Descriptors for
Coconut

(*Cocos nucifera* L.)

International Plant Genetic Resources Institute

IPGRI

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CONTENTS

PREFACE

Descriptors for coconut (*Cocos nucifera* **L.**) is a complete revision of the descriptor list given in Appendix V of *Coconut Genetic Resources*, 1978 (AGPE/IBPGR/78/4), which was the second IBPGR consultation held by IBPGR on coconut genetic resources. It was prepared in the IBPGR standard format by the Breeding Section of the National Coconut Development Programme, Tanzania and reviewed by the participants of the International Workshop on Coconut Genetic Resources, held at Cipanas, Indonesia from 8-11th October 1991 (see Contributors). It was subsequently revised by scientists participating in the International Database on Coconut Genetic Resources, held at Montpellier, France, from 19-23 May, 1992 (see Contributors).

The 250th anniversary of the publication of the first of sixteen volumes of *Herbarium Amboinense* by G.E. Rumphius (1628-1702) was celebrated in 1991. The first four chapters of the first volume contain coconut descriptors which are identifiable as some descriptors utilized today.

IBPGR encourages the collection of data on the first four categories of this list: 1. Accession; 2. Collection; 3. and 4. Characterization and Preliminary Evaluation. IBPGR endorses the information in categories 1-4 as the minimum that ideally should be available for any one accession. Other descriptors are given in categories 5 onwards that will enable the simple encoding of further characterization and evaluation data and which can serve as examples for the creation of additional descriptors in the IBPGR format by any user. An additional category of management descriptors is intended for curators of germplasm collections, as guidelines for management of accessions in medium- and long-term storage, as well as for multiplication/regeneration.

Although the suggested coding should not be regarded as the definitive scheme, this format has the full backing of IBPGR and is promoted worldwide. The descriptor list given here is intended to be comprehensive with regard to the scope of descriptors that it contains. This approach is to assist with the standardization of descriptor definitions for all descriptors. IBPGR does not, however assume that each collection will characterize accessions of their collection utilizing all descriptors given. Descriptors should be used when they are useful to the curator and the users of the collections genetic resources.

This descriptor list provides an international format and thereby produces a universally understood 'language' for all plant genetic resources data. The adoption of this scheme for all data encoding, or at least the production of a transformation method to convert other schemes to the IBPGR format, will produce a rapid, reliable, and efficient means for information storage, retrieval, and communication. This will greatly assist the utilization of germplasm throughout the international plant genetic resources network. It is recommended, therefore, that information should be produced by closely following the descriptor list with regard to: ordering and numbering descriptors; using the descriptors specified; and using the descriptor states recommended.

Any suggestions for modifications will be welcomed by IBPGR.

DEFINITIONS AND USE OF THE DESCRIPTORS

IBPGR now uses the following definitions in genetic resources documentation:

(i)   passport (accession identifiers and information recorded by collectors);

(ii)   characterization (consists of recording those characters which are highly heritable, can be easily seen by the eye and are expressed in all environments);

(iii)   preliminary evaluation (consists of recording a limited number of additional traits thought desirable by a consensus of users of the particular crop);

(iv)   further evaluation (consists of recording a number of additional descriptors thought to be useful in crop improvement);

(v)   management (information indispensable for management of accessions in medium- and long-term storage as well as for multiplication/regeneration).

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

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

(a)   the SI system of measurements is used. The units to be applied are given in square brackets following the descriptor;

(b)   many quantitative characters which are continuously variable are recorded on a 1-9 scale, where:

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

is the expression of a character. If the character is not expressed, '0' should be recorded (see also (e)). 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 8 (Biotic stress susceptibility) 1 = very low susceptibility and 8 = high to very high susceptibility;

(c)   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, or where the descriptor is discontinuous up to three codes in the order of frequency can be recorded;

(d)   absence/presence of characters are scored as:

> 0   Absent
> +   Present

(e)   when the descriptor is inapplicable, '0' is used as the descriptor value, e.g. if an accession does not have a central leaf lobe, '0' would be scored for the following descriptor:

> <u>Shape of central leaf lobe</u>
>
> 3   Toothed
> 5   Elliptic
> 7   Linear

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

(g)   standard colour charts, e.g. Royal Horticultural Society Colour Chart, Methuen Handbook of Colour, 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 the it is used);

(h)   dates should be expressed numerically in the format DDMMYYYY, where

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

PASSPORT

1. ACCESSION DATA

1.1   ACCESSION NUMBER

This number serves as a unique identifier for accessions and is assigned when an accession is entered into the collection. Once assigned this number should never be reassigned to another accession in the collection. Even if an accession is lost, its assigned number is still not available for re-use. Letters should be used before the number to identify the genebank or national system (e.g. MG indicates an accession from the genebank at Bari, Italy, PI indicates an accession within the USA system)

1.2   DONOR NAME

Name of institution or individual responsible for donating the germplasm

1.3   DONOR NUMBER

Number assigned to accession by the donor. This may be the donor collection accession number, a pollination number or other number

1.4   FEMALE PARENT ACCESSION NUMBER

1.5   MALE PARENT ACCESSION NUMBER

1.6   OTHER NUMBER(S) ASSOCIATED WITH THE ACCESSION

Any other identification numbers known to exist in other collections for this accession, e.g. USDA Plant Inventory number (not COLLECTOR'S NUMBER, see 2.3). Other numbers can be added as 1.6.3, etc.

1.6.1 <u>Other number 1</u>

1.6.2 <u>Other number 2</u>

1.7   SCIENTIFIC NAME (*Cocos nucifera* L.)

1.7.1 <u>Category</u> (= 'Type')

1   Tall *(typica)*
2   Dwarf *(nana)*
3   Hybrid
4   Other (specify in the NOTES descriptor, 1.18)

1.7.2 <u>Colour name generally applied to the accession</u>

Use colour chart if possible. Give chart name and colour code

1   Yellow
2   Yellow-Red
3   Red-Yellow
4   Red
5   Red-Green
6   Green-Red
7   Green
8   Green-Yellow
9   Yellow-Green
10   Red-yellow-green (brown)
11   Other (specify in the NOTES descriptor, 1.18)

1.8   CULTIVAR NAME

Either a registered or other formal cultivar designation given to the accession (see the International Coconut Cultivar Registration Authority (ICCRA) checklist of coconut cultivar names)

1.8.1 <u>Translation/transliteration</u>

1.8.2 <u>Synonyms</u>

1.8.3 <u>Accepted abbreviation</u>

1.9   NUMBER OF TREES IN FEMALE PARENT POPULATION

1.10   NUMBER OF TREES FROM FEMALE PARENT POPULATION REPRESENTED BY SAMPLE

1.11   NUMBER OF TREES IN MALE PARENT POPULATION

1.12   NUMBER OF TREES FROM MALE PARENT POPULATION REPRESENTED BY SAMPLE

1.13   ACQUISITION DATE

Date on which the accession entered the collection (in the format DDMMYYYY)

1.14   POLLINATION GROUP

      1   Predominantly self-pollinated (generally dwarfed)
      2   Intermediate
      3   Predominantly out-crossing (generally tall varieties)

1.15   TYPE OF MATERIAL RECEIVED

      1   Zygotic embryos
      2   Seednuts
      3   Plants (including seedlings)
      4   Somatic tissue
      5   Pollen

1.16   ACCESSION SIZE

Exact number of nuts, plants, cultures or weight of pollen in the genebank

1.17   TYPE OF MAINTENANCE

      1   Field planting
      2   Cryopreservation (embryos)
      3   Lyophilized (freeze dried) (pollen)
      4   Tissue or embryo culture
      5   Other or other combination between 1-4 (specify in the NOTES descriptor, 1.18)

1.18   NOTES

Any additional information may be specified here

2. COLLECTION DATA

2.1 COLLECTING INSTITUTE(S)

Institute(s) and people collecting/sponsoring the sample collection

2.2 SITE NUMBER

Number assigned to the physical site by the collector

2.3 COLLECTOR'S NUMBER

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

2.4 COLLECTION DATE OF ORIGINAL SAMPLE

(in the format DDMMYYYY)

2.5 COUNTRY OF COLLECTION

Name of the country in which the sample was collected or was bred. Use three letter abbreviations adopted by the Statistical Office of the United Nations. Copies of these are available from IBPGR Headquarters and have been published in the FAO/IBPGR *Plant Genetic Resources Newsletter,* number 49 (March, 1982)

2.6 PROVINCE/STATE

Name of the primary administrative subdivision of the country in which the sample was collected

2.7 DEPARTMENT/COUNTY

Name of the secondary administrative subdivision (within a Province/State) of the country in which the sample was collected

2.8   COLLECTION SITE

Distance in kilometers and direction from the nearest town, village or map grid reference point (e.g. CURITIBA 7S means 7 km south of Curitiba) and the name of the farm or other location and the farmer or other individual on whose land the sample was collected

2.9   LATITUDE OF COLLECTION SITE

Degrees and minutes followed by N (North) or S (South) (e.g. 01030S)

2.10 LONGITUDE OF COLLECTION SITE

Degrees and minutes followed by E (East) or W (West) (e.g. 07625W)

2.11 PARENT POPULATION

2.11.1 <u>Origin of population to be sampled</u>

    1   Known (give details in the NOTES descriptor, 2.38)
    2   Presumed (give authority in the NOTES descriptor, 2.38)
    3   Unknown

2.11.2 <u>Generation structure</u>

    1   All palms uniform age
    2   Parents and progeny generations mixed in population

2.11.3 <u>Age estimate of parent material</u>

Specify the age, in years, of the population

2.11.4 Collection source

1 Wild (never cultivated)
2 Domestic (garden/houseyard)
3 Small farm field
4 Large farm field
5 Nursery
6 Farm heap
7 Backyard heap or cultivation
8 Market heap
9 Research organization (advanced cultivar)
10 Other (specify in the descriptor COLLECTOR'S NOTES, 2.38)

2.12 ADJACENT PALM STATUS

If there are other palms in the area of the sampled population, indicate if these were likely to act as pollinators

1 Proximity (include older/younger non-sampled palms above/below the sampled palms)
2 Type (same/different. If different, specify type in the descriptor COLLECTOR'S NOTES, 2.38)

2.13 COLLECTION PROCEDURE

1 Harvested after controlled pollination (both parents known)
2 Harvested after open pollination (one parent known)
3 Picked up below palm (seed parent assumed)
4 Taken from heap (population assumed)

2.14 SAMPLING PROCEDURE

1 Random
2 Biased (provide details in the descriptor COLLECTOR'S NOTES, 2.38)

2.15 STATUS OF SAMPLE

1 Wild
2 Breeding/research material
3 Landrace
4 Advanced cultivar
5 Other (specify in the descriptor COLLECTOR'S NOTES, 2.38)

2.16 GENERAL APPEARANCE OF THE POPULATION

Provide a subjective assessment of the general appearance of the population

3 Poor
5 Medium
7 Good

2.17 POLLEN SOURCE

1 Isolated individual inflorescences
2 Bulked individual inflorescences
3 Non-isolated inflorescences

2.18 EMBRYO CULTURE STATUS

1 Embryo culture used for growth only
2 Embryo culture used for transport and growth
3 Embryo culture used for medium-term storage
4 Embryo culture used for cryopreservation

2.19 TISSUE CULTURE STATUS

1 Material produced using zygotic embryo culture
2 Material produced using somatic embryo culture

2.20 SEEDLING AGE [yr]

If seedling is taken, provide age at time of selection, indicate if this is an exact age or an estimate

2.21 MATURITY OF SEEDNUTS/EMBRYOS

If material is not a seedling or pollen, provide number of days of delay or storage period between harvest and selection

1 Fully mature (fruit colour change)
2 Early mature (before colour change)
3 Late mature (after colour change)
4 Or give exact age from controlled pollination

2.22   SIZE OF THE POPULATION

Specify number of palms or area that palms occupy. Indicate if exact or estimated measurement has been made

2.23   PLANT POPULATION DENSITY

Quantify palms by hectare

2.24   NUMBER OF PALM TREES SAMPLED IN THE POPULATION

Number of palms sampled in population. If estimated provide method used (i) row by column count; (ii) area by plant density; for both, allow for missing stands

2.25   TOTAL NUMBER OF SEEDNUTS, PLANTLETS OR EMBRYOS COLLECTED

2.26   TOTAL WEIGHT OF POLLEN COLLECTED [g]

2.27   CROPPING SYSTEM AND ASSOCIATED FLORA

> 1   Pure stand (clean weeded)
> 2   Pure stand (weeds)
> 3   Pure stand (with planted cover)
> 4   Intercropped (specify crop(s) in the descriptor COLLECTOR'S NOTES, 2.38)

2.28   CULTIVATION STATUS

> 1   Uncultivated
> 2   Low input
> 3   Intensive

2.29   LOCAL/VERNACULAR NAME

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

2.30 USES OF THE SOURCE POPULATION

 1 Oil (or copra)
 2 Edible nuts (specify if cooked or raw)
 3 Fibre/cocopeat
 4 Biomass
 5 Tender/jelly/water
 6 Ornamental
 7 Medicinal
 8 Sap product (toddy/sugar)
 9 Wood
 10 Other (specify in the descriptor COLLECTOR'S NOTES, 2.38)

2.31 SPECIAL BOTANICAL CHARACTERISTICS OF THE POPULATION

Record the following five descriptors on a 1-9 scale, where

 3 Low frequency
 5 Medium
 7 High frequency

2.31.1 Spicata

2.31.2 Plicata

2.31.3 Androgena

2.31.4 Makapuno

2.31.5 Other (frequency of other special characters, give character and value in the descriptor COLLECTOR'S NOTES, 2.38)

2.32 OVERALL APPEARANCE/SHAPE OF CROWN OF PARENT TREE

See Fig. 1

 1 Spherical
 2 Hemispherical
 3 X-shaped 'silhouette'
 4 V-shaped
 5 Other (specify in the descriptor COLLECTOR'S NOTES, 2.38)

1 Spherical

2 Hemispherical

3 X-shaped 'silhouette'

4 V-shaped
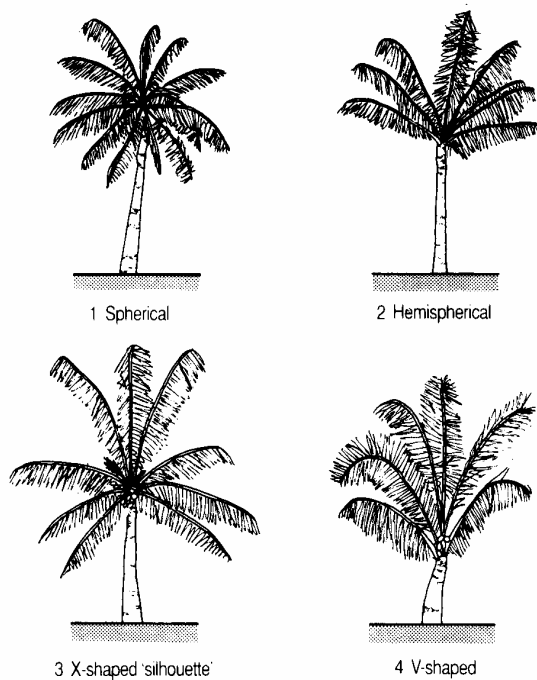
Fig. 1 Overall appearance/shape of crown of parent tree

2.33 FRUIT COMPONENT ANALYSIS (FCA)

Measure 50 palms per accession over a 4 year timespan, one analysis should be performed per harvest round, ensuring that 24 nuts/year/palm are measured

2.33.1 <u>Fruit weight</u> [g]

With husk

2.33.2 <u>Nut weight</u> [g]

Without husk

2.33.3 <u>Shell and meat weight</u> [g]

Without water

2.33.4 <u>Meat or shell weight</u> [g]

Specify which (either meat or shell) is measured

2.34 PHOTOGRAPH

Was a photograph(s) taken of the accession or habitat at the time of collection? If so, provide an identification number(s) in the descriptor COLLECTOR'S NOTES, 2.38

    0   No
    +   Yes

2.34.1 Fruit section photograph

Was a fruit section photograph taken? If so, provide an identification number in the descriptor COLLECTOR'S NOTES, 2.38

    0   No
    +   Yes

2.35 COLLECTION SOURCE ENVIRONMENT

2.35.1 Agricultural potential

Subjective assessment of the agricultural potential of the source location

    3   Low
    5   Medium
    7   High

Further descriptors on the Collection Source Environment (2.35.2 -2.35.24) are presented in Appendix I. These are not numbered in the Appendix in this manner, but should be for this section. This has been done in order to reduce the repetition of descriptors in Sections 2, 3 and 5

2.36 HERBARIUM SPECIMEN

Was a herbarium specimen collected? If so, provide an identification number in the descriptor COLLECTOR'S NOTES, 2.38

    0   No
    +   Yes

2.37 PREVAILING STRESSES

Information on associated biotic and abiotic stresses. Indicate if disease indexing was done at time of collection

2.38 COLLECTOR'S NOTES

Additional information recorded by the collector or any specific information on any state in any of the above descriptors

CHARACTERIZATION AND PRELIMINARY EVALUATION

3. SITE DATA

3.1 COUNTRY

(See instructions in COUNTRY OF COLLECTION, 2.5)

3.2 SITE (RESEARCH INSTITUTE)

3.2.1 Site number

3.2.2 Latitude

(See format under 2.9)

3.2.3 Longitude

(See format under 2.10)

3.2.4 Name of farm or institute

3.3 EVALUATOR'S NAME AND ADDRESS

3.4 EVALUATION ENVIRONMENT

Environment in which characterization/preliminary evaluation was carried out

1 Field
2 Screenhouse
3 Glasshouse
4 Secondary nursery
5 Laboratory
6 Other (specify in the descriptor NOTES, 3.12)

3.5 NURSERY

1 Base root
2 Polybag
3 Other (specify in the descriptor NOTES, 3.12)

3.6 OVERALL PALM DENSITY FOR FIELD [palms ha^{-1}]

Specify if nursery environment differs significantly from that of the final planting site(s), and if so, give information on both

3.7 CROPPING SYSTEM

1 Monoculture
2 Intercropping (specify the crop in the descriptor NOTES, 3.12)

3.8 NUMBER OF PALMS/NUTS ACCESSIONS IN THE FIELD

3.9 ENVIRONMENTAL CHARACTERISTICS OF SITE

Descriptors on the Environmental characteristics of site (3.9.1 - 3.9.23) are presented in Appendix I. These are not numbered in the Appendix in this manner, but should be for this section. This has been done in order to reduce the repetition of descriptors in Sections 2, 3 and 5

3.10 FERTILIZER

Specify formula [N-P-K ratio], rate [kg ha^{-1}] and frequency of application

3.11 PLANT PROTECTION

Specify pesticide by common chemical name; rate of application, type (spray, soil drench, etc.) and frequency

3.12 NOTES

Any other site-specific information

4. PLANT DATA

For vegetative characters measure or observe on 30 palms when palms trees are 10 years old

4.1 ACCESSION PALM DENSITY [palms ha^{-1}]

(Calculated for each accession)

4.2   GROSS MORPHOLOGY

4.2.1   Palm age

4.2.1.1   Date of measurement

(in the format DDMMYYYY)

4.2.1.2   Value for descriptor

4.2.2   Palm height [cm]

Measure from ground level to tip of tallest leaf

4.3   NURSERY EVALUATION - SEEDNUTS

All these descriptors can be obtained from accessions already in collections and not from nuts of a newly introduced accession

4.3.1   Date of harvest

(in the format DDMMYYYY)

4.3.2   Date set to germinate

(in the format DDMMYYYY)

4.3.3   Maximum amount of seed germination [%]

If seednut is used

4.3.4   Number of days to 25, 50, 75% and maximum germination

Measure from date of sowing

4.3.5   Date of field establishment

(in the format DDMMYYYY)

4.3.6   Number of days to field establishment

4.4   NURSERY EVALUATION - EMBRYOS/TISSUE CULTURE

4.4.1   Embryo germination [%]

Number of days to 25, 50, 75 maximum germination (defined as both shoot and root development)

4.4.2   Colour of seedling

Indicate chart name and colour codes

1 Green
2 Red
3 Yellow
4 Brown
5 Other (specify in the NOTES descriptor, 4.15)

4.5   STEM MORPHOLOGY

Provide the age at the time of measurement

4.5.1   Girth at 20 cm above soil level [cm]

4.5.2   Girth at 1.5 m height [cm]

4.5.3   Girth below oldest green leaf [cm]

4.5.4   Stem height [cm]

Measure from ground to oldest green leaf

4.5.4.1   Date 1

(in the format DDMMYYYY)

4.5.4.2   Height 1 [cm]

4.5.4.3   Date 2

(in the format DDMMYYYY)

4.5.4.4   Height 2 [cm]

4.5.5   Mean distance between internodes [cm]

Measure at girth height measurement position

4.5.6   Vertical description of stem
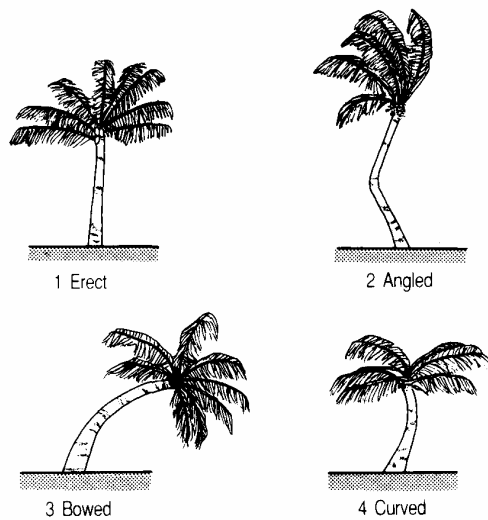
See Fig. 2

1 Erect
2 Angled
3 Bowed
4 Curved

1 Erect   2 Angled

3 Bowed   4 Curved

Fig. 2 Vertical description of stem

4.5.7   Bole category   .

See Fig. 3

0 No bole
3 Low
7 High

| 0   No bole | 3   Low | 7   High |
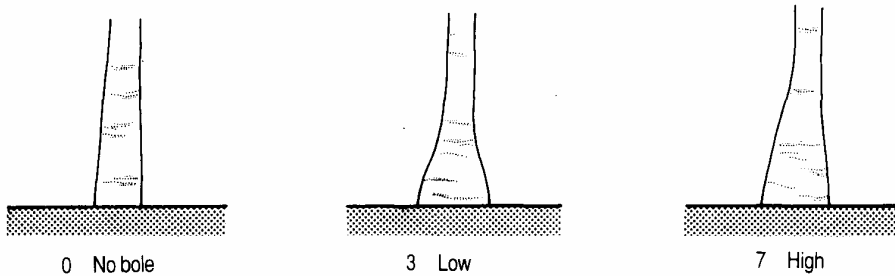
Fig. 3 Bole category

4.5.8   Width of leaf scar [cm]

4.5.9   Height of 10 leaf scars

Measure starting from 1.5 m from ground surface

4.6   CROWN MORPHOLOGY

Provide the age at the time of measurement

4.6.1   Number of green leaves

4.6.2   Overall appearance/shape of crown

See Fig. 1

1 Spherical
2 Hemispherical
3 X-shaped 'silhouette'
4 V-shaped
5 Other (specify in the NOTES descriptor, 4.15)

4.7   LEAF MORPHOLOGY

Measure length of leaf 14. If this is not used, specify the leaf used

4.7.1   Number of first split leaf

4.7.2   Colour of petiole

Indicate chart name and colour codes

1 Green
2 Red
3 Yellow
4 Brown
5 Other (specify in the NOTES descriptor, 4.15)

4.7.3   Petiole length [cm]

From base to the most proximal leaflet

4.7.4   Petiole thickness [cm]

Measure at insertion of first leaflet

4.7.5   Petiole width [cm]

4.7.6   Rachis length [cm]

From the base of the petiole to the tip

4.7.7   Number of leaflets

Count on one side of the frond that has the first leaflet closest to the base

4.7.8   Leaflet length [cm]

Use 4 leaflets (2 on each side), those where rachis becomes triangular

4.7.9   Leaflet width [mm]

Use leaflet measured for 4.7.8 (at maximum width)

4.7.10   Leaflet colour

Indicate chart name and colour codes

4.7.11   Leaf spiral direction

Indicate the proportion or the percentage of population (when viewed from beneath the crown

1 Left   (Subsequent (younger) leaf is to left of previous inflorescence and bunch hangs to right of leaf
2 Right   (Opposite to above)

4.7.12   Trichome number or density

4.7.13   Rate of leaf production

Number of leaves produced in one year

4.8   INFLORESCENCE AND FLOWER MORPHOLOGY

For descriptors 4.8.1 - 4.8.22 measure or observe a single inflorescence on each of 30 palms

4.8.1   Type

1 Normal
2 Spicata (full or partial)
3 Androgena
4 Additional spathes or bracts
5 Other (specify in the NOTES descriptor, 4.15)

4.8.2   Stalk colour

Indicate chart name and colour codes

4.8.3   Branch colour

Indicate chart name and colour codes

4.8.4   Female flower colour

Indicate chart name and colour codes

4.8.5   Male flower colour

Indicate chart name and colour codes

4.8.6   Length of the central axis [cm]

Measure from first spike to end

4.8.7   Length of stalk [cm]

Distance between the point where the bunch is attached to the palm and the base first spike

4.8.8   Stalk girth [cm]

4.8.9   Number of spikelets with female flowers

4.8.10   Number of spikelets without female flowers

4.8.11   Length of longest branch [cm]

4.8.12   Length of spikelet [cm]

Measure on first spikelet bearing fruit

4.8.13   Number of female flowers

Can be counted from scars if flowers have been shed

4.8.14   Female flower distribution per rachilla

(0, 1, 2, or more expressed as number of female flowers: total number of spikelets)

4.8.15   Diameter of female flowers [mm]

When flowers are receptive, over the widest part of flower

4.8.16   Number of inflorescences/year

4.8.17   Concordance of phase

Percentage of open male flowers at the time when female flowers are receptive. Specify method used and number of observations made in one year

4.8.18   Period between emergence and opening

4.8.19   Length male phase [d]

4.8.20   Length female phase [d]

4.8.21   Period between phases [d]

(Put (-) if phases are overlapping and (+) if non-overlapping)

4.8.22   Period between successive inflorescences [d]

(Put (-) if phases are overlapping and (+) if non-overlapping)

4.8.23   Flowering time

Measured from time of field planting on 50% of palms

4.8.23.1   Age when first (unopened) spathe appears on 50% of palms [months]

4.8.23.2   Age when first inflorescence opens on 50% of palms [months]

4.8.23.3   Leaf number of first inflorescence

Number of leaf, count from leaf one, in the nursery where the first inflorescence appears

4.9   FRUIT

Indicate which of the following developmental stages the measurement was taken under if stage is not specified

1 **Post-receptive stage** (when the stigma on the female flower turns brown)
2 **Full-size** (the fruit stops enlarging and is full of water)
3 **Mature** (at least one fruit on a bunch is changing from the fresh to the dry colour with some fresh remaining, at least on the calyx)
4 **Terminal** (depends on whether the fruit germinates (on the palm or in the nursery) or is converted to copra (by natural or artificial drying))

All descriptors observed/measured at Stage 3 unless otherwise indicated

4.9.1   Fruit set

Number of fruit set per tree, average of 10 trees (per year)

4.9.2   Fruit precocity

4.9.2.1 Time between post-receptivity and maturity [d]

4.9.2.2 Age at which first mature fruit is harvested [months]

4.9.3   Fruit colour

Indicate chart name and colour codes

4.9.4   Quantity of liquid endosperm [ml]

4.9.5   Sugar content [%]

Specify method of analysis used

4.9.6   Aromatic or other flavour

4.9.7   Edible husk

0 No
+ Yes

4.9.8   Whole fruit colour

Colour including husk. Indicate chart name and colour codes

4.9.9   Fruit appearance/shape (Longitudinal section)

Including husk. See Fig. 4

1 Oblong
2 Ovoid
3 Angled
4 Round

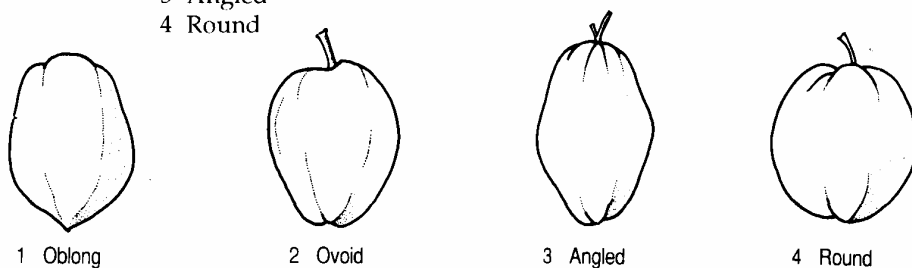1 Oblong   2 Ovoid   3 Angled   4 Round

Fig. 4 Fruit appearance/shape

4.9.10   Fruit polar section shape

1 Round
2 Egg-shaped
3 Pear-shaped
4 Elliptic

4.9.11   Fruit polar length [cm]

Including husk

4.9.12   Fruit polar circumference [cm]

Including husk

4.9.13 Fruit equatorial length [cm]

Including husk

4.9.14 Fruit equatorial circumference [cm]

Including husk

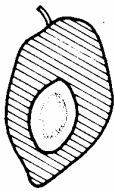4.9.15 Nut (fruit without husk) appearance/shape
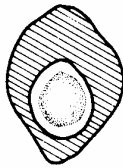
See Fig. 5

2 Pointed
4 Ovoid
6 Almost round
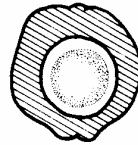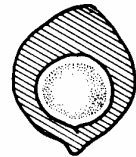8 Oblate

| 2 Pointed | 4 Ovoid | 6 Almost round | 8 Oblate |

Fig. 5 Nut appearance/shape

4.9.16 Nut polar length [cm]

4.9.17 Nut polar circumference [cm]

4.9.18 Nut equatorial length [cm]

4.9.19 Nut equatorial circumference [cm]

4.10 FRUIT COMPONENT ANALYSIS (FCA)

Measure 50 palms per accession over a 4 year timespan, one analysis should be performed per harvest round ensuring that 24 nuts/year/palm are measured

4.10.1   Fruit weight [g]

With husk

4.10.2   Nut weight [g]

Without husk

4.10.3   Shell and meat weight [g]

Without water

4.10.4   Meat or shell weight [g]

Specify which (either meat or shell) is measured

4.11 ENDOSPERM

Measure on a mature fruit (12 months old). Average of 10 fruits. Measure for all except makapuno (gel-endosperm) types

4.11.1   Endosperm thickness [mm]

Measure on the nut's equator

4.11.2   Solid endosperm dry matter content [%]

Measured on a sample of at least 100 g fresh weight for each analysis. Dry at 105°C until mass is constant

4.12 YIELD

Measure on each tree, every two months, during four consecutive years

4.12.1   Date observations began

(in the format DDMMYYYY)

4.12.2 Date observations ended

(in the format DDMMYYYY)

4.12.3 Number of palms observed

4.12.4 Number of bunches/palm/year

4.12.5 Number of ripe nuts harvested/palm/year

4.12.6 Number of drinking nuts harvested/palm

4.12.7 Copra weight per nut [g]

Calculated as 106% on the dry endosperm mass divided by 0.94

4.12.8 Copra yield/palm/year

4.13 OIL CHARACTERISTICS

4.13.1 Dry meat oil content [%]

Based on weight of oil extracted/total dry weight of the sample x 100 (Soxhlet Method to be used)

4.13.2 Fresh meat oil content [%]

Based on weight of oil extracted/total fresh weight of the sample x 100 (Soxhlet Method to be used)

4.14 SHELL THICKNESS [mm]

Measure at five randomly selected points, or at a standardized site (i.e. equator of nut)

4.15 NOTES

Any additional information, especially in the category of 'other' under various descriptors above, may be specified here

FURTHER CHARACTERIZATION AND EVALUATION

5. SITE DATA

5.1 COUNTRY

(See instructions in COUNTRY OF COLLECTION, 2.5)

5.2 SITE (RESEARCH INSTITUTE)

5.2.1 Site number

5.2.2 Latitude

(See format under 2.9)

5.2.3 Longitude

(See format under 2.10)

5.2.4 Name of farm or institute

5.3 EVALUATOR'S NAME AND ADDRESS

5.4 EVALUATION ENVIRONMENT

Environment in which characterization/preliminary evaluation was carried out

        1 Field
        2 Screenhouse
        3 Glasshouse
        4 Secondary nursery
        5 Laboratory
        6 Other (specify in the descriptor NOTES, 5.12)

5.5 NURSERY

        1 Base root
        2 Polybag
        3 Other (specify in the descriptor NOTES, 5.12)

5.6 OVERALL PALM DENSITY FOR FIELD [palm/ha]

Specify if nursery environment differs significantly from that of the final planting site(s), and if so, give information on both

5.7 CROPPING SYSTEM

1 Monoculture
2 Intercropping (specify the crop in the descriptor NOTES, 5.12)

5.8 NUMBER OF PALMS/NUTS ACCESSIONS IN THE FIELD

5.9 ENVIRONMENTAL CHARACTERISTICS OF SITE

Descriptors on the Environmental characteristics of site (5.9.1 - 5.9.23) are presented in Appendix I. These are not numbered in the Appendix in this manner, but should be for this section. This has been done in order to reduce the repetition of descriptors in Sections 2, 3 and 5

5.10 FERTILIZER

Specify formula [N-P-K ratio], rate [kg ha] and frequency of application

5.11 PLANT PROTECTION

Specify pesticide by common chemical name; rate of application, type (spray, soil drench, etc.) and frequency

5.12 NOTES

Any other site-specific information

6. PLANT DATA

6.1 YIELD

Measured on each tree every two months during four consecutive years

6.1.1 Litres of toddy/palm

6.1.2 Amount of coir fibre or cocopeat

6.1.3 <u>Quantity of shell charcoal</u>

6.2 PROTEIN CONTENT [%]

Based on dry weight and undefatted basis

6.3 OIL CHARACTERISTICS

6.3.1 <u>Oil quality</u>

Ratio of oleic:linoleic fatty acids

6.3.2 <u>Lauric:myristic oil ratio</u>

Indicate method used

6.3.3 <u>Tocopherol content</u>

Indicate method used

6.4 FIBRE CHARACTERISTICS

6.4.1 <u>Fibre length</u> [mm]

Average of 20 fibres, each separated manually from husk

6.4.2 <u>Fibre hardness</u>

Indicate method used

6.4.3 <u>Fibre tensile strength</u> [kN m kg^{-1}]

Measured as the maximum force (pull) the fibres can withstand before they break. An instrument is normally used for this purpose. State the type and name of the instrument used and alternative units, if used

6.5 INTROGRESSION DESIGNATION

1 Predominantly domestic (Niu Vai) type
5 Introgressed type
9 Predominantly wild (Niu Kafa) type

7. 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

7.1 REACTION TO SALINITY

7.2 REACTION TO WATERLOGGING

7.3 REACTION TO DROUGHT

7.4 REACTION TO LOW TEMPERATURE

7.5 REACTION TO MINERAL DEFICIENCIES

7.5.1 <u>Iron</u>

7.5.2 <u>Phosphorus</u>

7.5.3 <u>Potassium</u>

7.5.4 <u>Manganese</u>

7.5.5 <u>Calcium</u>

7.5.6 <u>Molybdenum</u>

7.5.7 <u>Zinc</u>

7.5.8 <u>Boron</u>

7.5.9 <u>Nitrogen</u>

7.5.10 <u>Sulphur</u>

7.5.11   <u>Magnesium</u>

7.5.12   <u>Sodium</u>

7.5.13   <u>Chlorine</u>

7.6   REACTION TO MINERAL TOXICITIES

7.6.1   <u>Sulphur</u>

7.6.2   <u>Aluminium</u>

7.6.3   <u>Boron</u>

7.6.4   <u>Chlorine</u>

7.6.5   <u>Copper</u>

7.6.6   <u>Fluorine</u>

7.6.7   <u>Manganese</u>

7.7   REACTION TO pH

Observe when soil pH is between 4 and 9

8. 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 the NOTES descriptor, 8.11.

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

8.1 FUNGAL DISEASES

Causal organism	Disease or common name
8.1.1 *Ganoderma* spp. *Ganoderma boninense*	Basal stem rot, root rot, or Ganoderma butt rot
8.1.2 *Phytophtora palmivora*	Bud rot, leaf drops, wilt, nut fall
8.1.3 *Phytophtora katsurae*	Premature nut fall
8.1.4 *Curvularia maculans*	Curvularia leaf spot, or leaf drop
8.1.5 *Colletotrichum gloeosporioides*	Anthracnosis, or fruit rot
8.1.6 *Marasmiellus cocophilus*	Lethal·bole rot
8.1.7 *Phomopsis cocoina*	Phomopsis leaf spot
8.1.8 *Bipolaris incurvata*	Bipolaris leaf blight
8.1.9 *Ceratocystis paradoxa*	Stem bleeding
8.1.10 *Pestalotia palmarum* *Botroydiplodia theobromae*	Leaf blight
8.1.11 *Catacauma torrendiella*	Lixa pequena, Verrucosis disease
8.1.12 *Botryosphaeria* sp.	Queima das folhas, leaf blight
8.1.13 *Coccostroma palmicola*	Lixa grande
8.1.14 *Corticium penicillatum*	
8.1.15 *Helminthosporium*	Leaf spot

8.2 VIRAL AND VIROID DISEASES

Causal organism	Disease or common name
8.2.1 Coconut foliar decay virus (CFDV)	Foliar decay
8.2.2 Coconut cadang-cadang viroid (CCCVd)	Coconut cadang-cadang, or Yellow mottling disease
8.2.3 Coconut tinangaja viroid (CTiVd)	Coconut tinangaja
8.2.4 Viroid-like agents	

8.3 BACTERIAL DISEASES

8.3.1	Bacterial stripe

8.4 NEMATODES

8.4.1 *Rhadinaphelenchus cocophilus*	Red ring

8.5 PROTOZOAN

8.5.1 *Phytomonas stabeli*	Hartrot, Cedros wilt, or Marchitez

8.6 MOLLICUTES DISEASES

8.6.1 MLOs	Blast, Lethal yellowing, Root wilt, Kerala wilt, Dry bud rot

8.7 ARTHROPOD PESTS

Taking into account that some of the species listed by various authors as coconut pests were probably species that caused some damage some years ago and that new pests are discovered and the pest status of some insects diminishes and also because they vary according to the site location, a complete list of pests would be too unwieldy. This is a more or less complete listing of coconut pests

	Causal organism	**Pest or common name**

Orthoptera
8.7.1 *Locusta* spp.

8.7.2 *Tropidodacris* spp.

8.7.3 *Segestes decoratus* Redtenbacher

8.7.4 *Segestes* spp.

8.7.5 *Segestidea uniformis* (Willemse)

8.7.6 *Sexava* spp.

Phasmida
8.7.7 *Graeffea crovanii* (Le Guillou)

8.7.8 *Graeffea* spp.

8.7.9 *Ophicranea* spp.

Hemiptera
8.7.10 *Amblypelta cocophaga* China　　　　　　　　　　　　　Tatipaka

8.7.11 *Pseudotheraptus wayi* Brown

8.7.12 *Axlijagastus cambelli* Distant

8.7.13 *Lyncus* spp.

8.7.14 *Staphanitis typicus* Distant

8.7.15 *Myndus crudus* van Duzee

8.7.16 *Cerataphis palmae* Hil Ris Lambers

8.7.17 *Nipaecoccus nipae* (Maskell)

Causal organism   **Pest or common name**

8.7.18 *Eucaplymnatus tesselatus* Signoret

8.7.19 *Vinsonia stellifera* Westwood

8.7.20 *Aspidiotus destructor* Signoret

8.7.21 *Aonidiella orientalis* (Newstead)

8.7.22 *Crysomphalus* spp.

8.7.23 *Ischnaspis longirostris* Signoret

8.7.24 *Aleurodicus* spp.

8.7.25 *Aleurotrachelas* spp.

Coleoptera
8.7.26 *Promecotheca coeruleipennis* Blanchard

8.7.27 *Promecotheca* spp.

8.7.28 *Coelaenomenodera elaeidis* Maulik

8.7.29 *Brontispa* spp.

8.7.30 *Plesispa* spp.

8.7.31 *Rhynchophorus ferrugineus* Oliver   Red weevil

8.7.32 *Rhynchophorus palmarum* L.

8.7.33 *Rhynchophorus phoenicis* Fabricius

8.7.34 *Oryctes rhinoceros* L.   Black beetle, or
                                                                       Rhinoceros beetle

Causal organism	**Pest or common name**

<u>Lepidoptera</u>
8.7.35 *Brassolis* spp.

8.7.36 *Nephantis serinopa* Meyrick.

8.7.37 *Apoda* spp.

8.7.38 *Setora nitens* Walker

8.7.39 *Macroplectra nararia* Moore

8.7.40 *Parasa lepida* Cramer

8.7.41 *Susica* spp.

8.7.42 *Castnia daedalus* Cramer

8.7.43 *Brachartona catoxantha* Hampson

8.8 ACARI

8.8.1 *Eriophyes guerreronis* (Keifer)

8.9 RODENTS AND VERMIN

8.9.1 *Ratus* spp.	Rats
8.9.2	Bats
8.9.3	Birds

8.10 WEEDS

8.11 NOTES

Specify here any additional information

9. BIOCHEMICAL CHARACTERS

9.1   ISOZYME/POLYPHENOL PROFILE

9.2   RFLP/DNA FINGERPRINTS

10. CYTOLOGICAL CHARACTERS AND IDENTIFIED GENES

MANAGEMENT

M1. MANAGEMENT DATA

M1.1 ACCESSION NUMBER   (Passport 1.1)

M1.2 POPULATION IDENTIFICATION   (Passport 2.3)

Collector's number, pedigree, cultivar name, etc. depending on the population type

M1.3 STORAGE ADDRESS

(Building, room, or location in field, research farm etc.)

M1.4 ACQUISITION DATE

(in the format DDMMYYYY)

M1.5 AMOUNT OF NUTS IN STORAGE(S)   (Passport 1.12)

M1.6 DUPLICATION AT OTHER LOCATION(S)   (Passport 1.6)

M2. MULTIPLICATION/REGENERATION DATA

M2.1 ACCESSION NUMBER   (Passport 1.1)

M2.2 POPULATION IDENTIFICATION   (Passport 2.3)

Collector's number, pedigree, cultivar name, etc. depending on the population type

M2.3 FIELD PLOT NUMBER

M2.4 LOCATION

M2.5 COLLABORATOR

M2.6   ESTABLISHMENT DATE

(in the format DDMMYYYY)

M2.7   PALMS DENSITY

M2.8   FERTILIZER APPLICATION

M2.9   GERMINATION IN THE FIELD [%]

M2.10   SEEDLING VIGOUR

Assessed 18 days after emergence

M2.11   NUMBER OF PLANTS ESTABLISHED

M2.12   AGRONOMIC EVALUATION

M2.13   PREVIOUS MULTIPLICATION AND/OR REGENERATION

M2.13.1   Location

M2.13.2   Sowing date

(in the format DDMMYYYY)

M2.13.3   Plot number

M2.14   OTHERS

M3.   GERMPLASM AND MOVEMENT ACTIVITIES DATA

M3.1   TRANSIT ROUTE

1   Air
2   Sea
3   Land

M3.2 DATE DESPATCHED

(in the format DDMMYYYY)

M3.3 DATE RECEIVED

(in the format DDMMYYYY)

M3.4 TRANSIT CONDITIONS

1 Bags/containers
2 Exposure low temperature during transhipment
3 Exposure dehydration during transhipment
4 Duration of voyage

M3.5 PRE- AND POST-TRANSIT PRECAUTIONS

M3.5.1 Was there a treatment before departure?

0 No
+ Yes

M3.5.2 Type of product used

1 Fungicide
2 Insecticide
3 Fumigant
4 Nematicide

M3.5.3 Active ingredient

Provide the name and dose used

M3.6 PROPAGATION PREPARATIONS (Except seedlings)

Specify whether nuts were deshusked before despatch

1 Seednuts (stored, sliced, soaked etc.)
2 Embryos
3 Tissue culture plantlets

APPENDIX I

A. COLLECTION SOURCE ENVIRONMENT

A.1 Topography

This refers to the differences in elevation of the land surface on a broad scale. The reference is:

FAO, 1990. In: *Guidelines For Soil Profile Description*, 3rd Edition (Revised), Rome, p.70

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 range of elevation		
8 Mountainous	>30%, great range of elevation (>300 m)		
9 Other (specify in the appropriate Section's NOTES)			

A.2 Elevation of collection site [m]

Altitude above sea level

A.3 Land element and position

Description of the geomorphology of the immediate surroundings of the collection site (Adapted from *FAO, 1990*). See Fig. 6

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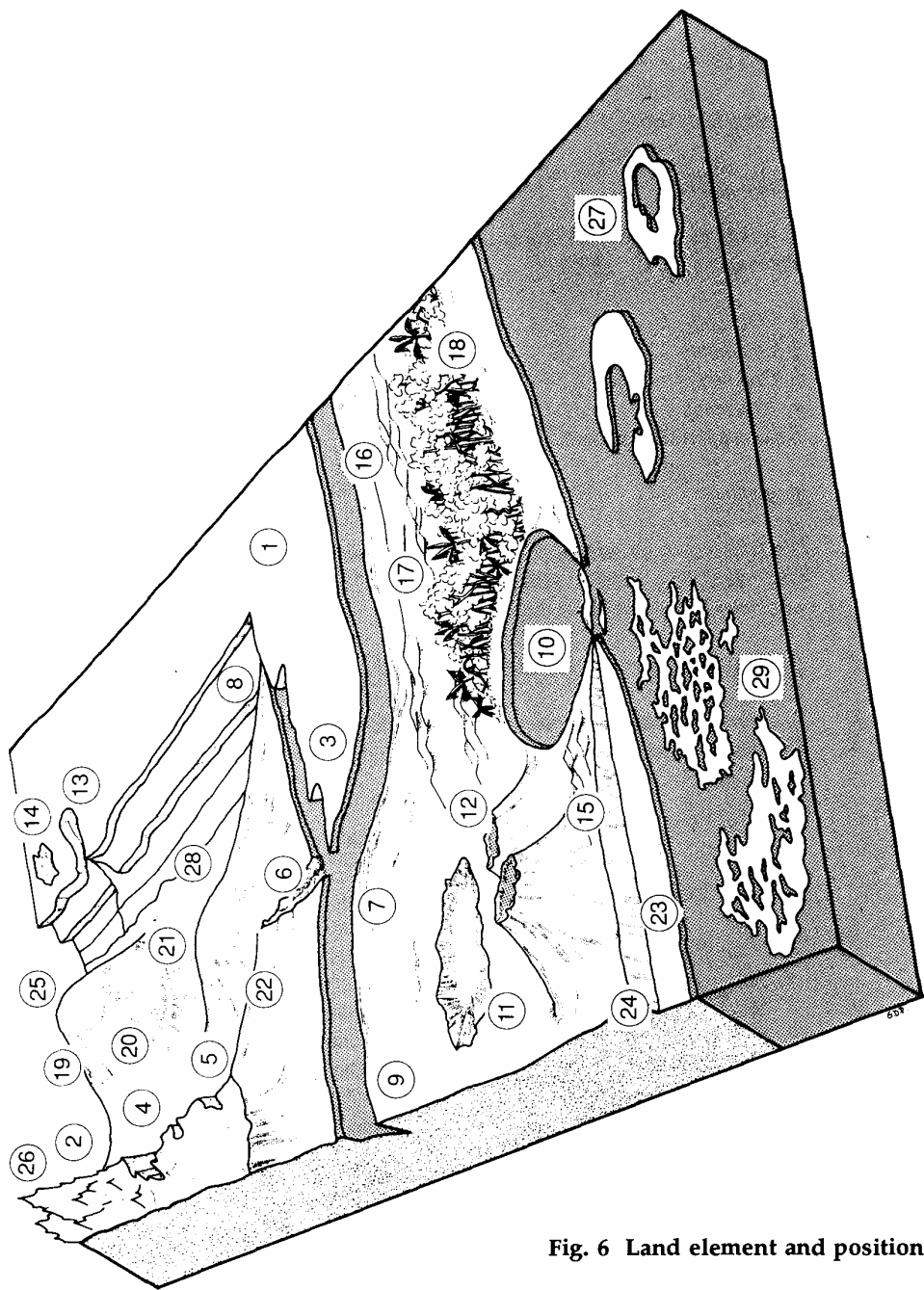
Fig. 6 Land element and position

A.4   Slope [°]

Estimated slope of the collection site

A.5   Slope form

It refers to the general shape of the slope in both the vertical and horizontal directions (*FAO, 1990*)

1 Straight
2 Concave
3 Convex
4 Terraced
5 Complex (Irregular)

A.6   Aspect

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

A.7   Soil texture classes (Adapted from *FAO, 1990*)

For convenience in determining the texture classes of the following list and the particle size classes are given for each of the fine earth fraction below. See Fig. 7

1 Clay	12 Coarse sandy loam
2 Loam	13 Loamy sand
3 Clay loam	14 Loamy very fine sand
4 Silt	15 Loamy fine sand
5 Silty clay	16 Loamy coarse sand
6 Silty clay loam	17 Very fine sand
7 Silt loam	18 Fine sand
8 Sandy clay	19 Medium sand
9 Sandy clay loam	20 Coarse sand
10 Sandy loam	21 Sand, unsorted
11 Fine sandy loam	22 Sand, unspecified

Soil particle size classes (Adapted from *FAO, 1990*)

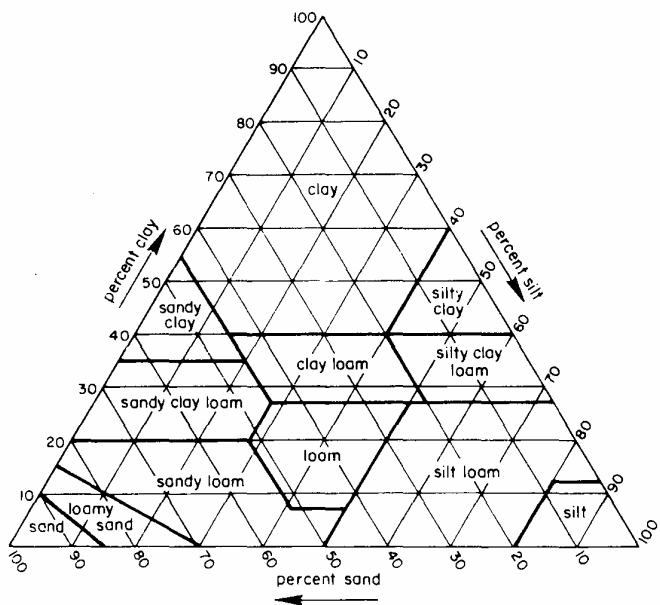|				
1 Clay		<	2	µm
2 Fine silt	3	-	20	µm
3 Coarse silt	21	-	63	µm
4 Very fine sand	64	-	125	µm
5 Fine sand	126	-	200	µm
6 Medium sand	201	-	630	µm
7 Coarse sand	631	-	1250	µm
8 Very coarse sand	1251	-	2000	µm

Fig. 7 Soil texture classes

A.8   Soil organic matter content

1 Nil (as on 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 from forest)
5 Peaty

A.9   Rock fragments

Large rock and mineral fragments (>2 mm) are described according to abundance (Adapted from *FAO, 1990*)

1 Very few   0   -   2%
2 Few   2   -   5%
3 Common   5   -   15%
4 Many   15   -   40%
5 Abundant   40   -   80%
6 Dominant   > 80%

A.10   Soil taxonomic classification

As detailed a classification as possible should be given. This may be taken from a soil survey map. State class (e.g., Alfisols, Spodosols, Vertisols etc.)

A.11   Soil matrix colour (Adapted from *FAO, 1990*)

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 categories may be used

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

A.12   Stoniness/rockiness/hardpan/cementation

Differentiate between permeable coral rocks and other impermeable rocks

1 Tillage unaffected
2 Tillage affected
3 Tillage difficult
4 Tillage impossible
5 Essentially paved

A.13   Soil parent material (Adapted from *FAO, 1990*)

Two lists of examples of parent material and rock are given below. The reliability of the geological information and the knowledge of the local lithology will determine whether a general or a specific definition of the parent material can be given. Saprolite is used if the *in situ* weathered material is thoroughly decomposed, clay-rich but still showing rock structure. Alluvial deposits and colluvium derived from a single rock type may be further specified by that rock type

A.13.1 Unconsolidated material

1   Aeolian deposits (unspecified)
2   Aeolian sand
3   Littoral deposits
4   Lagoonal deposits
5   Marine deposits
6   Lacustrine deposits
7   Fluvial deposits
8   Alluvial deposits
9   Unconsolidated (unspecified)
10 Volcanic ash
11 Loess
12 Pyroclastic deposits
13 Glacial deposits
14 Organic deposits
15 Colluvial deposits
16 *In situ* weathered
17 Saprolite

A.13.2 <u>Rock type</u>

1 Acid igneous/ metamorphic rock	15 Sedimentary rock
2 Granite	16 Limestone
3 Gneiss	17 Dolomite
4 Granite/Gneiss	18 Sandstone
5 Quartzite	19 Quartzitic sandstone
6 Schist	20 Shale
7 Andesite	21 Marl
8 Diorite	22 Travertine
9 Basic igneous/ metamorphic rock	23 Conglomerate
10 Ultra basic rock	24 Siltstone
11 Gabbro	25 Tuff
12 Basalt	26 Pyroclastic rock
13 Dolerite	27 Evaporite
14 Volcanic rock	28 Gypsum rock
	29 Not known

A.14   <u>Soil depth to groundwater table</u> [cm]
(Adapted from *FAO, 1990*)

The depth to the groundwater table, if present, as well as an estimate of the approximate annual fluctuation, should be given. The maximum rise of the groundwater table can be inferred approximately from changes in profile colour in many, but not all, soils

1 Very shallow	0	-	25 cm
2 Shallow	26	-	50 cm
3 Moderately deep	51	-	100 cm
4 Deep	101	-	150 cm
5 Very deep		>	150 cm

A.15   <u>Soil drainage</u> (*FAO, 1990*)

1 Very poorly drained
2 Poorly drained
3 Somewhat poorly (imperfectly) drained
4 Moderately well drained
5 Well drained
6 Somewhat excessively drained
7 Excessively drained

A.16   Flooding (*FAO, 1990*)

Flooding or temporary inundation is described according to its estimated frequency, duration and depth. Information may be obtained from records of past flooding or from local enquiry. The frequency and duration classes should give an indication of the average occurrence of inundation

A.17   Quality of the groundwater (*FAO, 1990*)

1 Saline
2 Brackish
3 Fresh
4 Polluted
5 Oxygenated
6 Stagnating

A.18   Soil salinity

1 Low   (<160 ppm dissolved salts)
2 Medium   (161-480 ppm)
3 High   (481-1440 ppm)
4 Very high   (>1440 ppm)

A.19   Soil moisture (*FAO, 1990*)

Moisture conditions prevailing in the soil at the time of collection should be given together with the depth. Attention should be paid to unusual moisture conditions caused by inseasonal weather, prolonged exposure of the profile, flooding, etc.

1 Dry
3 Slightly moist
5 Moist
9 Wet

A.20   Soil *p*H

Actual value of the soil within the following root zones depths around the accession

10-15 cm
30-60 cm
60-90 cm

A.21 Water availability

    1 Rainfed
    2 Irrigated
    3 Flooded
    4 River banks
    5 Sea coast
    6 Other (specify in the appropriate Section's NOTES)

A.22 Soil fertility

    3 Low
    5 Moderate
    7 High

A.23 Climate of collection site

    Should be assessed as close to the collection as possible

    A.23.1 Temperature range [°C]

        Provide either the diurnal (mean, maximum, minimum) or the seasonal (mean, maximum, minimum)

    A.23.2 Rainfall range [mm]

        Annual average (state number of recorded years)

        A.23.2.1 Consecutive months per year with < 100 mm

        A.23.2.2 Years in last decade with mean amount < 2000 mm

    A.23.3 Wind [km s^{-1}]

        Annual average (state number of years recorded)

A.23.3.1 Frequency of typhoons or hurricane force winds

A.23.3.2 Date of most recent typhoons or hurricane force winds

(in the format DDMMYYYY)

A.23.4 Frost

A.23.4.1 Date of most recent frost

(in the format DDMMYYYY)

A.23.4.2 Lowest temperature

Specify seasonal average and minimum survived

A.23.4.3 Duration of temperature below freezing

A.23.5 Relative humidity

A.23.5.1 Relative humidity diurnal range [%]

A.23.5.2 Relative humidity seasonal range [%]

A.23.6 Light

3　Shady
7　Sunny

A.24 Other (specify in the appropriate Section's NOTES)

REFERENCES

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