Bioversity International

Embrapa

Descriptors for

Mangaba

(*Hancornia speciosa* Gomes)

List of Descriptors

Allium (E/S)	2000
Almond (Revised)* (E)	1985
Apple* (E)	1982
Apricot* (E)	1984
Avocado (E/S)	1995
Bambara groundnut (E/F)	2000
Banana (E/S/F)	1996
Baobab (E)	2015
Barley (E)	1994
Beta (E)	1991
Black pepper (E/S)	1995
Brassica and *Raphanus* (E)	1990
Brassica campestris L. (E)	1987
Buckwheat (E)	1994
Butiá (E)	2015
*Capsicum** (E/S)	1995
Cardamom (E)	1994
Carrot (E/S/F)	1999
Cashew* (E)	1986
Chenopodium pallidicaule (S)	2005
Cherimoya (E/S)	2008
Cherry* (E)	1985
Chickpea (E)	1993
Citrus (E/F/S)	1999
Coconut (E)	1992
Coffee (E/S/F)	1996
Cotton (Revised)* (E)	1985
Cowpea* (E)	1983
Crocus (E)	2015
Cultivated potato* (E)	1977
Date palm (F)	2005
Durian (E)	2007
Echinochloa millet* (E)	1983
Eggplant (E/F)	1990
Faba bean* (E)	1985
Fig (E)	2003
Finger millet* (E)	1985
Forage grass* (E)	1985
Forage legumes* (E)	1984
Grapevine (E/S/F)	1997
Groundnut (E/S/F)	1992
Hazelnut (E)	2008
Jackfruit (E)	2000
Kodo millet* (E)	1983
Lathyrus spp. (E)	2000
Lentil* (E)	1985
Litchi (E)	2002
Lupin* (E/S)	1981
Maize (E/S/F/P)	1991
Mango (Revised) (E)	2006
Mangosteen (E)	2003
Medicago (Annual)* (E/F)	1991
Melon (E)	2003
Mung bean* (E)	1980
Oat* (E)	1985
Oca* (S)	2001
Oil palm (E)	1989
Panicum miliaceum and *P. sumatrense* (E)	1985
Papaya (E)	1988
Peach* (E)	1985
Pear* (E)	1983
Pearl millet (E/F)	1993
Pepino (E)	2004
Phaseolus acutifolius (E)	1985
*Phaseolus coccineus** (E)	1983
Phaseolus lunatus (E/P)	2001
*Phaseolus vulgaris** (E/P)	2001
Pigeonpea (E)	1993
Pineapple (E)	1991
Pistacia (excluding *P. vera*) (E)	1998
Pistachio (E/F/A/R)	1997
Plum* (E)	1985
Potato varieties* (E)	1985
Quinoa (E/F/S)	2013
Rambutan (E)	2003
Rice* (E/P)	2007
Rocket (E/I)	1999
Rye and Triticale* (E)	1985
Safflower* (E)	1983
Sesame* (E)	2004
Setaria italica and *S. pumila* (E)	1985
Shea tree (E)	2006
Sorghum (E/F)	1993
Soyabean* (E/C)	1984
Strawberry (E)	1986
Sunflower* (E)	1985
Sweet potato (E/S/F)	1991
Taro (E/F/S)	1999
Tea (E/S/F)	1997
Tomato (E/S/F)	1996
Tree tomato (E)	2013
Tropical fruit* (E)	1980
Ulluco (S)	2003
Vigna aconitifolia and *V. trilobata* (E)	1985
Vigna mungo and *V. radiata* (Rev.)* (E)	1985
Walnut (E)	1994
Wheat (Revised)* (E)	1985
Wheat and *Aegilops** (E)	1978
White clover (E)	1992
Winged bean* (E)	1979
*Xanthosoma** (E)	1989
Yam (E/S/F)	1997

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Descriptors for

Mangaba

(Hancornia speciosa Gomes)

Bioversity International is a global research-for-development organization. We have a vision – that agricultural biodiversity nourishes people and sustains the planet.

We deliver scientific evidence, management practices and policy options to use and safeguard agricultural and tree biodiversity to attain sustainable global food and nutrition security. We work with partners in low-income countries in different regions where agricultural biodiversity can contribute to improved nutrition, resilience, productivity and climate change adaptation.

Bioversity International is a member of the CGIAR Research Centre. CGIAR is a global research partnership for a food-secure future.

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The Brazilian Agricultural Research Corporation (**Embrapa**) aims at technological innovation, while linked to the Ministry of Agriculture, Livestock and Food Supply (Mapa). The mission of Embrapa is to provide solutions for research, development and innovation for sustainability of agriculture for the benefit of the Brazilian society.

www.embrapa.br

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Cover Photo: Mangaba (*Hancornia speciosa* var. *speciosa*) fruits from Cabo de Santo Agostinho, Pernambuco, Brazil.
Credit: Josué Francisco da Silva Júnior

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CONTENTS

PREFACE

The '**Descriptors for Mangaba** (*Hancornia speciosa* Gomes)' were developed by Josué Francisco da Silva Junior from the Embrapa Tabuleiros Costeiros and a group of researchers specialized in this species from three research centers of the Brazilian Agricultural Research Corporation (Embrapa), located in the Northeast Region of Brazil. Adriana Alercia managed the whole development process and provided technical expertise. The scientific overview of this document was provided by Dr Ehsan Dulloo from Bioversity International.

A draft version prepared in the Bioversity internationally accepted format for descriptor lists was circulated among a number of international experts for their comments. A full list of the names and addresses of those involved in the production of this publication is given in the *Contributors* section.

Mangaba, a neglected species, is considered by the Brazilian Ministry of the Environment (MMA), one of the "Plants of the Future", a group of plants with a high priority for conservation, research and development in the country. Research on the genetic resources of underutilized native tropical species has been one of the main objectives of Bioversity International and Embrapa, and this list for mangaba contributes greatly to its characterization and, consequently, conservation and use activities.

Bioversity International (formerly known as IPGRI) encourages the collecting of data for all five types of descriptors (see Definitions and Use of the Descriptors), whereby data from the first four categories—*Passport*, *Management*, *Environment and Site*, and *Characterization*—should be made available for any accession. The number of descriptors selected in each of the categories will depend on the crop and its importance to the description of the crop. Descriptors listed under *Evaluation* allow for a more extensive description of the accession, but they generally require repeated trials over a period of time. Descriptors used by traditional communities and farmers to differentiate genotypes in natural and cultivated areas were also taken into consideration.

Although the suggested coding should not be regarded as the definitive scheme, this format represents an important tool for a standardized characterization system and is promoted by Bioversity International throughout the world.

This descriptor list provides an international format and thereby produces a universally understood 'language' for plant genetic resources data. The adoption of this scheme for data encoding, or at least the production of a transformation method to convert other schemes into the Bioversity International standard format, will produce a rapid, reliable, and efficient means of information storage, retrieval and communication, and will assist with the use of germplasm.

This descriptors list is intended to be comprehensive for the descriptors it contains. Bioversity International does not, however, assume that curators will characterize accessions of their collections using all descriptors given. Descriptors should be used when they are useful to users, either collection' curators for the management and maintenance of their germplasm material or to all other users of plant genetic resources for promoting their sustainable use. To this end, highly discriminating descriptors are listed at the beginning of the Characterization section (highlighted text) to facilitate selection of descriptors.

The 'List of Multi-crop Passport Descriptors' (Alercia *et al.*, 2015) was developed to provide consistent coding schemes for common passport descriptors among crops. They are marked in the text as [MCPD]. Owing to the generic nature of the multicrop passport descriptors, not all descriptor states for a particular descriptor will be relevant to a specific crop.

In Annex I, the reader will find a 'Collecting form for mangaba' that will facilitate data collection.

Any suggestions for improvement of the 'Descriptors for Mangaba (*Hancornia speciosa* Gomes)' will be highly appreciated by Bioversity International and Embrapa Tabuleiros Costeiros.

INTRODUCTION

Common and local names of mangaba in different languages and dialects found in literature

Language	Name
English	Mangaba, mangaba tree, mangabeira
French	Mangaba, mangabeira, caoutchouc de Pernambouc
German	Mangabeira, mangabeirabaum
Portuguese	Mangaba, mangabeira, mangava, mangaveira
Spanish	Mangaba, mangabeira
Akwen – Xavante	Ritó
Akwen – Xerente	Kritó
Apinayé	Apênh, pênh ou apênhti (fruit); mànohô (tree)
Bakairi	Matola
Bororo	Báto
Canela	Apen
Guaraní	Mangaá, mangaì,
Inyrybe (Karajá)	Urà
Irántxe	Kapá
Kamayurá	Mangawa
Kisêdjê	Pêni
Krahô	Apên
Krinkatí	Pêny
Kuikuro	Katuga
Mehinaku	Ketula
Munduruku	Unhuá or iubá
Nahukwá - Kalapalo	Katuga, katúa
Nambikwara	Katikisu, kadikisu, katêkiçú, katikanekisu, tilanekisu
Panará	Pey
Paresí or Halíti	Katyola, katiulá, katipulá
Tapirapé	Magãwã
Timbira pattern	Penxõ, apenxõ
Umutína	Bato-rukwa
Wauja or Waurá	Ietula

Mangaba is a native fruit species of Brazil, but also occurs in Paraguay, Bolivia and Peru. The *genus* is monotypic, and there are six botanical varieties. *H. speciosa* var. *speciosa* is the most widely distributed occurring in the Cerrado (a type of savannah), coastal tablelands and lowlands of Brazil. Mangaba tree produces one of the most important raw materials for fruit juice and ice cream agroindustry among the native fruits of Northeast Brazil. Its fruits can be

considered good sources of iron and vitamin *C*. Before the arrival of the Europeans in the New World, the Indians who used their fruits in the food and its latex in the production of artifacts already knew it. It was used during the Second World War for rubber production, however this exploitation was abandoned in the late 1950s.

In its occurrence areas in the region as well as in Central Brazil, there is an accelerated genetic erosion process in many natural populations as result of monocultures and land speculation. Strategies for *ex situ* conservation of mangaba have been conducted by Brazilian researchers and teaching institutions through genebanks. *In situ* conservation is performed in governmental and private conservation units, and in many cases it is associated with traditional communities, like the women mangaba pickers and family farmers from different parts of the country that have the important fruit source of income and livelihood. The Brazilian production of mangaba is almost entirely from extractivism.

This document is a first approach for the definition of a descriptors list, aiming at its application in mangaba genetic resources. Due to the emergence and expansion of several genebanks and collections of the species in different regions of Brazil (eight are currently known), it has seen a blurring in the characters used in characterization and evaluation of accessions activities, which led a group of researchers involved in mangaba conservation, to promote standardization of the characters and traits of mangaba.

DEFINITIONS AND USE OF THE DESCRIPTORS

Bioversity uses the following definitions in genetic resources documentation:

Passport descriptors: These provide the basic information used for the general management of the accession (including registration at the genebank and other identification information) and describe parameters that should be observed when the accession is originally collected.

Management descriptors: These provide the basis for the management of accessions in the genebank and assist with their multiplication and regeneration.

Environment and site descriptors: These describe the environmental and site-specific parameters that are important when characterization and evaluation trials are held. They can be important for the interpretation of the results of those trials. Site descriptors for germplasm collecting are also included here.

Characterization descriptors: These enable an easy and quick discrimination between phenotypes. They are generally highly heritable, can be easily seen by the eye and are equally expressed in all environments. In addition, these may include a limited number of additional traits thought desirable by a consensus of users of the particular crop.

Evaluation descriptors: The expression of many of the descriptors in this category will depend on the environment and, consequently, special experimental designs and techniques are needed to assess them. Their assessment may also require complex biochemical or molecular characterization methods. These types of descriptors include characters such as yield, agronomic performance, stress susceptibilities and biochemical and cytological traits. They are generally the most interesting traits in crop improvement.

Characterization will normally be the responsibility of genebank curators, while evaluation will typically be carried out elsewhere (possibly by a multidisciplinary team of scientists). The evaluation data should be fed back to the genebank, which will maintain a data file.

Highly discriminating descriptors are highlighted in the text and are listed at the beginning of the *Characterization* section.

The following internationally accepted norms for the scoring, coding and recording of descriptor states should be followed:

(a) the Système International d'Unités (SI);

(b) the units to be applied are given in square brackets following the descriptor name;

(c) standard colour charts, e.g. Royal Horticultural Society Colour Chart, Methuen Handbook of Colour, or Munsell Color Chart for Plant Tissues, are strongly recommended for all ungraded colour characters (the precise chart used should be specified in the section where it is used);

(d) the three-letter abbreviations from the *International Standard (ISO) Codes for the representation of names of countries* are used (http://unstats.un.org/unsd/methods/m49/m49alpha.htm);

(e) quantitative characters, i.e. those that are continuously variable, should preferably be measured quantitatively. Alternatively, in cases where it is difficult to measure in this way, it is acceptable to score instead on a 1–9 scale, where:

1	Very low	6	Intermediate to high
2	Very low to low	7	High
3	Low	8	High to very high
4	Low to intermediate	9	Very high
5	Intermediate		

is the expression of a character. The authors of this list have sometimes described only a selection of the states, e.g. 3, 5 and 7 for such descriptors. Where this has occurred, the full range of codes is available for use by extension of the codes given or by interpolation between them, e.g. in Section 10 (*Biotic stress susceptibility*), 1 = very low susceptibility and 9 = very high susceptibility;

(f) when a descriptor is scored using a scale, such as in (e), '0' would be scored when (i) the character is not expressed; (ii) a descriptor is inapplicable. In the following example, '0' will be recorded if an accession does not have leaf hairs:

Young leaf hairiness
Observed on the upper side of the leaf

0 Absent
3 Slightly hairy
5 Hairy
7 Very hairy

(g) absence/presence of characters is scored as in the following example:

Presence of stone cell aggregates in mesocarp

0 Absent
1 Present

(h) blanks are used for information not yet available;

(i) for accessions which are not generally uniform for a descriptor (e.g. mixed collection, genetic segregation), the mean and standard deviation could be reported where the descriptor is continuous. Where the descriptor is discontinuous, several codes in the order of frequency could be recorded; or other publicized methods can be utilized, such as Rana *et al.* (1991) or van Hintum (1993), that clearly state a method for scoring heterogeneous accessions;

(j) dates should be recorded numerically as YYYYMMDD, where

YYYY	-	4 digits to represent the year
MM	-	2 digits to represent the month
DD	-	2 digits to represent the day

If the month or days are missing, this should be indicated with hyphens or '00' [double zero], (e.g. 1975----, 19750000; 197506--, 19750600).

PASSPORT

All descriptors listed under Passport, belonging to the multicrop passport descriptors category, are indicated in the text as [MCPD].

1. Accession descriptors

1.1 Persistent unique identifier (PUID) [MCPD]

Any persistent, unique identifier assigned to the accession so it can be unambiguously referenced at the global level and the information associated with it harvested through automated means. Report one PUID for each accession.

- The Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) is facilitating the assignment of a persistent unique identifier (PUID), in the form of a DOI, to PGRFA at the accession level (http://www.fao.org/plant-treaty/areas-of-work/global-information-system/doi/en/).

- Genebanks not applying a true PUID to their accessions should use, and request recipients to use, the concatenation of INSTCODE, ACCENUMB, and GENUS as a globally unique identifier similar in most respects to the PUID whenever they exchange information on accessions with third parties (e.g. NOR017:NGB17773:ALLIUM).

1.2 Institute code [MCPD]

FAO WIEWS code of the institute where the accession is maintained. The codes consist of the 3-letter ISO 3166 country code of the country where the institute is located, plus a number. The current set of institute codes is available from http://apps3.fao.org/wiews/wiews.jsp.

1.3 Accession number [MCPD]

This number serves as a unique identifier for accessions within a genebank, and is assigned when a sample is entered into the genebank collection. Once assigned, this number should never be reassigned to another accession in the collection. Even if an accession is lost, its assigned number should never be reused. Letters should be used before the number to identify the genebank or national system (e.g. CGN indicates an accession from the genebank in Wageningen, the Netherlands; PI indicates an accession within the USA system).

1.3.1 Local plant number

This identifies a single plant within a population of plants having the same accession number. It may be any combination of plot identity, row number, or tree position within the row.

1.4 Donor institute code [MCPD]

FAO WIEWS code of the donor institute. (See instructions under *Institute code*, **1.2**).

1.4.1 Donor institute name [MCPD]

Name of the donor institute (or person). This descriptor should be used only if DONORCODE cannot be filled because the FAO WIEWS code for this institute is not available.

1.5 Donor accession number [MCPD]

Identifier assigned to an accession by the donor. (See instructions under *Accession number*, **1.3**).

1.6 Other identifiers associated with the accession [MCPD]

Any other identifiers known to exist in other collections for this accession. Use the following format: INSTCODE:ACCENUMB;INSTCODE:identifier;… INSTCODE and identifier are separated by a colon without space. Pairs of INSTCODE and identifier are separated by a semicolon without space. When the institute is not known, the identifier should be preceded by a colon.

1.7 Genus [MCPD]

Genus name for taxon. Initial uppercase letter required (e.g. *Hancornia*).

1.8 Species [MCPD]

Specific epithet portion of the scientific name in lowercase letters (e.g. *Hancornia speciosa*). Only the following abbreviation is allowed: 'sp.'.

1.8.1 Species authority [MCPD]

Provide the authority for the species name e.g. (Gomes).

1.9 Subtaxon [MCPD]

Subtaxon can be used to store any additional taxonomic identifier. The following abbreviations are allowed: 'subsp.' (for subspecies); 'convar.' (for convariety); 'var.' (for variety); 'f.' (for form); 'Group' (for 'cultivar group').

1.9.1 Subtaxon authority [MCPD]

Provide the subtaxon authority at the most detailed taxonomic level.

1.10 Ancestral data [MCPD]

Information about either pedigree or other description of ancestral information (i.e. parent variety in the case of mutant or selection).

1.11 Accession

1.11.1 Accession name [MCPD]

Either a registered or other designation given to the material received other than the *Donor accession number*, **1.5** or *Collecting number*, **2.2**. First letter uppercase. Multiple names are separated by a semicolon without space. Example: Accession name: Bogatyr;Symphony;Emma.

1.11.2 Synonyms

Include here any names other than the current one. Newly assigned station names are frequently used as synonyms.

1.11.3 Common tree/crop name [MCPD]

Common name of the tree/crop. Example: 'mangaba'.

1.12 Acquisition date [YYYYMMDD] [MCPD]

Date on which the accession entered the collection where YYYY is the year, MM is the month and DD is the day. Missing data (MM or DD) should be indicated with hyphens or double zero.

1.13 Accession size

Number or weight of seeds, seedlings, bud sticks, *in vitro* plants, etc. of an accession in the genebank.

1.14 Type of material received

1 Seed/seeding
2 Vegetative
3 Pollen
4 *In vitro* culture
99 Other (e.g. more than one type, specify in descriptor **1.15 Remarks**)

1.15 Remarks

The *Remarks* field is used to add notes or to elaborate on descriptors with value '99' or '999' (= Other).

2. Collecting descriptors

2.1 Collecting institute code [MCPD]

FAO WIEWS code of the institute(s) collecting the sample. If the holding institute has collected the material, the collecting institute code should be the same as the holding institute code. Multiple values are separated by a semicolon without space. (See instructions under *Institute code*, **1.2**).

2.1.1 Collecting institute name [MCPD]

Name of the institute collecting the sample. This descriptor should be used only if *Collecting institute code* cannot be filled because the FAO WIEWS code for this institute is not available. Multiple values are separated by a semicolon without space.

2.1.1.1 Collecting institute address [MCPD]

Address of the institute collecting the sample. This descriptor should be used only if *Collecting institute code* cannot be filled since the FAO WIEWS code for this institute is not available. Multiple values are separated by a semicolon without space.

2.2 Collecting number [MCPD]

Original identifier assigned by the collector(s) of the sample, normally composed of the name or initials of the collector(s) followed by a number (e.g. 'FM9909'). This identifier is essential for identifying duplicates held in different collections. It should be unique and always accompany subsamples wherever they are sent.

2.3 Collecting date of sample [YYYYMMDD] [MCPD]

Collecting date of the sample where YYYY is the year, MM is the month and DD is the day. Missing data (MM or DD) should be indicated with hyphens or double zero [00].

2.4 Collecting mission identifier [MCPD]

Identifier of the collecting mission used by the *Collecting institute* **2.1** or **2.1.1** (e.g. 'CIATFOR-052', 'CN426').

2.5 Country of origin [MCPD]

Three-letter ISO 3166-1 code of the country in which the sample was originally collected (e.g. landrace, crop wild relative, farmers' variety), bred or selected (breeding lines, GMOs, segregating populations, hybrids, modern cultivars, etc.) should be used.

2.6 Breeding institute code [MCPD]
FAO WIEWS code of the institute that has bred the material. If the holding institute has bred the material, the breeding institute code should be the same as the holding institute code. Follow the *Institute code* **1.2** standard. Multiple values are separated by a semicolon without space.

2.6.1 Breeding institute name [MCPD]
Name of the institute (or person) that bred the material. This descriptor should be used only if BREDCODE cannot be filled because the FAO WIEWS code for this institute is not available. Multiple names are separated by a semicolon without space.

2.7 Location of collecting site [MCPD]
Location information below the country level that describes where the accession was collected, preferably in English. This might include the distance in kilometres and direction from the nearest town, village or map grid reference point (e.g. 7 km south of Recife, in the state of Pernambuco).

Geographical coordinates

- For latitude and longitude descriptors, two alternative formats are proposed, but the one reported by the collecting mission should be used.

- Latitude and longitude in decimal degree format with a precision of four decimal places corresponds to approximately 10 m at the Equator and describes the point-radius representation of the location, along with geodetic datum and coordinate uncertainty in metres.

The following two mutually exclusive formats can be used for latitude and longitude:

2.8 Latitude of collecting site [DDMMSSH] [MCPD]
Degrees (2 digits), minutes (2 digits) and seconds (2 digits) followed by N (North) or S (South) (e.g. 103020S). Every missing digit (minutes or seconds) should be indicated with a hyphen. Leading zeros are required (e.g. 10----S; 011530N; 4531--S).

2.8a Latitude of collecting site [-/+DD.DDDD] [MCPD]
Latitude expressed in decimal degrees. Positive values are North of the Equator; negative values are South of the Equator (e.g. -44.6975).

2.9 Longitude of collecting site [DDDMMSSH] [MCPD]
Degrees (3 digits), minutes (2 digits) and seconds (2 digits) followed by E (East) or W (West) (e.g. 0762510W). Every missing digit (minutes or seconds) should be indicated with a hyphen. Leading zeros are required (e.g. 076 ----W).

2.9a Longitude of collecting site [-/+DDD.DDDD] [MCPD]
Longitude expressed in decimal degrees. Positive values are East of the Greenwich Meridian; negative values are West of the Greenwich Meridian (e.g. +120.9123).

2.10 Coordinate uncertainty [m] [MCPD]
Uncertainty associated with the coordinates in metres. Leave the value empty if the uncertainty is unknown.

2.11 Coordinate *datum* [MCPD]
The geodetic *datum* or spatial reference system upon which the coordinates given in decimal latitude and decimal longitude are based (e.g. WGS84, ETRS89, NAD83). The GPS uses the WGS84 *datum*.

2.12 Georeferencing method [MCPD]
The georeferencing method used (GPS, determined from map, gazetteer, or estimated using software). Leave the value empty if georeferencing method is not known.

2.13 Elevation of collecting site [m asl] [MCPD]
Elevation of collecting site is expressed in metres above sea level. Negative values are allowed.

2.14 Collecting /acquisition source [MCPD]
The coding scheme proposed can be used at 2 different levels of detail: either by using the general codes (in **boldface**) such as 10, 20, 30, 40, etc., or by using the more specific codes, such as 11, 12, etc.

10 Wild habitat
- 11 Forest or woodland
- 12 Shrubland
- 13 Grassland
- 14 Desert or tundra
- 15 Aquatic habitat
- 16 *Restinga*
- 17 Savannah
- 18 Coastal tableland

20 Farm or cultivated habitat
- 21 Field
- 22 Orchard
- 23 Backyard, kitchen or home garden (urban, periurban or rural)
- 24 Fallow land
- 25 Pasture
- 26 Farm store
- 27 Threshing floor
- 28 Park

30 Market or shop
40 Institute, Experimental station, Research organization, Genebank
50 Seed company
60 Weedy, disturbed or ruderal habitat
61 Roadside
62 Field margin
99 Other (elaborate in descriptor **2.27 Remarks**)

2.15 Biological status of accession [MCPD]

The coding scheme proposed can be used at 3 different levels of detail: either by using the general codes (in **boldface**) such as 100, 200, 300, 400, or by using the more specific codes such as 110, 120, etc.

100 Wild
110 Natural
120 Semi-natural/wild
130 Semi-natural/sown
200 Weedy
300 Traditional cultivar/landrace
400 Breeding/research material
410 Breeder's line
411 Synthetic population
412 Hybrid
413 Founder stock/base population
414 Inbred line (parent of hybrid cultivar)
415 Segregating population
416 Clonal selection
420 Genetic stock
421 Mutant (e.g. induced/insertion mutants, tilling populations)
422 Cytogenetic stocks (e.g. chromosome addition/substitution, aneuploids, amphiploids)
423 Other genetic stocks (e.g. mapping populations)
500 Advanced/improved cultivar (conventional breeding methods)
600 GMO (by genetic engineering)
999 Other (elaborate in descriptor **2.27 Remarks**)

2.16 Collecting source environment

Use descriptors **6.1** to **6.2** in section **6**.

2.17 Type of sample collected

Type of material collected. If different types of material have been collected from the same source, each sample (type) should be designated with a unique collecting number and a corresponding unique accession number

1 Vegetative
2 Seed
3 Pollen
4 *In vitro* culture
99 Other (specify which part of the plant is used in descriptor **2.27 Remarks**)

2.18 Number of plants sampled

Appropriate number of plants collected in the field to produce this accession.

2.19 Number of seeds collected

2.20 General appearance of population

Provide a subjective assessment of the general appearance of the population:

3 Poor
5 Medium
7 Good

2.21 Population isolation [km]

Straight line distance between two adjacent collecting sites.

2.22 Estimated age of most plants in the population [y]

2.23 Occurrence of seedlings and juveniles in the area

3 Rare
5 Common
7 Abundant

2.24 Ethnobotanical data

Information on traditional attributes of the sample in place for collecting expeditions (community): uses, methods of preparation, native names, healing properties, cultural beliefs and other characteristics.

2.24.1 Ethnic group

Name of the ethnic group of the donor of the sample or of the people living in the collecting area.

2.24.2 Local vernacular name

Name given by farmer to crop and cultivar/landrace/clone/wild form. State local language or dialect if the ethnic group is not provided.

2.24.2.1 Translation

Provide translation of the local name into English, if possible.

2.24.3 History of plant use

1 Ancestral/indigenous (always associated with the place and community)
2 Introduced (but in unknown distant past)
3 Introduced (time of introduction known)

Traditional knowledge about mangaba

This section includes descriptors for local/traditional knowledge about key characteristics of *Hancornia*, as seen by farmers. Please select the most important.

2.24.4 Main reasons for using mangaba

Indicate why the plant is used, from a local point of view:

1 Cultural/religious characteristics
2 Food security/scarcity
3 Nutritional properties
4 Agronomical characteristics
5 Resistance to abiotic stresses
6 Resistance to biotic stresses
7 Quality traits
8 Market demand

2.24.5 Distinguishing traits used by farmers/extractivists

Select the key traits or characteristics that the farmer/extractivist uses to distinguish one wild form of the same species or closely related species from another.

1 Tree height
2 Crown shape
3 Production per plant
4 Fruit size
5 Colour of mature fruit
6 Fruit shape
7 Fruit flavour
99 Other (specify in descriptor **2.27 Remarks**)

2.24.6 Part(s) of the plant used

1 Fruit
2 Leaf
3 Stem/trunk
4 Latex
5 Seed
99 Other (specify in descriptor **2.27 Remarks**)

Quality traits related to food uses

2.24.7 Organoleptic qualities

Describe particular organoleptic qualities of the fruit. Multiple values are allowed, separated by a semicolon (;).

1 Eating quality
2 Taste, flavour (pungent, sweet, acid, bitter, etc.)
3 Fragrance intensity
4 Flesh texture (firm, juicy, etc.)
99 Other (specify in descriptor **2.27 Remarks**)

2.24.8 Market traits

1 Marketability
2 Transportability (Perishability)
3 Shelf life/storage ability
99 Other (specify in descriptor **2.27 Remarks**)

Socio-economic characteristics

2.24.9 Seed/seedling supply system

1 Formal sector
2 Self harvested
3 Exchanges with relatives, neighbours
4 Exchanges between close villages
5 Local /regional market
6 Wild/naturally occurring

2.24.10 Main use of plant by farmers/extractivists

Multiple values are allowed separated by a semicolon (;).

1 Home consumption (sweets and drinks, animal fodder)
2 For direct sale
3 For sale through intermediary
4 Exchange, neighbour, friends, family
5 Nutraceutical use
6 Industrial
7 Ornamental
8 Latex extraction
9 Wood
99 Other (specify in descriptor **2.27 Remarks**)

2.24.11 Main form of market outlet

1 Local
2 State
3 National
4 Regional
5 International

2.24.12 Cultural characteristics

Is there any folklore associated with the collected material (e.g. taboos, believes, stories and/or superstitions about mangaba)? If so, describe it briefly in descriptor **2.27 Remarks**.

0 No
1 Yes

2.24.13 Prevailing stresses

Information on main associated biotic (pests and diseases) and abiotic (drought, salinity, temperature) stresses.

2.24.14 Mode of reproduction

1 Vegetative
2 Seeds
3 Both

2.24.15 Associated flora

Other dominant crop/or wild plant species, including other mangaba species, found in and around the collecting site.

2.24.16 Seasonality

1 Available only in season/at particular period
2 Available throughout the year

2.25 Photograph

Was/were (a) photograph(s) taken of the sample/specimen or habitat at the time of collecting? If so, provide (an) identification number(s) in the descriptor **2.27 Remarks**.

0 No
1 Yes

2.26 Herbarium specimen

Was a herbarium specimen collected? If so, provide an identification number in descriptor **2.27 Remarks** and indicate in which place (herbarium) the mangaba specimen was deposited.

0 No
1 Yes

2.27 Remarks

Specify here any additional information recorded by the collector or any specific information on descriptors with value “99” or ”999” (=Other).

MANAGEMENT

3. Management descriptors

3.1 Accession number (Passport **1.3**)

3.1.1 Local plant number

This identifies a single plant within a population of plants having the same accession number. It may be any combination of plot identity, row number, or tree position within the row.

3.2 Population identification (Passport **2.2**)

Collecting number, pedigree, cultivar name, etc., depending on the population type.

3.3 Accession location in orchard

Enter separate block designations, row numbers and tree numbers within the row for each duplicate tree of each accession if each tree is not identified with a unique local plant number (see descriptor **3.1.1**).

3.3.1 Block designation

3.3.2 Row number

3.3.3 Tree number within the row

3.4 Storage address

Building, room, shelf number(s), field location where stored/maintained.

3.5 Sowing/planting date [YYYYMMDD]

3.6 Plants/propagules establishment [%]

3.7 Type of germplasm storage [MCPD]

If germplasm is maintained under different types of storage, multiple choices are allowed, separated by a semicolon (e.g. 20;30). [Refer to FAO Genebank Standards for Plant Genetic Resources for Food and Agriculture (2014) for details on storage type].

10 Seed collection
- 11 Short term
- 12 Medium term
- 13 Long term

20 Field collection
30 *In vitro* collection (Slow growth)
40 Cryopreserved collection
50 DNA collection
99 Other (elaborate in **3.10 Remarks**)

3.8 Duplication at other location(s)

0 No
1 Yes

3.8.1 Location of safety duplicates [MCPD]

FAO WIEWS code of the institute(s) where a safety duplicate of the accession is maintained. Multiple values are separated by a semicolon without space. It follows *Institute code*, **1.2**.

3.9 *In vitro* conservation

3.9.1 Type of explant

1 Seed
2 Zygotic embryo
3 Apical or axillary meristem
4 Apical or axillary shoot tip
5 Somatic embryo
6 Callus
7 Cell suspension
99 Other (specify in descriptor **3.10 Remarks**)

3.9.2 Date of introduction *in vitro* [YYYYMMDD]

3.9.3 Type of sub-cultured material

1 Seed
2 Zygotic embryo
3 Apical or auxiliary meristem
4 Apical or auxiliary shoot tip
5 Somatic embryo
6 Callus
7 Cell suspension
99 Other (specify in descriptor **3.10 Remarks**)

3.9.4 Regeneration process

1 Organogenesis
2 Somatic embryogenesis
99 Other (specify in descriptor **3.10 Remarks**)

3.9.5 Number of genotypes introduced *in vitro*

3.9.6 Number of replicates per genotype

3.9.7 Last subculture date [YYYYMMDD]

3.9.8 Medium used at the last subculture

3.9.9 Number of plants at the last subculture

3.9.10 Location after the last subculture

3.9.11 Next subculture date [YYYYMMDD]

3.10 Remarks

Any additional information may be specified here.

4. Multiplication/regeneration descriptors

4.1 Accession number (Passport **1.3**)

4.2 Population identification (Passport **2.2**)

Collecting numbers, pedigree, cultivar name, etc., depending on the population type.

4.3 Field plot number

4.4 Multiplication/regeneration site locations

4.5 Collaborator

4.6 Regeneration year [YYYY]
Year (estimated) when tree should be propagated for regeneration.

4.7 Propagation method
1 Seed
2 Budding
3 Grafting
4 Layering
5 Tissue culture
99 Other (specify in descriptor **4.12 Remarks**)

4.8 Sowing/planting date [YYYYMMDD]

4.9 Cultural practices

4.9.1 Planting density
Number of trees established per hectare.

4.9.2 Fertilizer application
Specify type, doses, frequency of each and method of application.

4.9.3 Irrigation
Specify frequency.

4.10 Previous multiplication and/or regeneration

4.10.1 Location

4.10.2 Plot number

4.10.3 Sowing/planting date [YYYYMMDD]

4.11 Number of times accession regenerated
Since the date of acquisition.

4.12 Remarks
Any additional information may be specified here.

ENVIRONMENT AND SITE

5. Characterization and/or evaluation site descriptors

5.1 Country of characterization and/or evaluation

(See instructions in descriptor **2.5** Country of origin).

5.2 Site (research institute, farm and collection point)

5.2.1 Latitude

(See format under **2.8**).

5.2.2 Longitude

(See format under **2.9**).

5.2.3 Elevation [m asl]

5.2.4 Name and address of farm or institute

(Or description of location if on public land/in forests).

5.2.5 Planting site in the field

Give block, strip and/or row/plot numbers as applicable, plants/plot, replication.

5.3 Evaluator's name and address

5.4 Sowing/grafting/budding/layering date [YYYYMMDD]

5.5 Evaluation environment

Environment in which characterization/evaluation was carried out.

1 Field
2 Screenhouse
3 Greenhouse
4 Laboratory
99 Other (specify in descriptor **5.16 Remarks**)

5.6 Condition of tree

Record the condition of the tree at the time of characterization/evaluation.

1 Dying
2 Old – declining
3 Mature – diseased
4 Mature – non-vigorous
5 Mature – vigorous
6 Young (not yet bearing)
7 Seedling

5.7 Seed germination [%]
Specify number of days over which germination is measured.

5.8 Grafting/budding/layering success [%]
Specify number of days over which the success is recorded. Indicate the rootstock.

5.9 Number of days to planting after budding/layering [d]

5.10 Field establishment [%]
Specify number of days over which establishment is measured.

5.11 Sowing/planting site in the field
Give block, strip and/or row/plot numbers as applicable, plants/plot, replication.

5.12 Field spacing

5.12.1 Distance between trees in a row [m]

5.12.2 Distance between rows [m]

5.13 Fertilizer
Specify types used, doses, frequency of each and method of application.

5.14 Plant protection
Specify pesticides used, doses, frequency of each and method of application.

5.15 Environmental characteristics of site
Use descriptors **6.1.1** to **6.2** in section **6**.

5.16 Remarks
Any other site-specific information.

6. Collecting and/or characterization/evaluation site environment descriptors

6.1 Site environment

6.1.1 Topography

This refers to the profile in elevation of the land surface on a broad scale. (From FAO 1990).

1	Flat	0	-	0,5%
2	Almost flat	0,6	-	2,9%
3	Gently undulating	3	-	5,9%
4	Undulating	6	-	10,9%
5	Rolling	11	-	15,9%
6	Hilly	16	-	30%
7	Steeply dissected	>30%, moderate elevation range		
8	Mountainous	>30%, great elevation range (>300m)		
99	Other (elaborate in descriptor **6.2 Remarks**)			

6.1.2 Higher level landform (general physiographic features)

The landform refers to the shape of the land surface in the area in which the site is located (adapted from FAO 1990).

1 Plain
2 Basin
3 Valley
4 Plateau
5 Upland
6 Hill
7 Mountain

6.1.3 Land element and position

Description of the geomorphology of the immediate surroundings of the site (adapted from FAO 1990). (See Fig. 1).

1	Plain level	17	Interdunal depression
2	Escarpment	18	Mangrove
3	Interfluve	19	Upper slope
4	Valley	20	Midslope
5	Valley floor	21	Lower slope
6	Channel	22	Ridge
7	Levee	23	Beach
8	Terrace	24	Beachridge
9	Floodplain	25	Rounded summit
10	Lagoon	26	Summit
11	Pan	27	Coral atoll
12	Caldera	28	Drainage line (bottom position in flat or almost-flat terrain)
13	Open depression		
14	Closed depression	29	Coral reef
15	Dune	30	Other (specify in appropriate section's Remarks)
16	Longitudinal dune		

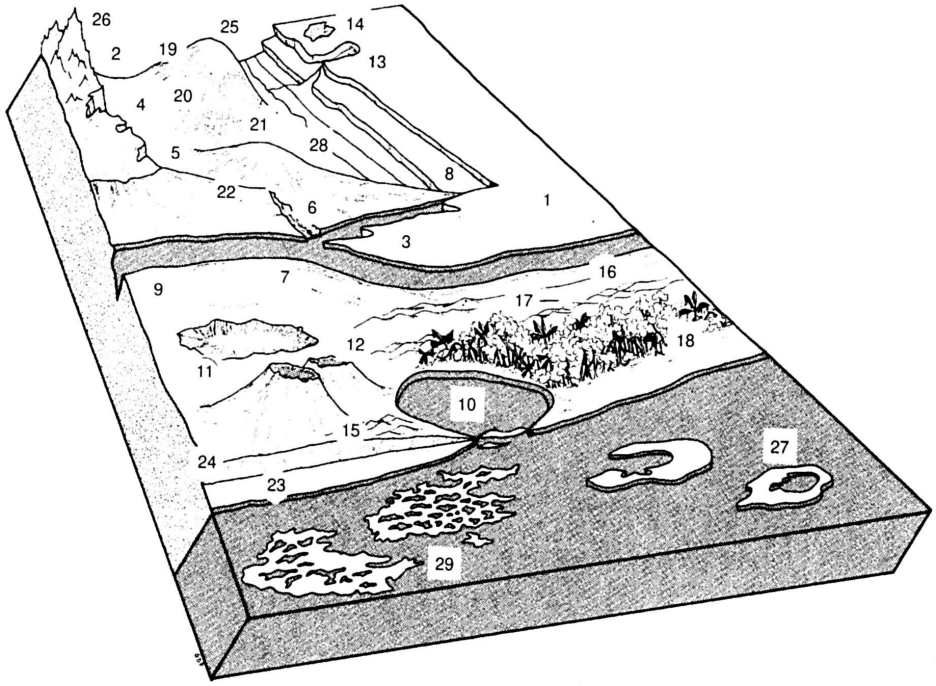


Fig. 1. Land element and position

6.1.4 Slope [°]

Estimated slope of the site.

6.1.5 Slope aspect

The direction the slope faces on which the accession was collected. Describe the direction with symbols N, S, E, W (e.g. a slope that faces a south-western direction has an aspect of SW).

6.1.6 Land use classification

(From FAO, 2006).

6.1.6.1 Crop agriculture (if present)

1 Annual field cropping
2 Perennial field cropping
3 Tree and shrub cropping

6.1.6.2 Mixed farming

1 Agroforestry plot
2 Homegarden
3 Agropastoralism/pasture

6.1.6.3 Forestry

1 Natural forest and woodland
2 Plantation forestry

6.1.6.4 Nature protection

1 Nature and game reserve, National Park
2 Degradation control planting

6.1.6.5 Human Settlement

1 Village
2 Town
3 Other (e.g. 'in industrial area', 'riverside', specify in appropriate descriptor **Remarks**)

6.1.7 Overall natural vegetation surrounding and at the site (if present)

(Adapted from FAO, 2006).

10 Herbaceous
- 11 Grassland
- 12 Forbland

20 Closed forest (continuous tree layer, crowns overlapping, large number of tree and shrub species in distinct layers)

30 Woodland (continuous tree layer, crowns usually not touching, understory may be present)

40 Scrubland

50 Dwarf shrubs

99 Other (specify in appropriate descriptor **Remarks**)

6.1.8 Soil drainage

(Adapted from FAO, 2006).

3 Poorly drained

5 Moderately drained

7 Well drained

6.1.9 Soil matrix colour

(Adapted from FAO, 2006).

The colour of the soil matrix material in the root zone around the accession is recorded in the moist condition (or both dry and moist condition, if possible) using the notation for hue, value and chroma as given in the Munsell Soil Color Charts (Munsell, 1975). If there is no dominant soil matrix colour, the horizon is described as mottled and two or more colours are given and should be registered under uniform conditions. Early morning and late evening readings are not accurate. Provide depth of measurement (cm). If colour chart is not available, the following states may be used:

1 White
2 Red
3 Reddish
4 Yellowish red
5 Brown
6 Brownish
7 Reddish brown
8 Yellowish brown
9 Yellow
10 Reddish yellow
11 Greenish, green
12 Grey
13 Greyish
14 Blue
15 Bluish-black
16 Black

6.1.10 Soil texture classes

(Adapted from FAO, 2006). For convenience in determining the texture classes of the following list, particle size classes are given for each of the fine earth fractions listed below. (See Fig. 2.).

1 Clay
2 Loam
3 Clay loam
4 Silt
5 Silt clay
6 Silt clay loam
7 Silt loam
8 Sandy clay
9 Sandy clay loam
10 Sandy loam
11 Loamy sand
12 Sand (unspecified)

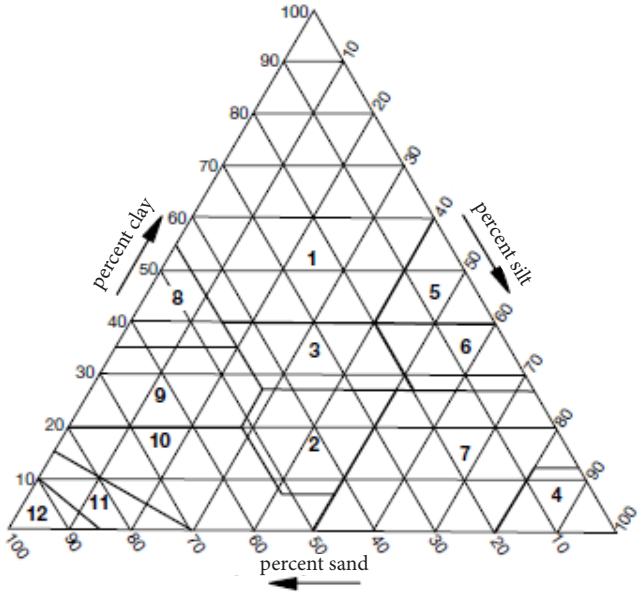


Fig. 2. Soil texture classes (adapted from FAO, 2006)

6.1.11 Soil organic matter content

1 Nil (as in arid zones)
2 Low (as in long-term cultivation in a tropical setting)
3 Medium (as in recently cultivated but not yet much depleted)
4 High (as in never cultivated, and in recently cleared forest)
5 Peaty

6.1.12 Water availability

1 Rainfed
2 Irrigated
3 Flooded
4 River banks
5 Sea coast
99 Other (specify in appropriate descriptor **Remarks**)

6.1.13 Soil fertility

General assessment of the soil fertility based on existing vegetation.

3 Low
5 Moderate
7 High

6.1.14 Climate of the site

Should be assessed as close to the site as possible.

6.1.14.1 Temperature [°C]

Provide either the monthly or the annual mean.

6.1.14.1.1 Number of recorded years [y]

6.1.14.2 Duration of the dry season [d]

6.1.14.3 Rainfall [mm]

Provide either the monthly or the annual mean (state number of recorded years).

6.1.14.3.1 Number of recorded years [y]

6.2 Remarks

Provide here any additional information related to the site (i.e. if data collected refers to collecting or to characterization/evaluation sites).

CHARACTERIZATION

7. Plant descriptors

List of minimum highly discriminating descriptors for mangaba

Descriptor Number	Descriptor Name
Characterization	
7.1.3	Crown shape
7.1.7	Tree growth habit
7.1.8	Branch pubescence
7.2.1	Leaf shape
7.2.3	Leaf lenght [cm]
7.2.4	Leaf width [cm]
7.2.5	Leaf pubescence
7.2.6	Petiole lenght [mm]
7.2.7	Leaf texture
7.4.4	Fruit weight [g]
7.4.5	Colour of fruit skin
7.4.6	Fruit taste
Evaluation	
8.2.1	Number of years from planting to first fructification [y]
8.4.1	Fruit content of total soluble solids –TSS [%]
8.4.2	Fruit total titratable acidity – TTA [g of citric acid/100 g FW]
8.4.3	Fruit ratio TSS/TTA
8.4.6.1	Protein content [g/100 g FW]
8.4.6.2	Calcium content [g/100 g FW]
8.4.6.3	Potassium content [g/100 g FW]
8.4.6.4	Ascorbic acid content [g/100 g FW]
8.4.6.5	Magnesium content [g/100 g FW]
8.4.6.6	Iron content [g/100 g FW]
8.4.6.7	Zinc content [g/100 g FW]
8.4.6.8	β carotene content [g/100 g FW]
8.5	Yield per tree [kg/year]

7.1 Tree descriptors

Randomly select five trees and record the average.

7.1.1 **Crown diameter** [m]

Measured in two directions.

7.1.2 **Plant height** [m]

Measured from ground level to the top of tree.

7.1.3 **Crown shape**

See Fig. 3

1 Pyramidal
2 Oblong
3 Spherical
4 Broadly roundish
5 Irregular
99 Other (specify in descriptor in **7.6 Remarks**)

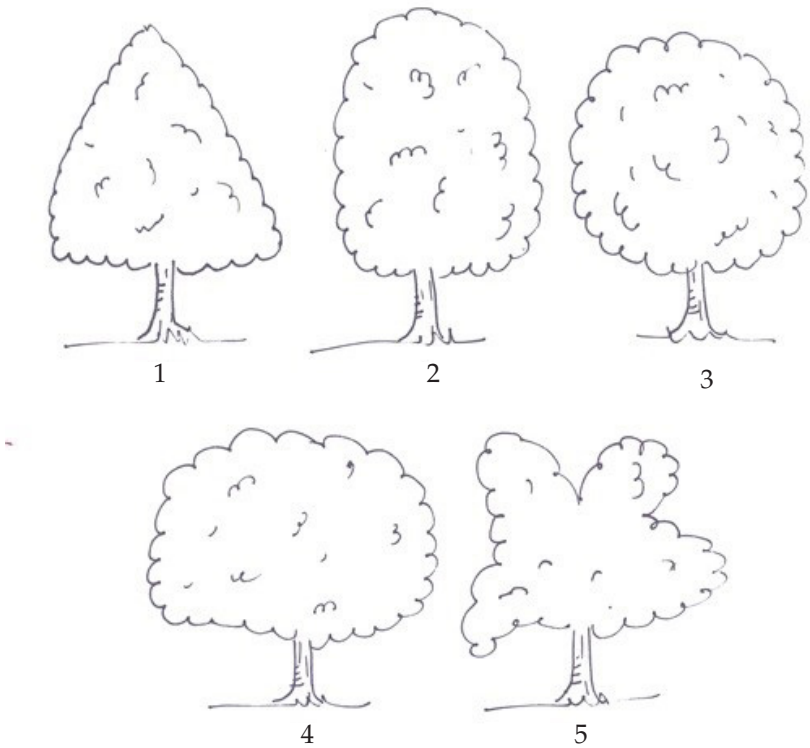


Fig. 3. Crown shape

7.1.4 Trunk surface

3 Smooth
7 Rough
8 Very rough

7.1.5 Trunk circumference [m]

Measured at 30 cm of ground level or 10 cm of line grafting.

7.1.6 Branching pattern

See Fig. 4.

3 Sparse
5 Medium
7 Dense

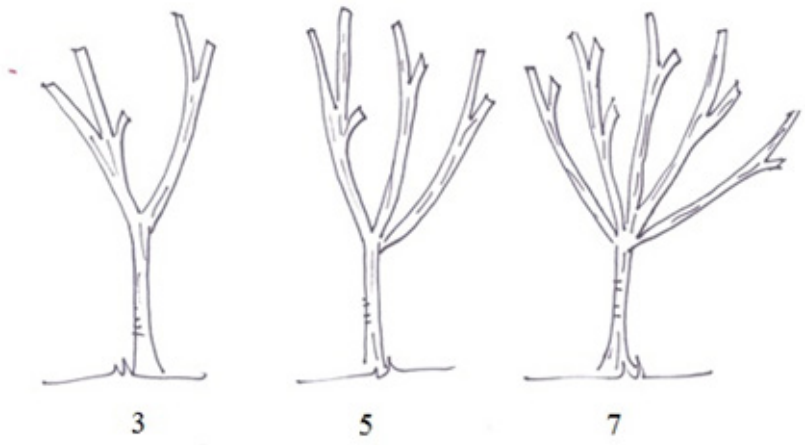


Fig. 4. Branching pattern

7.1.7 Tree growth habit

See Fig. 5.

1 Erect
2 Semi erect
3 Horizontal
4 Irregular
5 Dropping

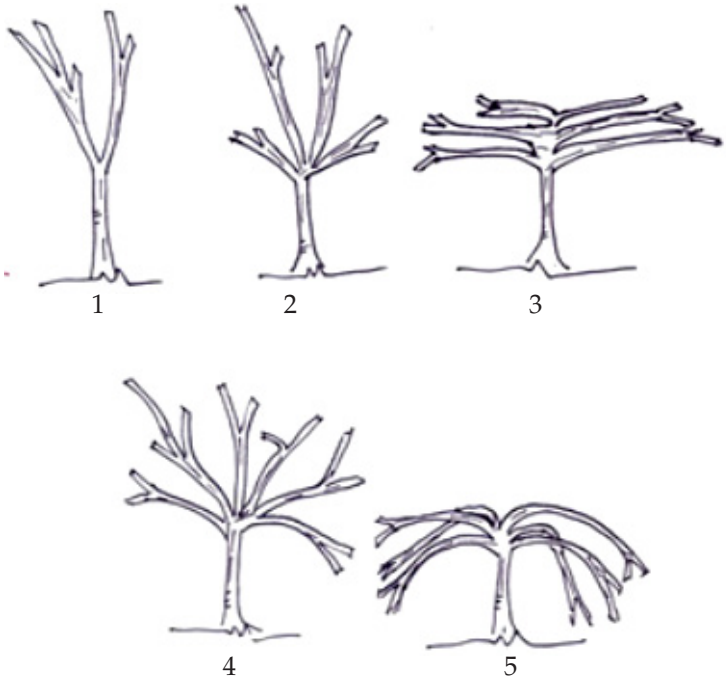


Fig. 5. Tree growth habit

7.1.8	Branch pubescence

0 Absent
1 Present

7.2 Leaf

Randomly select 10 leaves and record the average.

7.2.1	Leaf shape

See Fig. 6.

1 Ovate
2 Oblong
3 Elliptical
4 Lanceolate
5 Obovate
99 Other (specify in descriptor in **7.6 Remarks**)

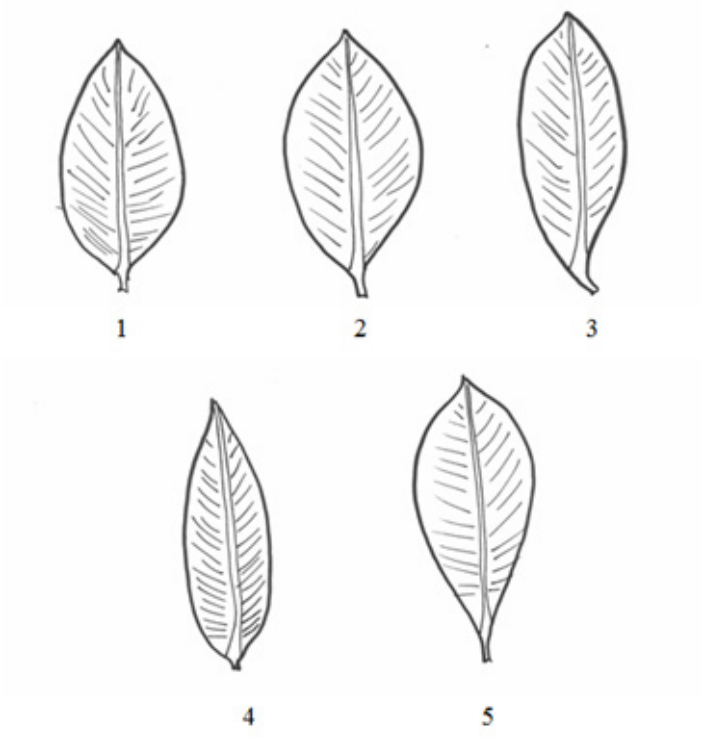


Fig. 6. Leaf shape

7.2.2 Leaflet base shape

See Fig. 7.

1 Acute
2 Obtuse
3 Truncate
99 Other (specify in descriptor in **7.6 Remarks**)

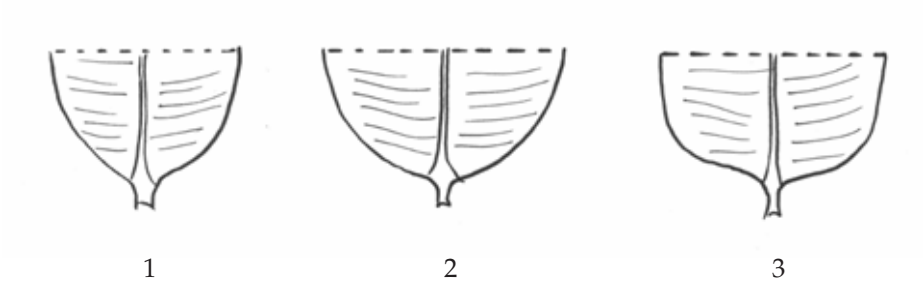


Fig. 7. Leaflet base shape

7.2.3 Leaf length [cm]

7.2.4 Leaf width [cm]

7.2.5 Leaf pubescence

0 Absent
1 Scarce
5 Intermediate
7 Dense

7.2.6 Petiole length [mm]

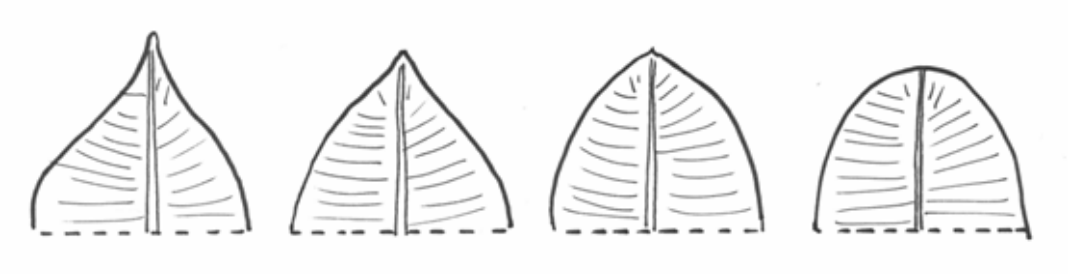
7.2.7 Leaf texture

1 Coriaceous
2 Semi-coriaceous
3 Smooth

7.2.8 Leaflet apex shape

See Fig. 8.

1 Acuminate
2 Acute
3 Obtuse
4 Rounded
99 Other (specify in descriptor in **7.6 Remarks**)



1 2 3 4

Fig. 8. Leaflet apex shape

7.3 Flower

7.3.1 Position of flower

1 Terminal
2 Subterminal
3 Axillary
99 Other (specify in descriptor in **7.6 Remarks**)

7.3.2 Sepal pubescence

0 Absent
3 Scarce
5 Intermediate
7 Dense

7.4 Fruit

For all fruit descriptors record the average of 20 randomly selected mature and healthy fruits per plant

7.4.1 Fruit shape

See Fig. 9.

1 Oblong
2 Spheroid
3 Ovoid
99 Other (specify in descriptor in **7.6 Remarks**)

1 2 3

Fig. 9. Fruit shape

7.4.2 Fruit lenght [mm]

7.4.3 Fruit diameter [mm]

7.4.4 Fruit weight [g]

7.4.5 Colour of fruit skin

1 Yellow
2 Light green
3 Green
4 Red
99 Other (specify in descriptor in **7.6 Remarks**)

7.4.6 Fruit taste

1 Sweet
2 Sweet-acid
3 Acid
99 Other (specify in descriptor in **7.6 Remarks**)

7.5 Seed

7.5.1 Total number of seeds per fruit

7.5.2 Number of viable seeds per fruit

7.5.3 Weight of seeds per fruit [g]

7.6 Remarks

Specify any additional information here.

EVALUATION

8. Tree descriptors

8.1 Flowering

8.1.1 Number of years between planting and first flowering [y]

8.1.2 Flowering season

8.1.2.1 Start of flowering period [YYYYMMDD]

8.1.2.2 End of flowering period [YYYYMMDD]

8.1.3 Secondary flowering

0 Absent
1 Present

8.1.4 Falling leaves

8.1.4.1 Season

Indicate in which season leaves fall.

1 Autumn
2 Winter
3 Spring
4 Summer

8.1.4.2 Type

3 Partial
7 Complete

8.2 Fruiting

8.2.1 Number of years from planting to first fructification [y]

8.2.2 Number of days from flowering to fruit ripening [d]

8.2.3 Harvest season

8.2.3.1 Start of fruiting period [YYYYMMDD]

8.2.3.2 **End of fruiting period** [YYYYMMDD]

8.3 Composition of the fruit

8.3.1 **Percentage of fruit peel** [%]

8.3.2 **Percentage of fruit pulp** [%]

8.3.3 **Percentage of seed in the fruit** [%]

8.4 Chemical and nutritional characteristics of the fruit

8.4.1 **Fruit content of total soluble solids –TSS** [%]

8.4.2 **Fruit total titratable acidity – TTA** [g of citric acid/100 g FW]

8.4.3 **Fruit ratio TSS/TTA**

8.4.4 **Fruit pH**

8.4.5 **Reducers sugars and total in fruit** [g/100g FW]

8.4.6 **Nutritional content of the ripening fruit**

8.4.6.1 **Protein content** [g/100 g FW]

8.4.6.2 **Calcium content** [g/100 g FW]

8.4.6.3 **Potassium content** [g/100 g FW]

8.4.6.4 **Ascorbic acid content** [g/100 g]

8.4.6.5 **Magnesium content** [g/100 g FW]

8.4.6.6 **Iron content** [g/100 g FW]

8.4.6.7 **Zinc content** [g/100 g FW]

8.4.6.8 **β carotene content** [g/100 g FW]

8.5 Yield per tree [kg/year]

8.6 Number of fruits per tree/year

8.7 Production behavior

1 Continuous
2 Alternate
3 Erratic

8.8 Remarks

Specify any additional information here.

9. Abiotic stress susceptibility

Scored under artificial and/or natural conditions, which should be clearly specified. These are coded on a susceptibility scale from 1 to 9, viz.:

1 Very low or no visible sign of susceptibility
3 Low
5 Intermediate
7 High
9 Very high

9.1 Reaction to low temperature

9.2 Reaction to high temperature

9.3 Reaction to shading

9.4 Reaction to drought

9.5 Remarks

Specify any additional information here (i.e. elevation, absence of direct sunlight, lightning storm, very dry soil, etc.).

10. Biotic stress susceptibility

In each case, it is important to state the origin of the infestation or infection, i.e. natural, field inoculation, laboratory. Record such information in descriptor **10.3 Remarks**. These are coded on a susceptibility scale from 1 to 9, viz.:

1 Very low or no visible signs of susceptibility
3 Low
5 Intermediate
7 High
9 Very high

10.1 Pests

	Causal Organism	Common name
10.1.1	*Aphis gossypii*	Green-aphid, Pulgão-verde
10.1.2	*Toxoptera citricida*	Black-aphid, Pulgão-preto
10.1.3	*Atta* spp.	Leafcutter ant, Formiga-cortadeira
10.1.4	Other (specify in **10.3. Remarks**)	

10.2 Diseases

	Causal Organism	Common name
10.2.1	*Colletotrichum gloeosporioides*	Anthracnose, antracnose
10.2.2	*Cylindrocladium clavatum* and *Fusarium solani*	Roots rot, podridões de raízes
10.2.3	*Mycosphaerella discophora* var. *macrospora*/ *Pseudocercospora* sp.	Brown spot, leaf spot, mancha parda, mancha púrpura, mancha foliar
10.2.4	*Sclerotium rolfsii*	Stem rot, podridão aquosa, podridão do colo
10.2.5	*Lasiodiplodia theobromae*	Dry branches, morte descendente, seca ramos

10.3 Remarks

Specify any additional information here.

11. Biochemical markers

Specify methods used and cite reference(s). Refer to *Descriptors for genetic marker technologies*, available in PDF format from Bioversity International web site (http://www.bioversityinternational.org/) or by email request to bioversityinternational-publications@cgiar.org.

12. Molecular markers

Refer to *Descriptors for genetic marker technologies*, available in PDF format from Bioversity International web site (http://www.bioversityinternational.org/) or by email request to bioversityinternational-publications@cgiar.org.

13. Cytological characters

13.1 Chromosome number

13.2 Ploidy level

13.3 Other cytological characters

14. Identified genes

Describe any known specific mutant present in the accession.

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Ms Adriana Alercia supervised and managed the production and publication and provided technical expertise. Ms Ana Laura Cerutti provided support during text development and layout processes. Dr. Ana da Silva Lédo prepared the illustrations used in the characterization of the plant.

Annex I. COLLECTING FORM for mangaba

==========

SAMPLE IDENTIFICATION

COLLECTING INSTITUTE CODE (2.1):

COLLECTING NUMBER (2.2):

PHOTOGRAPH No. (2.25): HERBARIUM SPECIMEN (2.26):

COLLECTING DATE OF SAMPLE [YYYYMMDD] (2.3):

GENUS (1.7): SPECIES (1.8): SUBTAXON (1.9):
COMMON TREE/CROP NAME (1.11.3):

==========

COLLECTING SITE LOCATION

COUNTRY OF ORIGIN (2.5):

LOCATION (2.7): km: direction: from:

LATITUDE (2.8): LONGITUDE (2.9): ELEVATION (2.13): m asl

Additional notes:

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COLLECTING SITE ENVIRONMENT

COLLECTING/ACQUISITION SOURCE (2.14):
10. Wild habitat
20. Farm or cultivated habitat
30. Market or shop
40. Institute, Experimental station, Research Org., Genebank
50. Seed company
60. Weedy, disturbed or ruderal habitat
99. Other (specify):

HIGHER LEVEL LANDFORM (6.1.2):
1. Plain 2. Basin 3. Valley 4. Plateau
5. Upland 6. Hill 7. Mountain

SLOPE [°] (6.1.4): SLOPE ASPECT (6.1.5): (code N,S,E,W)

OVERALL NATURAL VEGETATION SURROUNDING AND AT THE SITE (IF PRESENT) (6.1.7):
11. Grassland 12. Forbland 20. Closed forest 30. Woodland
40. Scrubland 50. Dwarf shrubs 99. Other (specify):

SOIL DRAINAGE (6.1.8):
3. Poorly drained 5. Moderately drained 7. Well drained

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SAMPLE

BIOLOGICAL STATUS OF ACCESSION (2.15):
100. Wild
200. Weedy
300. Traditional cultivar/landrace
400. Breeding/research material
500. Advanced/improved cultivar (conventional breeding)
600. GMO (by genetic engineering)
999. Other (specify):

TYPE OF SAMPLE COLLECTED (2.17):
1. Vegetative 2. Seed 3. Pollen 4. *In vitro* culture 99. Other (specify):

No. PLANTS SAMPLED (2.18): No. SEEDS COLLECTED (2.19):

GENERAL APPEARANCE OF POPULATION (2.20):
3. Poor 5. Medium 7. Good

POPULATION ISOLATION (2.21) [km]

PREVAILING STRESSES (2.24.13):
Information on main associated biotic (pests and diseases) and abiotic (drought, salinity, temperature) stresses

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ETHNOBOTANICAL DATA

LOCAL/VERNACULAR NAME (2.24.2):

ETHNIC GROUP (2.24.1):

HISTORY OF PLANT USE (2.24.3):
1. Ancestral/indigenous (always associated with the place and community)
2. Introduced (but in unknown distant past) 3. Introduced (time of introduction known)

PARTS OF THE PLANT USED (2.24.6):
1. Fruit 2. Leaf 3. Stem/Trunk
4. Latex 5. Seed 99. Other (specify):

PLANT USE (2.24.10):
1. Home consumption 2. For direct sale 3. For sale through intermediary etc.
4. Exchange, neighbour, friends, family 5. Nutraceutical use 6. Industrial
7. Ornamental 8. Latex extraction
99. Other (specify):

CULTURAL CHARACTERISTICS (2.24.12): Mention if there is any folklore (i.e., taboos, stories and/or superstitions)
0. No 1. Yes: specify in REMARKS (2.27)

Start of flowering period [YYYYMMDD] (8.1.2.1):

End of flowering period [YYYYMMDD] (8.1.2.2):

Start of fruiting period [YYYYMMDD] (8.2.3.1):

End of fruit ripening [YYYYMMDD] (8.2.3.2):

MODE OF REPRODUCTION (2.24.14):
1. Vegetative 2. Seeds 3. Both

SEASONALITY (2.24.16):
1. Available only in season/at particular period 2. Available throughout the year

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ASSOCIATED FLORA (2.24.15):
Other dominant crop/or wild plant species, including other *Hancornia* botanical varieties, found in and around the collecting site

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REMARKS (2.27):

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