génétique existante. L'implantation d'une collection dans un endroit précis permettra de mieux identifier et caractériser les variétés par utilisation de descripteurs morphologiques et de techniques biochimiques.

MOTS CLÉS

Saint-Vincent, *Artocarpus altilis*, matériel génétique.

Received 8 August 1996
Accepted 22 February 1997

Fruits, 1997, vol 52, p 27-35
© Elsevier, Paris

RESUMEN ESPAÑOL, p 35

● introduction

The breadfruit (*Artocarpus altilis* (Parkin) Fosberg), having been first introduced by Captain William Bligh in 1793 (POWELL, 1977), has been in the Caribbean for more than 200 years. Since then this species has remained seriously under-exploited, despite being an important carbohydrate food, especially for the rural populations of some territories. Within the last decade, markets in North America and the United Kingdom have been supplied with fresh and processed fruits mainly from St Lucia and Jamaica. The sustainability of this trade will depend on the supply of increased quantities of high quality fruits and breadfruit products. Increased breadfruit production is easy to accomplish in the region, given the rapid establishment of the plant in areas receiving adequate rainfall. However, identification of germplasm with commercially important traits such as excellent eating qualities, high yields and extended shelf-life are important to stimulate the development of new plantings.

There are several reports on the wide genetic diversity of breadfruit which exist in the South Pacific (WILDER, 1928; PARHAM, 1966; KOROIVEIBAU, 1966; RAGONE, 1991). In a detailed description of the voyage of the HMS Providence which brought the breadfruit to the Caribbean, POWELL (1977) quoted Bligh as informing the Governor of St Helena that he had five 'kind' of breadfruit on board, but the varieties were not named. This first description of the germplasm was provided by Dr Alexander Anderson, Curator of the Botanical Gardens where they were initially established in St Vincent : "*...there are six varieties of the tree and fruit in the garden, some kinds loaded, whilst there is scarcely any fruit on the others; so that some one of them is always in fruit. The number one tree produces is very great, often in clusters of five or six, bending the lower branches to the ground. According to different varieties, the fruit is of various shapes and sizes, in weight from four to ten pounds, some smooth skinned, others rough and tuberculated*" (HOWARD, 1954).

However, there remains an ubiquitous unawareness of breadfruit variation in the

Caribbean and where any distinction is made, it is limited to the 'Yellow breadfruit' and the 'White breadfruit' on the basis of flesh colour and less frequently, on skin colour during fruit development. LEAKEY (1977) conducted a reconnaissance and listed the varieties 'Koshi', 'Common', 'Waterloo', 'Cocoabread' and 'Captain Bligh' as occurring in St Vincent. Subsequently, ANDREWS (1991) also reported these varieties there, as well as 'White' or 'Massa' but in neither of these reports were there details of vegetative morphology and descriptions of the fruits were quite brief. The study described in this paper was undertaken to identify and describe the seedless breadfruit germplasm of St Vincent, as a first step towards the establishment of a germplasm collection for characterisation, evaluation, and development of standards for the assessment of new introductions.

● materials and methods

survey location

During 1991 and 1994, two extensive surveys were made throughout St Vincent, West Indies (13° 12' latitude, 69° 14' longitude) to assess the extent of the existing breadfruit germplasm. This territory was chosen because of the well-documented record of the introduction of this crop to the island and the fact it has remained a major food staple. Both surveys were conducted during the months of July and August. The study began at the Botanical Gardens in Kingstown and was extended to several other locations, which permitted almost total coverage of the major producing areas on the island.

data collection

Information was collected on all varieties encountered during the surveys through interviews with extension staff of the Ministry of Agriculture, farmers and home owners in each of the districts. The varieties were distinguished either by name or by morphological or performance characteristics. Canopy shape, branch height and the mean angle of orientation of the first order

branches closest to the ground of accessible trees were noted. Mature leaves and available fruits were also collected and described for all trees. Yield was recorded on the basis of current fruit number. Where possible, information on other important characteristics, for example, time of bearing, eating quality, taste, shelf life was also collected. Root cuttings were collected subsequently for establishment of collections at the Botanical Gardens in St Vincent and at the University Field Station in Trinidad.

● results

breadfruit variety location

Most of the varieties exist on the windward side of the island where rainfall receipt averages more than 2250 mm annually. The predominant areas of production are in inland valleys, where trees occur on slopes or along river banks and gullies, but some also grow close to the sea and along roadsides (table I). Most of the varieties identified are cultivated on farmers' holdings as part of mixed cropping systems in which breadfruit forms part of the upper storey canopy along with other fruit trees or remnant forest trees, while bananas or vegetable crops occupy the lower storey. A few

varieties were identified at private residences.

During the surveys, 25 breadfruit varietal names were reported (table I). Only 22 specimens are identified and described in this paper because names such as 'Creole', 'Ready Roast' and 'Dessert' are used for trees which show differences in vegetative or reproductive morphology, time of bearing, eating quality or other characteristics. Varieties such as 'Waterloo' have more than one name. The 'Creole' or 'Common' types are by far the most widespread.

vegetative morphology

canopy form

Tree form is described for 17 of the accessions since the other five were inaccessible to the author and only leaf and fruit samples could be obtained.

The trees of most varieties are pyramidal in shape with branch angles of 80 to 85° on the first whorl of first order branches.

'Cocoabread', 'Dessert (003)', 'Liberal' and 'Lawyer Caine' have elliptical canopies, but branch angles vary from the 80° to 85° range in the first two varieties to 60° to 70° in

Table I
Breadfruit Variety names in St Vincent, with accession numbers and location.

<i>Accession N°</i>	<i>Variety</i>	<i>Location</i>
001	Creole/Ready Roast	Fancy – land sloping steeply upward from the coast
002	Creole	Sandy Bay – sloping exposed site above the sea coast
003	Dessert/Ready Roast	Sandy Bay – as above
004	Cocobread/Wilkes	Eversham Vale – on banana estate in high rainfall inland valley; Collins; Largo Heights
005	Kashee	Eversham Vale – as above; Botanic Gardens; Vermont
006	Sally Young	Eversham Vale – as above
007	Creole/Common	Eversham Vale – as above
008	Creole/Common	Eversham Vale – as above
009	Creole	Belmont – in a gully near a main road
010	White	Vermont – on a river bank near a road; Botanic Gardens; Queensbury
011	Butterheart	Queensbury – on a banana estate located on an upland site
012	Hope Marble	Queensbury – at the bottom of a slope and near the main road; Vermont
013	Liberal	Largo Heights – an upland site where natural vegetation predominates
014	Waterloo/Lulu/Massa	Largo Heights – as above; South Winds
015	Soursop	Largo Heights – on a very steep slope on a river bank
016	Dessert	Largo Heights – upland site on farmer's plot
017	Lawyer Caine/Oldwind	Old Benjamin, Largo Heights – as above
018	Creole	Villa - home owner's yard in flat location
019	England/Captain Bligh	South River – on a river bank in narrow valley near road; Botanic Gardens
020	Floater/White/ Creole white	South River – on high bank above river bed
021	Black	South River – on river bank opposite that on which accession N° 019 is located
022	Hogpen	South River – as above

'Liberal' and 25° to 40° in 'Lawyer Caine' in which the canopy is held rather erect.

Other varieties, such as 'Creole (001)', 'Kashee', 'Hope Marble' and 'Soursop', have pyramidal but erectly held canopies because of branch angles of 45°, 45–60°, 45° and 45°, respectively. 'Waterloo' has a rather spreading canopy with branch angles of 90° (table II).

Most varieties have 10 to 15 leaves/branch and their tree canopies generally appear dense. The canopies of 'England' and 'Waterloo' have an open appearance owing to leaf numbers of 5 to 6, and 7 to 9, respectively. The distinctly bunched and drooping foliage of 'Kashee' might be attributed to internode length of only 1 cm whereas, in the other varieties, internode length between current leaves was about 2 cm.

leaf morphology

Leaves of breadfruit varieties are highly variable in size and morphological characteristics. However, there are also similarities; in order to facilitate comparisons, the descriptions are presented in a classification scheme in table II.

Lobe number is used to arrange the varieties into one of five leaf groups since it is quantifiable, consistent on the trees described and differences are easily detected.

On the basis of other characteristics, mainly lobe width, sinus depth, the presence of overlapping lobes and brown colour development at the junction of the main veins and midribs, sub-groups and varieties can be distinguished. In the 7 lobe class, 'Kashee' is distinguished by its greater sinus depth and also the puckered lamina and bunched

Table II
A comparison of the leaf morphology of breadfruit varieties in St Vincent.

Group	Variety	Lobe N°	Sinus ^b depth (%)	Leaf colour	Vein colour	Hairs	Leaf length (cm)	Other
1a	Cocobread	7	60–70	dkg/g	g/lg	2	42–50	
	Butterheart	7	60–70	dkg/g	yg/lg	3	55	
	Floaters	7	70–80	dkg/g	yg/lg	1	45	
1b	Kashee ^a	7	80–90	dkg/g	g/lg	1	50	Puckered leaf margin; bunched drooping foliage; compact canopy
2a	Waterlo ^a	7 to 9	40–70	dkg/g	gy/ly	1	45	Overlapping lobes; wide branch angle; spreading canopy
2b	Sally Young	7 to 9	70–80	dkg/g	lg/lg	3	60	
	Creole (007)	7 to 9	60–80	dkg/g	yg/lg	2	50	
	Creole (008)	7 to 9	70–80	dkg/g	yg/lg	3	50	Short petioles
	Creole (009)	7 to 9	50–70	vdkg/bg	yg/bg	3	40–45	Glossy leaves
3a	Creole (001)	9	75	dkg/lg	by/ly	2	55	
	Creole (002)	9	75	dkg/lg	by/ly	2	50	
	Black	9	70–80	dkg/g	yg–by/lg	1	60	Glossy leaves
	Hogpen	9	25–70	dkg/g	g–yg/lg	1	70	Dull leaves
	Creole (18)	9	60–70	dkg/g	yg–by/g	2	63	
3b	England ^a	9	90	dkg/g	yg/lg	1	45	Thin lobes; fine-textured, open canopy
3c	White	9	70–80	dkg/g	g/lg	3	60	Brown colour at junction of lateral veins and midrib
	Dessert (016)	9	60–80	dkg/g	g/lg	3	45	As above
3d	Lawyer Caine ^a	9	60–70	vdkg/g	g–yg/lg	3	45	Overlapping lobes; brown colour at junction of lateral veins and midrib; elliptical, erect canopy
4a	Dessert (003) ^a	9 to 11	75	dkg/lg	ly/lg	2	70	
4b	Soursop ^a	9 to 11	20–50	dkg/g	yg–bg/lg	1	45	Overlapping lobes; upright canopy
5a	Liberal ^a	11	70–75	dkg/g	g/lg	3	75	Brown colour at junction of lateral veins and midrib; very thick veins
5b	Hope Marble ^a	11	70–90	dkg/g	g/lg	3	70	

^a Varieties which seem distinct according to the features in bold type; ^b sinus depth experienced as a percentage of the distance between the leaf margin and midrib. Leaf and vein colour (upper/lower surface): g, green; lg, light green; yg, yellow green; by, bright yellow; dkg, dark green; vdkg, very dark green. Hairiness: 1, glabrous; 2, fairly dense; 3, dense.

drooping foliage. 'Waterloo' differs from the other varieties in the 7 to 9 lobe class by its overlapped lobes; its wide branch angles and consequent spreading canopy makes it even more distinct. All the 'Creole' types are in lobe classes 7 to 9 and 9. Within the latter class, 'White' and 'Dessert (016)' form one of the sub-groups because of the brown coloration at the vein junctions. 'England' with its thin lobes and very deep sinuses, and 'Lawyer Caine' which has both overlapping lobes and brown coloration at the vein junctions as well as a very erect canopy, appear to be distinctly different. Varieties within each of the lobe classes 9 to 11 and 11 differ. 'Soursop' and 'Dessert (003)' can be distinguished by five leaf characteristics including leaf size, as well as canopy shape, while 'Liberal' and 'Hope Marble' differ in three.

fruit morphology

The varieties showed considerable variation in fruit characteristics including size, shape and both external and internal features. Similarities exist, however, and the descriptions are presented in a classification in table III. The varieties are classified into the following four fruit shapes: oval, round, round and oval, and subglobose. Other characteristics including skin colour and texture, fruit size, core size and flesh colour are used to detect further similarities or differences within the groups.

The oval group consists of 41% of the varieties with two-thirds having rough skin texture. In 'White' this roughness appeared due to immaturity since the distal portion of the fruit specimen was smooth. All mature fruits are light green in colour. Flesh colour is

Table III
Description and comparison of fruit characteristics of breadfruit varieties in St Vincent.

Variety	Shape	Skin texture	Skin colour	Fruit wt (kg)	Core ^a size	Flesh colour	Other
Cocobread	oval ^b	vs	lg	2.7-3.1	large	pc	
Creole (007)	oval ^b	s	lg	2.73	small	vpc	
Sally Young	oval ^b	sr	lg	2.7	small	pc	
Liberal	oval ^b	fr	lg	1.8	small	pc	Browning of skin
Black	oval ^b	fr	lg	2	medium	yc	
Waterloo	oval ^b	r	g	1.8	medium	pc	Immature fruit; browning of skin
Soursop	oval ^b	r	lg	0.9	large	yc	Immature fruit
Kashee	oval ^b	r	lg	1.6	small	pc	Slight browning of skin
Floater	round	s	lyg	3.2	medium	yc	Browning of skin
Hogpen	round	s	lg	2.7	medium	yc	Browning of skin
Creole (002)	round	s	g	2	small	ly	
Dessert (003)	round	s	g	1.6	small	pc	
Lawyer Caine	round	s	lyg	1.4	medium	yc	Browning of skin
Creole (009)	round	fs	bg-b	1-1.2	medium	yc	
Creole (018)	round	fr	lg	2.3	small	py	
Creole (008)	round and oval ^b	fs	lg	2.73	medium	pc	Browning of skin; latex
Dessert (016)	oval ^b	fs	yg	0.89	small	vpc	With reddish browning of skin
Creole (001)	oval ^b	fr	bg	1.23	small	c	
Hope Marble	subglobose	s	g	1	medium	ly	
Butterheart	subglobose	fr	g	1.3	medium	yc	
England	subglobose	fr	lg	1.4	small	c	Browning of skin

^a relative to fruit size; ^b includes cylindrical and elliptical fruit shapes; ^c both fruit shapes produced on the same branch. s, smooth; vs, very smooth; sr, slightly rough; fr, fairly rough; r, rough; g, green; lg, light green; lyg, light yellow green; bg, browning green; b, brown; c, cream; pc, pale cream; vpc, very pale cream; yc, yellowish cream; ly, light yellow; w, white.

generally pale cream and yellow cream flesh colour, as occurs in 'Soursop', does not necessarily indicate maturity. Only 'Sally Young' and 'Creole (001)' are similar in at least five characteristics other than shape.

Thirty-two percent of the varieties are in the round group. These fruits are generally smooth and, except for the outstanding brown skin of 'Creole (009)', most varieties produce light green to light yellow green fruit with yellowish flesh. In both the oval and the round groups, fruit size range from 1.4 to over 3 kg.

There are only three varieties (14%) in the group with both round and oval fruit, which are fairly smooth and have pale cream flesh

colour, but variations occur in browning of the skin, fruit size, core size and time of bearing.

Within the remaining 14% of the varieties, that is the group with the relatively small, sub-globose fruits, there is variation among the varieties in all characteristics.

time of bearing and yield

May to August is the main bearing season for 13 of the 19 varieties for which information was available (table IV). For these varieties there is also a minor season from October to December. This latter period was reported as the main bearing season for 'Dessert (006)' and 'Lawyer Caine'. 'Butterheart' bears from December to August. Fruit

Table IV
Yield, bearing time and fruit quality of breadfruit varieties in St Vincent.

Variety	Fruit n/tree	Time of bearing	Quality
Creole (001)	200	June-Aug	Good; quick roasting
Creole (002)	120	Year round	Thick slices
Dessert (003)	60	Year round	Excellent; very smooth texture
Cocobread	10	May-June (major) Oct-Dec (minor)	Excellent; very smooth texture 2 days after harvesting; Fries well; remains moist after roasting; susceptible to anthracnose
Kashee	60	May-June	Very good, light texture; roast very quickly
Sally Young	120	June-Aug	'Super quality'; well appreciated for its thick slices
Creole (008)			'Nice eating'; yellow, firm, starchy flesh easy to peel
Creole (009)			Good especially when boiled; very firm, easily sliced, moist and smooth textured. Shelf life 4-5 days
White	2	May-June	Immature fruit flavour bland; flesh firm and just becoming starchy
Butterheart	200	Dec-Aug	Smooth textured; easy to slice; more starchy than 009; cooked flesh bright yellow as egg yolk
Hope Marble	120	Yearound	Good; taste best when roasted 2 days after harvesting; very starchy; very firm flesh; not as easy slicing as 009 and 011
Liberal	120	May-June (major)	—
Waterloo	10 (400 at peak)	May-July	—
Soursop	20 (300 at peak)	May-June	Porous flesh near core; may contain seeds; susceptible to anthracnose
Dessert (016)	80	Jan-Feb Oct-Nov	Thick flesh
Lawyer Caine	10	Jan-Feb Oct-Nov	—
Creole (018)	150	June-Aug	Excellent especially when roasted
England	150	June-Aug	Thin slices
Floaters	400	June-Aug	Good
Black	200	June-Aug	Thick slices
Hogpen	200	June-Aug	Very good; thick slices

is borne year-round by 'Dessert (003)', 'Creole (002)', and 'Hope Marble'; 'Liberal', which has its peak production from May to June, also exhibits this tendency.

Fruit counts made during the survey ranged from 2 in 'White' to 400 in 'Floaters'. Trees with less than 100 fruits were generally of those varieties which matured earlier in the May to August season and, to a lesser extent, those which have their main bearing season between October and December. 'Waterloo' and 'Soursop' were reported to produce up to 300 and 400 fruits, respectively, at peak production. However, due to the variation in the time of peak production among varieties, variation in tree age and the absence of data for the minor season the data presented underestimate the annual yield of these varieties.

fruit quality

The eating quality of the fruit of all varieties is quite acceptable with assessment, ranging from 'good' to 'superb' (table IV). Eating quality depends on both taste and texture, with very smooth mouth feel being preferred. Roasting is a common cooking method, therefore, ease of roasting is also regarded as a desirable characteristic. Other features of the cooked flesh which may enhance quality are thickness of the flesh and easy slicing.

The anthracnose disease which causes brown circular spots on the skin, not only impairs the appearance of the fresh fruit, but also imparts a bitter flavour to the cooked flesh if the spots are not removed before cooking. Susceptibility to this disease is therefore, undesirable.

● discussion

In this survey, an unexpectedly large number, 25, in all of breadfruit varietal names were recorded including the five to six varieties previously noted by LEAKEY (1977) and ANDREWS (1991), respectively. In these three studies on the germplasm in St Vincent, only the 'England' or 'Captain Bligh' variety makes any reference to the 18th century introduction. The leaf morphology, fruit shape, size and flesh colour of 'England' and

'Kashee' match those of 'Maire'—possibly Bligh's 'Mire' (LEAKEY, 1977)—and 'Aravei', respectively, which are Tahitian varieties described by WILDER (1928). It is evident that varietal names, such as 'Creole', 'Dessert' or 'Ready Roast', are sometimes applied to trees which differ morphologically and in bearing habit, and that different names are used for varieties which appear similar. This situation can act as a deterrent to the evaluation of the germplasm by making the exercise seem complicated and long term. It is important, therefore, to establish how much of the existing variation is genetically determined and the range of phenotypic expression within groups of genetically similar materials.

One approach to identifying similarities among the accessions which the survey results allow is the comparison of vegetative and reproductive characteristics. On the basis of leaf morphology and other vegetative characters it is possible to reduce the number of accessions for evaluation from 22 to 12 by assigning 14 of them to four sub-groups (Table I). It is possible also, to classify the accessions into only four groups using fruit shape, but the variability in other fruit characters demonstrate, that, on its own, fruit shape is not a useful basis for classification. Of all the accessions described only 'Sally Young' and 'Creole (007)' had both similar vegetative and fruit characteristics. Thus, without information on the number of genotypes, any further attempt at confirming or reducing the number of groups to which the accessions could be allocated, as suggested by both vegetative and fruit morphological characters, is thwarted. Similarly, PARHAM (1966) developed a classification scheme using twelve leaf shapes and four fruit shapes, as well as the presence of hairs, seediness and five skin textural types, but found it inadequate to describe the diversity of morphological characteristics in 166 varieties observed in a survey of breadfruit varieties in the South Pacific. RAGONE (1991) used isozyme analysis to characterise 204 breadfruit accessions into 90 zymotypes, but, due to somatic variation, even within one zymotype considerable morphological variation existed.

The survey method, while very useful for documenting varietal names, can provide

only a preliminary description of a germplasm. In the present study, descriptions are sometimes partial due to unavailability of some types of data such as yield and eating quality. Additionally, tree age and environmental factors influence phenotype thus increasing variability in expression of characters such as tree height, leaf size, lobe number and fruit size. The stage of development of fruit samples determines expression of all fruit morphological characters and eating and post-harvest quality. Consequently, the range of phenotypic expression encountered during a survey is not necessarily indicative of a similar range of genetic variability. Nevertheless, since 'Kashee', 'England', 'Soursop' and 'Waterloo' among others are so easily distinguished, genuine genetic diversity resulting from mutation or germplasm introductions other than Bligh's (LEAKEY, 1977) ought not to be discounted.

For greater commercialisation of this crop, the most important characteristics for which breadfruit need to be evaluated pertain to the fruit as the nomenclature of the Vincen-tian germplasm suggests. Varietal names are based on eating quality ('Dessert', 'Coco-bread'), flesh colour ('White', 'Butterheart'), ease of cooking ('Ready Roast'), size ('Hope Marble'), skin texture ('Kashee' which means 'thorny' according to ANDREWS (1991) and other methods of utilisation ('Hog Pen'). An objective evaluation of such characteristics can only be undertaken if the varieties in the germplasm are clearly identified and the sources of variation referred to above are minimised. Therefore, the next step in this study will be the establishment of a germ-plasm collection in one location for charac-terisation using morphological features and biochemical techniques aid in identification and classification. Specific focus will be placed on evaluating the relative usefulness of various morphological characteristics for description since these will be of particular benefit for recognition to producers and

others involved in the trade. The collection will also facilitate commencement of an evaluation of characteristics of economic impor-tance including those which relate to consumer preference, yield and bearing habit, tree size and canopy shape. The best accessions will be distributed subsequently, for evaluation of environmental effects on these characters.

acknowledgements

The assistance of the Ministry of Agriculture and Labour and the people of St Vincent is gratefully acknowledged.

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Inventario de las variedades del árbol del pan en la isla de San-Vincent

RESUMEN

INTRODUCCIÓN. La identificación del germoplasma del árbol del pan con características comerciales importates es necesario para estimular nuevas plantaciones en el Caribe y para suplir le mercado de exportación con cantidades aumentados de frutos de superior calidad. Este estudio fue un

paso hacia adelante para obtener esa información. **MATERIAL Y MÉTODOS.** Se condujeron dos estudios en San Vicente. Las variedades se identificaron por su nombre y se describieron usando las características morfológicas, producción y calidad para el consumo. Se colectaron estacas de raíces para el establecimiento de colecciones en San Vicente y Trinidad. **RESULTADOS.** Aunque se registraron 25 variedades del árbol del pan, sólo se describieron 22 debido a que ciertos nombres son usados para identificar árboles con morfologías similares. La morfología de los árboles y hojas es muy variable. Igualmente las frutas mostraron considerables diferencias en sus características externas e internas dentro de las diferentes formas de frutas. Mayo a agosto es el principal período de fructificación y un árbol puede llegar a tener hasta 400 frutas durante el pico de la época de producción. La calidad para el consumo de la mayoría de las variedades es de « bueno » a « superior ». **DISCUSIÓN.** Factores como la edad del árbol y el ambiente afectan la expresión morfológica de los caracteres, por consiguiente los nombres varietales, basados en características morfológicas, no necesariamente indican variaciones genéticas. El establecimiento de una colección de germoplasma en una localidad eliminaría esas fuentes de variación y permitiría una más clara identificación y caracterización usando descriptores morfológicos y técnicas bioquímicas.

PALABRAS CLAVES

San Vicente, *Artocarpus altilis*, germoplasma.