



Descriptors for

**Taro**

*Colocasia esculenta*



## List of Descriptors

|   |      |   |      |
|---|------|---|------|
| Almond (revised) * (E)                  | 1985 | <i>Phaseolus acutifolius</i> (E)                      | 1985 |
| Apple (E)                               | 1982 | <i>Phaseolus coccineus</i> * (E)                      | 1983 |
| Apricot * (E)                           | 1984 | <i>Phaseolus vulgaris</i> * (E)                       | 1982 |
| Avocado (E,S)                           | 1995 | Pigeonpea (E)   | 1993 |
| Bambara groundnut (E)                   | 1987 | Pineapple (E)   | 1991 |
| Banana (E,S,F)                          | 1996 | <i>Pistacia</i> (excluding <i>Pistacia vera</i> ) (E) | 1998 |
| Barley (E)                              | 1994 | Pistachio (E,F)                                       | 1997 |
| Beta (E)                                | 1991 | Plum * (E)  | 1985 |
| Black pepper (E,S)                      | 1995 | Potato variety * (E)                                  | 1985 |
| <i>Brassica</i> and <i>Raphanus</i> (E) | 1990 | Quinoa * (E)  | 1981 |
| <i>Brassica campestris</i> L. (E)       | 1987 | Rice * (E)  | 1980 |
| Buckwheat (E)                           | 1994 | Rye and Triticale * (E)                               | 1985 |
| Capsicum (E,S)                          | 1995 | Safflower * (E)                                       | 1983 |
| Cardamom (E)                            | 1994 | Sesame * (E)  | 1981 |
| Carrot (E,S,F)                          | 1998 | <i>Setaria italica</i>                                |      |
| Cashew (E)                              | 1986 | and <i>S. pumilia</i> (E)                             | 1985 |
| Cherry * (E)                            | 1985 | Sorghum (E,F)   | 1993 |
| Chickpea (E)                            | 1993 | Soyabean * (E,C)                                      | 1984 |
| Citrus (E)                              | 1988 | Strawberry (E)  | 1986 |
| Coconut (E)                             | 1992 | Sunflower * (E)                                       | 1985 |
| Coffee (E,S,F)                          | 1996 | Sweet potato (E,S,F)                                  | 1991 |
| Colocasia * (E)                         | 1980 | Tea (E,S,F)   | 1997 |
| Cotton (Revised) (E)                    | 1985 | Tomato (E, S, F)                                      | 1996 |
| Cowpea (E)                              | 1983 | Tropical fruit * (E)                                  | 1980 |
| Cultivated potato * (E)                 | 1977 | <i>Vigna aconitifolia</i>                             |      |
| Echinochloa millet * (E)                | 1983 | and <i>V. trilobata</i> (E)                           | 1985 |
| Eggplant (E,F)                          | 1990 | <i>Vigna mungo</i>                                    |      |
| Faba bean * (E)                         | 1985 | and <i>V. radiata</i> (Revised) * (E)                 | 1985 |
| Finger millet (E)                       | 1985 | Walnut (E)  | 1994 |
| Forage grass * (E)                      | 1985 | Wheat (Revised) * (E)                                 | 1985 |
| Forage legumes * (E)                    | 1984 | Wheat and <i>Aegilops</i> * (E)                       | 1978 |
| Grapevine (E,S,F)                       | 1997 | White Clover (E)                                      | 1992 |
| Groundnut (E,S,F)                       | 1992 | Winged Bean * (E)                                     | 1979 |
| Kodo millet * (E)                       | 1983 | Xanthosoma (E)  | 1989 |
| Lentil * (E)                            | 1985 | Yam (E,S,F)   | 1997 |
| Lima bean * (E)                         | 1982 |   |      |
| Lupin * (E,S)                           | 1981 |   |      |
| Maize (E,S,F)                           | 1991 |   |      |
| Mango (E)                               | 1989 |   |      |
| Medicago (Annual) * (E,F)               | 1991 |   |      |
| Mung bean * (E)                         | 1980 |   |      |
| Oat * (E)                               | 1985 |   |      |
| Oca * (S)                               | 1982 |   |      |
| Oil palm (E)                            | 1989 |   |      |
| <i>Panicum miliaceum</i>                |      |   |      |
| and <i>P. sumatrense</i> (E)            | 1985 |   |      |
| Papaya (E)                              | 1988 |   |      |
| Peach * (E)                             | 1985 |   |      |
| Pear * (E)                              | 1983 |   |      |
| Pearl millet (E,F)                      | 1993 |   |      |

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*Colocasia esculenta*

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## PREFACE

**Descriptors for Taro (*Colocasia esculenta*)** is a revision of the original IBPGR publication **Descriptors for *Colocasia*** (AGP:IBPGR/79/52, 1980). The 1980 list was based upon the work of the Regional Committee in Southeast Asia and its descriptor numbers are given in parentheses beside the present descriptors for cross-referencing purposes. This descriptor list includes modifications for the Solomon Islands, Papua New Guinea, Indonesia, New Caledonia and Vanuatu developed during 1989 to 1997 by Dr Anton Ivancic and Dr Vincent Lebot. However, the list is suitable for Asian, Pacific and Caribbean taros. A draft version prepared in the internationally accepted IPGRI format for descriptor lists was subsequently sent to a number of experts for their comments and amendments. Later it was revised by taro experts as part of the AusAID/SPC Taro Genetic Resources Project - Taro Collection Strategy Workshop, during 7-11 December 1998, at NARI, Lae, Papua New Guinea. The names and addresses of those involved are given in 'Contributors'.

IPGRI encourages the collecting of data for all five types of descriptors (see page 1, Definitions and Use of Descriptors), whereby data from the first four categories - *Passport, Management, Environment and Site*, and *Characterization* - should be available for any accession. The number of descriptors selected in each of the categories will depend on the crop and their importance to the crop's description. Descriptors listed under *Evaluation* allow for a more extensive description of the accession, but generally require replicated trials over a period of time.

Although the suggested coding should not be regarded as the definitive scheme, this format represents an important tool for a standardized characterization system and it is promoted by IPGRI 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 IPGRI format, will produce a rapid, reliable and efficient means for information storage, retrieval and communication, and will assist with the utilization of germplasm. 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.

**This descriptor list is intended to be comprehensive for the descriptors that it contains. This approach assists with the standardization of descriptor definitions. IPGRI does not, however, assume that each curator will characterize accessions of their collection utilizing all descriptors given. Descriptors should be used when they are useful to the curator for the management and maintenance of the collection and/or to the users of the plant genetic resources. However, highly discriminating descriptors are marked as highlighted text to facilitate selection of descriptors.**

Multicrop passport descriptors (see Annex I) were developed jointly by IPGRI and FAO, to provide consistent coding schemes for common passport descriptors across crops. They are marked in the text as [MCPD]. Please note that 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 II, the reader will find a Collecting form for taro that will facilitate data collecting.

Any suggestions for improvement on the Descriptors for Taro will be highly appreciated by IPGRI.

## DEFINITIONS AND USE OF THE DESCRIPTORS

IPGRI uses the following definitions in genetic resources documentation:

**Passport descriptors:** These provide the basic information used for the general management of the accession (including the 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. This type of descriptors includes 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 marked as **highlighted text**.

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

- (a) the *Système International d'Unités* (SI) is used;
- (b) the units to be applied are given in square brackets following the descriptor name;

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- (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) many quantitative characters which are continuously variable are recorded 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;

- (e) when a descriptor is scored using a 1-9 scale, such as in (d), '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 a central leaf lobe:

### **Shape of central leaf lobe**

- |   |          |
|---|----------|
| 1 | Toothed  |
| 2 | Elliptic |
| 3 | Linear   |

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

### **Terminal leaflet**

- |          |         |
|----------|---------|
| 0        | Absent  |
| 1 (or +) | Present |

- (g) blanks are used for information not yet available;
- (h) 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;
- (i) dates should be expressed numerically in the format YYYYMMDD, where
- |      |   |                                 |
|------|---|---------------------------------|
| YYYY | - | 4 digits to represent the year  |
| MM   | - | 2 digits to represent the month |
| DD   | - | 2 digits to represent the day.  |



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# PASSPORT

## 1. Accession descriptors

### 1.1 Accession number [MCPD]

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 should never be re-used. Letters should be used before the number to identify the genebank or national system (e.g. IDG indicates an accession that comes from the genebank at Bari, Italy; CGN indicates an accession from the genebank at Wageningen, The Netherlands; 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 [MCPD]

Number assigned to an accession by the donor

### 1.4 Other number(s) associated with the accession [MCPD]

Any other identification number known to exist in other collections for this accession, e.g. USDA Plant Inventory number (not Collecting number, see descriptor 2.2). Other numbers can be added as 1.4.3, etc.

#### 1.4.1 Other number 1

#### 1.4.2 Other number 2

### 1.5. Scientific name

#### 1.5.1 Genus [MCPD]

#### 1.5.2 Species (2.1), [MCPD]

#### 1.5.3 Subspecies [MCPD]

#### 1.5.4 Botanical variety

### 1.6 Pedigree

Parentage or nomenclature, and designations assigned to breeders' material

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### 1.7 Accession

#### 1.7.1 Accession name [MCPD]

Either a registered or other formal designation given to the accession

#### 1.7.2 Synonyms

Include here any previous identification other than the current name. Collecting number or newly assigned station names are frequently used as identifiers.

### 1.8 Acquisition date [YYYYMMDD]

Date on which the accession entered the collection

### 1.9 Accession size

Approximate number or weight of tubers, seeds, tissue cultures, etc. of an accession in the genebank

### 1.10 Type of material received

- 1 Seed
- 2 Plant (including seedling)
- 3 Shoot/bud/stem cutting
- 4 Pollen
- 5 Root/tuber
- 6 *In vitro* culture
- 99 Other (specify in descriptor **1.11 Notes**)

### 1.11 Notes

Any additional information may be specified here

## 2. Collecting descriptors

### 2.1 Collecting institute(s)

Name and address of the institute(s) and individuals collecting/sponsoring the collection of the sample(s)

### 2.2 Collecting number (1.1), [MCPD]

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. It should be unique and always accompany subsamples wherever they are sent.

**2.3 Collecting date of original sample** [YYYYMMDD] (1.3), [MCPD]

**2.4 Country of collecting** (1.4), [MCPD]

Name of the country in which the sample was collected. Use the three-letter abbreviations from the *International Standard (ISO) Codes for the representation of names of countries*, No. 3166, 4th Edition. Copies of these are available from DIN: Deutsches Institut für Normung e.V., 10772 Berlin, Germany; Tel. +30-2601-369; Fax +30-2601-1231, Tlx. 184 273-din-d; Web site URL: <<http://www.din.de/set/de/DIN>>.

**2.5 Province/State** (1.5)

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

**2.6 Department/County**

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

**2.7 Location of collecting site** (1.6), [MCPD]

Distance in kilometres and direction from the nearest town, village or map grid reference point (e.g. CURITIBA 7S means 7 km south of Curitiba)

**2.8 Latitude of collecting site** (1.9), [MCPD]

Degrees and minutes followed by N (North) or S (South) (e.g. 1030S). Missing data (minutes) should be indicated with hyphen (e.g. 10—S).

**2.9 Longitude of collecting site** (1.8), [MCPD]

Degrees and minutes followed by E (East) or W (West) (e.g. 07625W). Missing data (minutes) should be indicated with hyphen (e.g. 076—W).

**2.10 Elevation of collecting site** [m asl] (1.7), [MCPD]

**2.11 Collecting source** (1.10), [MCPD]

The coding scheme proposed can be used at two different levels of detail: either by using the global codes such as 1, 2, 3, 4, or by using the more detailed coding such as 1.1, 1.2, 1.3, etc.

- 0 Unknown
- 1 Wild habitat
  - 1.1 Forest/woodland
  - 1.2 Shrubland
  - 1.3 Grasslands
  - 1.4 Desert/tundra

- 2 Farm
  - 2.1 Field
  - 2.2 Orchard
  - 2.3 Garden
  - 2.4 Fallow
  - 2.5 Pasture
  - 2.6 Store
- 3 Market
  - 3.1 Town
  - 3.2 Village
  - 3.3 Urban area (around city)
  - 3.4 Other exchange system
- 4 Institute/Research organization
- 99 Other (specify in descriptor **2.20 Collector's notes**)

**2.12 Collecting source environment**

Use descriptors **6.1.1 to 6.1.22** in section 6

**2.13 Status of sample**

(1.11), [MCPD]

- 0 Unknown
- 1 Wild
- 2 Weedy
- 3 Traditional cultivar/Landrace
- 4 Breeder's line
- 5 Advanced cultivar
- 99 Other (e.g. feral, specify in descriptor **2.20 Collector's notes**)

**2.14 Type of sample**

(1.12)

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

- 1 Petiole base top
- 2 Seed
- 3 Corm
- 4 Cormel
- 5 Sucker
- 6 Stolon
- 7 Tissue culture
- 99 Other (specify which part of the plant in descriptor **2.20 Collector's notes**)

**2.15 Number of plants sampled**

**2.16 Occurrence of taro in sampling area**

- 1 Rare
- 2 Occasional
- 3 Frequent
- 4 Abundant
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17 Ethnobotanical data****2.17.1 Cultural characteristics**

Is there associated folklore with the collected taro type? (e.g. taboos, stories and/or superstitions associated with taro). If so, describe it briefly in descriptor 2.20

**Collector's notes**

- 0 No
- 1 Yes

**2.17.2 Frequency of use of the plant**

- 1 Daily
- 2 Weekly
- 3 Occasional
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.3 Main cooking methods**

(Corm only)

- 1 Boiling
- 2 Baking
- 3 Roasting
- 4 Local specialities
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.3.1 Cooking time [min]**

Record the number of minutes for each descriptor state of 2.17.3, as available

**2.17.3.2 Number of recipes****2.17.3.3 Processing**

- 1 Fermentation
- 2 Puddings
- 3 Chips
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.4 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)

**2.17.5 Parts of plant used**

- 1 Petiole
- 2 Leaf
- 3 Corm
- 4 Cormel
- 5 Stolon
- 6 Flower/inflorescence
- 7 Root
- 8 Tuber
- 9 Sap/resin
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.6 Plant uses**

- 1 Food
- 2 Medicine
- 3 Animal feed
- 4 Forage
- 5 Ornamental
- 6 Ceremonial
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.7 Local vernacular name** (1.2)

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

**2.17.8 Translation/Transliteration**

Provide translation of the local accession name into English

**2.17.9 Taro name meaning**

Does the taro name have a meaning? If yes, describe it briefly in descriptor 2.20 **Collector's notes**

- 0 No
- 1 Yes

**2.17.10 Ethnic group**

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

**2.17.11 Palatability (taste quality) of cooked starch** (3.1)  
(According to local preference)

**2.17.11.1 Corm palatability**

- 1 Poor
- 2 Acceptable
- 3 Good

**2.17.11.2 Leaf blade palatability**

- 1 Poor
- 2 Acceptable
- 3 Good

**2.17.11.3 Petiole palatability**

- 1 Poor
- 2 Acceptable
- 3 Good

**2.17.11.4 Inflorescence palatability**

- 1 Poor
- 2 Acceptable
- 3 Good

**2.17.12 Consistency of cooked corms** (3.5)  
(Boiled only)

- 1 Sticky
- 2 Firm
- 3 Soft
- 4 Mealy
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.13 Cooked corm aroma** (3.6)

- 0 Absent (Non-aromatic)
- 1 Present (Aromatic)

**2.17.14 Special uses**

- 1 Children
- 2 Older people
- 3 Feasts
- 4 Religious purpose
- 5 Chiefs
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.15 Growing conditions** (1.13)

- 1 Wet land (flooded)
- 2 Wet land (raised beds)
- 3 Upland
- 4 Slopes
- 5 Natural swamp
- 6 Atoll (pits)
- 99 Other (specify in descriptor 2.20 **Collector's notes**)

**2.17.15.1 Preferred growing conditions**

If yes, describe farmer's perceptions on adaptation in descriptor 2.20

**Collector's notes**

- 0 No
- 1 Yes

**2.17.16 Associated flora**

Other dominant crop/plant species, including other *Colocasia* species, found in and around the collecting site

**2.17.17 Taro popularity**

Is the variety popular and widely grown? If yes, describe briefly why in descriptor

**2.20 Collector's notes**

- 0 No
- 1 Yes

**2.17.18 Market information**

Specify if any premium price was assigned to the type of *Colocasia*

- 0 No
- 1 Yes

**2.17.19 Cultural practices**

**2.17.19.1 Planting date** [YYYYMMDD]

**2.17.19.2 Harvest date** [YYYYMMDD]

**2.17.20 Cropping system**

- 1 Monoculture
- 2 Intercropped (specify crop in descriptor 2.20 **Collector's notes**)



**2.17.21 Seasonality**

- 1 Available only in season/at particular period
- 2 Available throughout the year
- 99 Other (specify in descriptor **2.20 Collector's notes**)

**2.18 Photograph**

Was a photograph(s) taken of the accession or habitat at the time of collecting? If so, provide an identification number(s) in descriptor **2.20 Collector's notes**.

- 0 No
- 1 Yes

**2.19 Prevailing stresses**

Information on associated biotic and abiotic stresses and the accession's reaction

**2.20 Collector's notes**

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

## MANAGEMENT

### 3. Management descriptors

- 3.1 Accession number** (Passport 1.1)
- 3.2 Population identification** (Passport 2.2)  
Collecting number, pedigree, cultivar name, etc., depending on the population type
- 3.3 Storage address**  
(Building, room, shelf numbers/location in medium- and/or long-term storage)
- 3.4 Storage date** [YYYYMMDD]
- 3.5 Seed germination at storage (initial)** [%]
- 3.6 Date of last seed germination test** [YYYYMMDD]
- 3.7 Seed germination at the last test** [%]
- 3.8 Date of next test** [YYYYMMDD]  
Estimated date when the accession should next be tested
- 3.9 Moisture content at harvest** [%]
- 3.10 Moisture content at storage (initial)** [%]
- 3.11 Type of stored plant material**  
1 Plant  
2 Tissue  
3 Seed  
99 Other (specify in descriptor 4.12 Notes)
- 3.12 Amount of stored plant material** [g or number] (Passport 1.9)
- 3.13 Duplication at other location(s)** (Passport 1.4)
- 3.14 *In vitro* conservation**

- 3.14.1 Type of explant**  
1 Apical or axillary meristem  
2 Apical or axillary shoot tip  
3 Zygotic embryo  
4 Seed  
99 Other (specify in descriptor 4.12 Notes)
- 3.14.2 Date of introduction *in vitro*** [YYYYMMDD]
- 3.14.3 Type of subcultured material**  
1 Axillary shoot  
2 Apical shoot  
3 Callus  
4 Cell suspension  
99 Other (specify in descriptor 4.12 Notes)
- 3.14.4 Regeneration process**  
1 Organogenesis  
2 Somatic embryogenesis  
99 Other (specify in descriptor 4.12 Notes)
- 3.14.5 Number of genotypes introduced *in vitro***
- 3.14.6 Number of replicates per genotype**
- 3.14.7 Last subculture date** [YYYYMMDD]
- 3.14.8 Medium used at the last subculture**
- 3.14.9 Number of plants at the last subculture**
- 3.14.10 Location after the last subculture**
- 3.14.11 Next subculture date** [YYYYMMDD]

#### 4. Multiplication/regeneration descriptors

**4.1 Accession number** (Passport 1.1)

**4.2 Population identification** (Passport 2.3)

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

**4.3 Field plot number**

**4.4 Multiplication/regeneration site location**

**4.5 Collaborator**

**4.6 Planting date [YYYYMMDD]**

**4.7 Cultural practices**

**4.7.1 Field spacing**

**4.7.1.1 Distance between plants [cm]**

**4.7.1.2 Distance between rows [cm]**

**4.7.2 Fertilizer application**

Specify types, doses, frequency of each and method of application

**4.8 Plant/seedling vigour**

**4.8.1 Crops from seed/Tissue-cultured material**

Assessed 45 days after transplanting

3 Low

5 Medium

7 High

**4.8.2 Crop planted from petiole 'tops' or cormels**

Assessed 90 days from planting

3 Low

5 Medium

7 High

**4.9 Number of plants established**

**4.10 Previous multiplication and/or regeneration**

**4.10.1 Location**

**4.10.2 Sowing/planting date [YYYYMMDD]**

**4.10.3 Plot number**

**4.11 Number of times accession regenerated**

(Seeds, petiole 'tops', cormels, tissue cultures and cryogenic storage). Since the date of acquisition

**4.12 Notes**

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 2.4 Country of collecting)

#### 5.2 Site (research institute)

##### 5.2.1 Latitude

Degrees and minutes followed by N (North) or S (South) (e.g. 1030S). Missing data (minutes) should be indicated with hyphen (e.g. 10—S).

##### 5.2.2 Longitude

Degrees and minutes followed by E (East) or W (West) (e.g. 07625 W). Missing data (minutes) should be indicated with hyphen (e.g. 076—W).

##### 5.2.3 Elevation [m asl]

##### 5.2.4 Name and address of farm or institute

#### 5.3 Evaluator's name and address

#### 5.4 Planting date [YYYYMMDD]

#### 5.5 Harvest date [YYYYMMDD]

#### 5.6 Evaluation environment

Environment in which characterization/evaluation was carried out

- 1 Field
- 2 Screenhouse
- 3 Glasshouse
- 4 Laboratory
- 99 Other (specify in descriptor 5.13 Notes)

**5.7 Type of planting material**

- 1 Seedling
- 2 Entire corm
- 3 Corm piece
- 4 Cormel
- 5 Tissue culture plantlet (specify)
- 6 Tops
- 7 Stolon
- 8 Sucker
- 99 Other (specify in descriptor 5.13 Notes)

**5.8 Field establishment [%]**

Percentage of plants established

**5.8.1 Days to establishment [d]**

Specify number of days from planting after which establishment is measured

**5.9 Planting site in the field**

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

**5.10 Environmental characteristics of site**

Use descriptors 6.1.1 to 6.1.22 in section 6

**5.11 Fertilizer**

Specify types, doses, frequency of each and method of application

**5.12 Plant protection**

Specify pesticides used, doses, frequency of each and method of application

**5.13 Notes**

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.

The reference is 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 (>300 m)     |
| 99 | Other             | (specify in appropriate section's Notes) |

**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   | 29 | Coral reef   |
| 14 | Closed depression | 99 | Other (specify in appropriate section's Notes)                 |
| 15 | Dune              |    |  |
| 16 | Longitudinal dune |    |  |



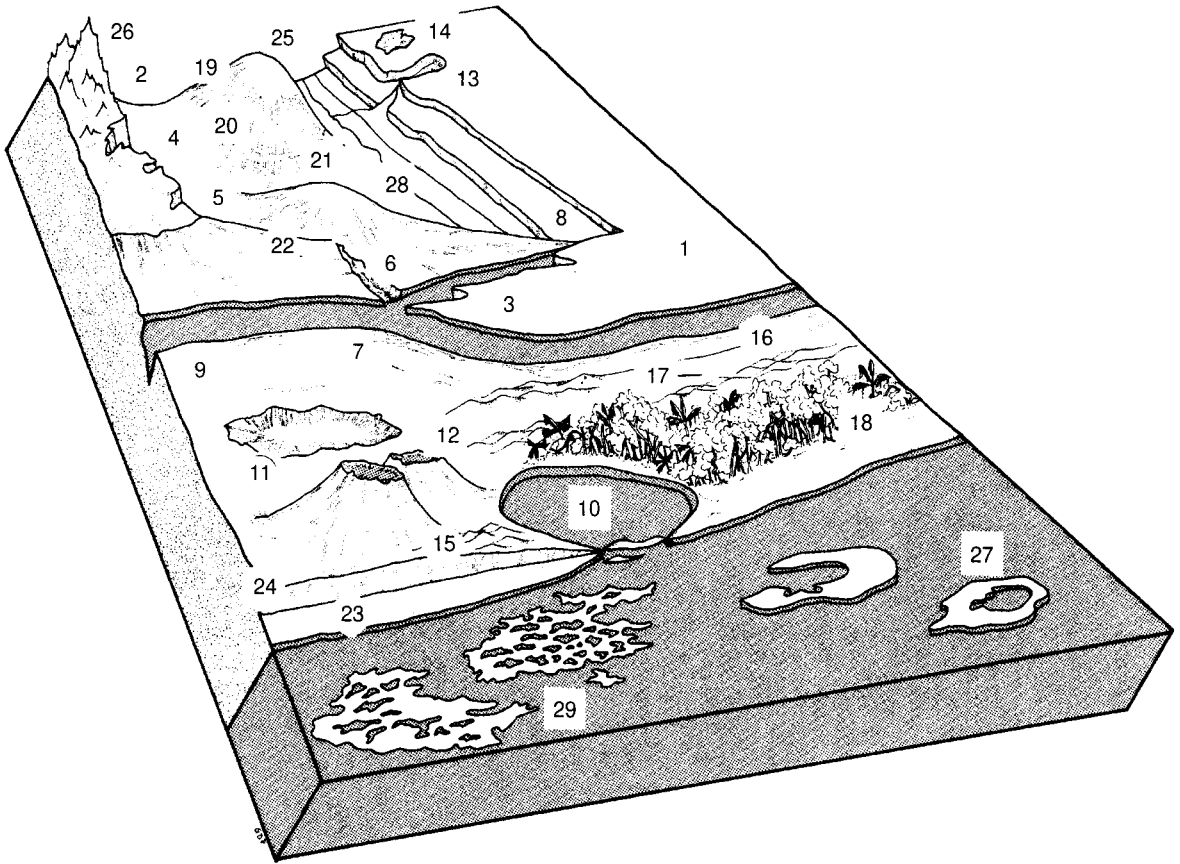


Fig. 1. Land element and position

**6.1.4 Slope [°]**

Estimated slope of the site

**6.1.5 Slope aspect**

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

**6.1.6 Crop agriculture**

(From FAO 1990)

- 1 Annual field cropping
- 2 Perennial field cropping

**6.1.7 Overall vegetation surrounding and at the site**

(Adapted from FAO 1990)

- |    |           |  |
|----|-----------|--|
| 1  | Grassland | (Grasses, subordinate forbs, no woody species)   |
| 2  | Forbland  | (Herbaceous plants predominant)  |
| 3  | Forest    | (Continuous tree layer, crowns overlapping, large number of tree and shrub species in distinct layers) |
| 4  | Woodland  | (Continuous tree layer, crowns usually not touching, understorey may be present)                       |
| 5  | Shrubland | (Continuous layer of shrubs, crowns touching)  |
| 6  | Savanna   | (Grasses with a discontinuous layer of trees or shrubs)  |
| 99 | Other     | (specify in appropriate section's Notes)   |

**6.1.8 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.

**6.1.8.1 Unconsolidated material**

- |   |                                |    |  |
|---|--------------------------------|----|--|
| 1 | Aeolian deposits (unspecified) | 10 | Volcanic ash                                   |
| 2 | Aeolian sand                   | 11 | Loess  |
| 3 | Littoral deposits              | 12 | Pyroclastic deposits                           |
| 4 | Lagoonal deposits              | 13 | Glacial deposits                               |
| 5 | Marine deposits                | 14 | Organic deposits                               |
| 6 | Lacustrine deposits            | 15 | Colluvial deposits                             |
| 7 | Fluvial deposits               | 16 | <i>In situ</i> weathered                       |
| 8 | Alluvial deposits              | 17 | Saprolite                                      |
| 9 | Unconsolidated (unspecified)   | 99 | Other (specify in appropriate section's Notes) |

**6.1.8.2 Rock type**

(Adapted from FAO 1990)

|    |                                    |    |  |
|----|------------------------------------|----|--|
| 1  | Acid igneous/<br>metamorphic rock  | 16 | Limestone  |
| 2  | Granite                            | 17 | Dolomite   |
| 3  | Gneiss                             | 18 | Sandstone  |
| 4  | Granite/gneiss                     | 19 | Quartzitic sandstone                                 |
| 5  | Quartzite                          | 20 | Shale  |
| 6  | Schist                             | 21 | Marl   |
| 7  | Andesite                           | 22 | Travertine   |
| 8  | Diorite                            | 23 | Conglomerate   |
| 9  | Basic igneous/<br>metamorphic rock | 24 | Siltstone  |
| 10 | Ultra basic rock                   | 25 | Tuff   |
| 11 | Gabbro                             | 26 | Pyroclastic rock                                     |
| 12 | Basalt                             | 27 | Evaporite  |
| 13 | Dolerite                           | 28 | Gypsum rock  |
| 14 | Volcanic rock                      | 99 | Other (specify in<br>appropriate section's<br>Notes) |
| 15 | Sedimentary rock                   | 0  | Not known  |

**6.1.9 Stoniness/rockiness/hardpan/cementation**

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

**6.1.10 Soil drainage**

(Adapted from FAO 1990)

- 3 Poorly drained
- 5 Moderately drained
- 7 Well drained

**6.1.11 Soil salinity**

- 1 <160 ppm dissolved salts
- 2 160 - 240 ppm
- 3 241 - 480 ppm
- 4 >480 ppm

### 6.1.12 Soil depth to groundwater table

(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 0 - 25 cm
- 2 25.1 - 50 cm
- 3 50.1 - 100 cm
- 4 100.1 - 150 cm
- 5 >150 cm

### 6.1.13 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 1977). 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         | 7 Reddish brown    | 13 Greyish      |
| 2 Red           | 8 Yellowish brown  | 14 Blue         |
| 3 Reddish       | 9 Yellow           | 15 Bluish-black |
| 4 Yellowish red | 10 Reddish yellow  | 16 Black        |
| 5 Brown         | 11 Greenish, green |                 |
| 6 Brownish      | 12 Grey            |                 |

### 6.1.14 Soil pH

Actual value of the soil within the following root depths around the accession, record only at one of the following depths:

- 6.1.14.1 pH at 0-10 cm
- 6.1.14.2 pH at 11-15 cm
- 6.1.14.3 pH at 16-30 cm
- 6.1.14.4 pH at 31-60 cm
- 6.1.14.5 pH at 61-90 cm

### 6.1.15 Soil erosion

- 3 Low
- 5 Intermediate
- 7 High

**6.1.16 Rock fragments**

(Adapted from FAO 1990)

Large rock and mineral fragments (>2 mm) are described according to abundance

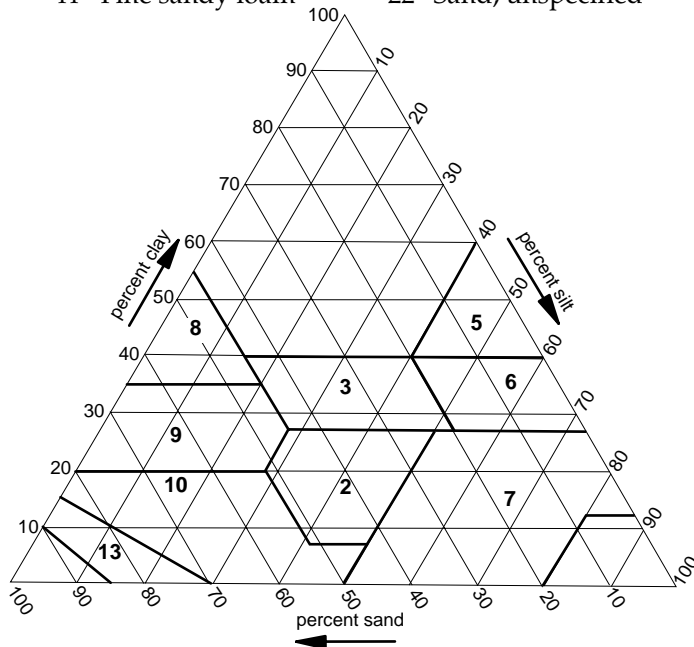
- 1 0 - 2%
- 2 2.1 - 5%
- 3 5.1 - 15%
- 4 15.1 - 40%
- 5 40.1 - 80%
- 6 >80%

**6.1.17 Soil texture classes**

(Adapted from FAO 1990)

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

- |                    |                         |
|--------------------|-------------------------|
| 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    |



**Fig. 2. Soil texture classes**

**6.1.17.1 Soil particle size classes**

(Adapted from FAO 1990)

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

**6.1.18 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 from forest)
- 5 Peaty

**6.1.19 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.).

**6.1.20 Water availability**

- 1 Rain-fed
- 2 Irrigated
- 3 Flooded
- 4 River banks
- 5 Sea coast
- 99 Other (specify in appropriate section's Notes)

**6.1.21 Soil fertility**

General assessment of the soil fertility based on existing vegetation

- 3 Low
- 5 Moderate
- 7 High

**6.1.22 Climate of the site**

Should be assessed as close to the site as possible

**6.1.22.1 Temperature [ $^{\circ}\text{C}$ ]**

Provide either the monthly (mean, maximum, minimum) or the seasonal (mean, maximum, minimum) temperature

**6.1.22.2 Dry season length [d]****6.1.22.3 Rainfall [mm]**

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

**6.1.22.4 Wind [m/s]**

Annual average (state number of years recorded)

**6.1.22.4.1** Frequency of typhoons or hurricane force winds

3 Low

5 Intermediate

7 High

**6.1.22.4.2** Date of most recent typhoons or hurricane force winds [YYYYMMDD]**6.1.22.4.3** Annual maximum wind velocity [m/s]**6.1.22.5 Frost****6.1.22.5.1** Date of most recent frost [YYYYMMDD]**6.1.22.5.2** Survival temperature [°C]

Specify seasonal average and minimum survival temperature

**6.1.22.5.3** Duration of temperature below 0°C [d]**6.1.22.6 Relative humidity****6.1.22.6.1** Relative humidity diurnal range [%]**6.1.22.6.2** Relative humidity seasonal range [%]**6.1.22.7 Light**

1 Shady

2 Sunny

**6.1.22.8 Daylength [h]**

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

## CHARACTERIZATION

### 7. Plant descriptors

For all quantitative descriptors (metric traits), record the average of at least five measurements per individual accession. Most of the observations should be made at maximum vegetative growth stage (about 90 - 120 days after planting), unless otherwise specified.

To make the colour description as simple as possible and because the complexity and difficulty in recording colour descriptors since most of them include colour variations, it was decided to list only the main colours.

#### 7.1 Plant habit

##### 7.1.1 Plant span

Maximum horizontal distance reached by leaves

- 1 Narrow (<50 cm)
- 2 Medium (50 – 100 cm)
- 3 Wide (>100 cm)

##### 7.1.2 Plant height

(2.8)

Maximum vertical distance reached by leaves, relative to ground level

- 1 Dwarf (<50 cm)
- 2 Medium (50 - 100 cm)
- 3 Tall (>100 cm)

##### 7.1.3 Number of stolons (side shoots)

(2.5)

See Fig. 3

- 0 None
- 1 1 - 5
- 2 6 - 10
- 3 11 - 20
- 4 >20

##### 7.1.3.1 Stolon length

Measure the longest stolon

- 1 Short (<15 cm)
- 2 Long (≥15 cm)





Fig. 3. Stolons (on left and right)

**7.1.4 Number of suckers (direct shoot)** (2.7)

- 0 Absent
- 1 1 - 5
- 2 6 - 10
- 3 11 - 20
- 4 >20

**7.2 Leaf**

Observations should be made on two fully developed leaves per plant, record the average of three plants

**7.2.1 Leaf base shape** (2.9.1)

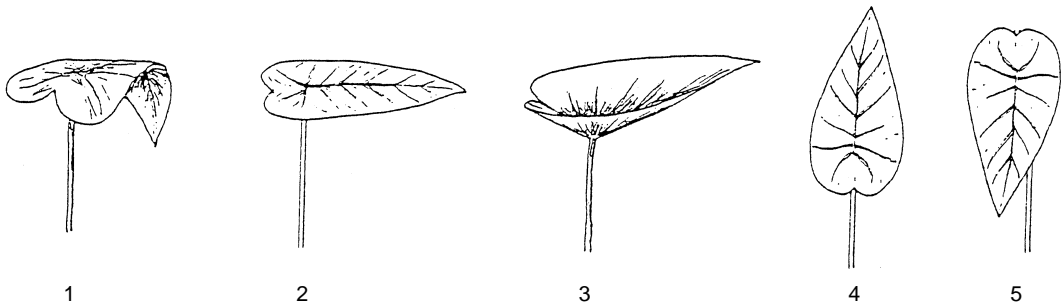
(With regard to the petiole attachment)

- 1 Peltate
- 99 Other (e.g. sagittate, hastate, specify in descriptor 7.8 Notes)

**7.2.2 Predominant position (shape) of leaf lamina surface**

Observed on fully open young leaves. See Fig. 4

- 1 Drooping
- 2 Horizontal
- 3 Cup-shaped
- 4 Erect - apex up
- 5 Erect - apex down
- 99 Other (specify in descriptor 7.8 Notes)



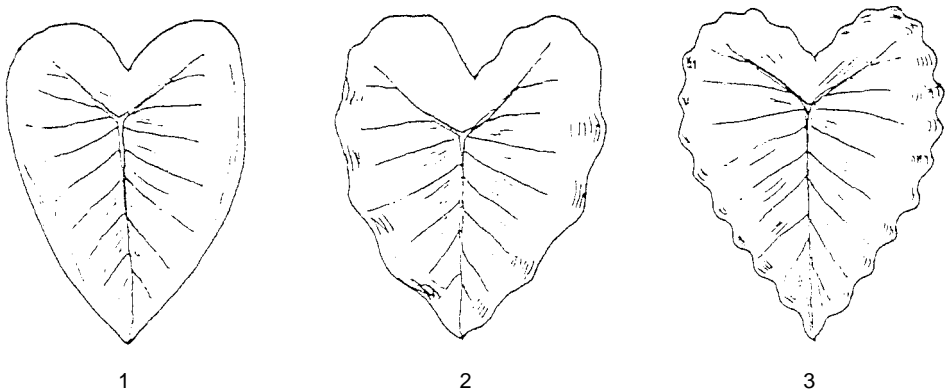
**Fig. 4. Predominant position (shape) of leaf lamina surface**

**7.2.3 Leaf blade margin**

(2.9.4)

See Fig. 5

- 1 Entire
- 2 Undulate
- 3 Sinuate
- 99 Other (specify in descriptors 7.8 Notes)



**Fig. 5. Leaf blade margin**

**7.2.4 Leaf blade colour** (2.9.10)

Observed on fully expanded and mature leaves

- 1 Whitish
- 2 Yellow or yellow green
- 3 Green
- 4 Dark green
- 5 Pink
- 6 Red
- 7 Purple
- 8 Blackish (violet-blue)
- 99 Other (specify in descriptor 7.8 Notes)

**7.2.4.1 Leaf blade colour variegation** (2.9.11)

- 0 Absent
- 1 Present

**7.2.4.2 Type of variegation**

- 1 Fleck
- 2 Mottle
- 3 Stripe

**7.2.4.3 Colour of variegation**

(As for 7.2.4)

**7.2.5 Leaf blade margin colour** (2.9.5)

Observed on the upper side of blade

- 1 Whitish
- 2 Yellow
- 3 Orange
- 4 Green
- 5 Pink
- 6 Red
- 7 Purple
- 99 Other (specify in descriptor 7.8 Notes)

**7.2.6 Leaf lamina appendages** (2.9.6)

- 0 Absent
- 1 Present

**7.2.7 Leaf lamina length/width ratio** (2.9.7)

Recorded at the maximum width and length of leaf lamina excluding petiole

**7.2.8 Petiole junction pattern** (2.9.12)

Area of spots at vein junction on upper surface of leaf. See Fig. 6

- 0 Absent
- 1 Small
- 2 Medium
- 3 Large

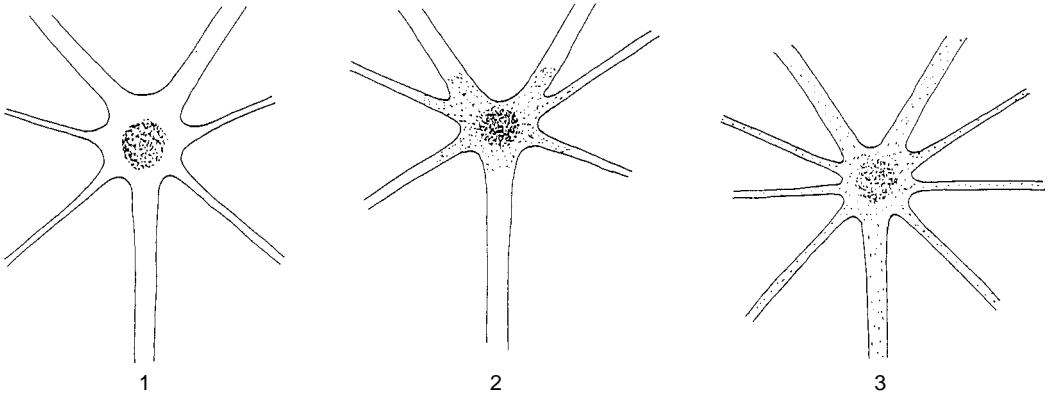


Fig. 6. Petiole junction pattern

**7.2.9 Petiole junction colour** (2.9.13)

Observed on the upper side

- 0 Absent
- 1 Yellow
- 2 Green
- 3 Red
- 4 Purple
- 99 Other (specify in descriptor 7.8 Notes)

**7.2.10 Sap colour of leaf blade tip** (2.9.14)

- 1 Whitish (transparent)
- 2 Yellow
- 3 Pink
- 4 Red
- 5 Dark red
- 6 Brownish
- 99 Other (specify in descriptor 7.8 Notes)

**7.2.11 Leaf main vein colour** (2.9.16)

Observe the upper side of leaf blade, beyond junction

- 1 Whitish
- 2 Yellow
- 3 Orange
- 4 Green
- 5 Pink
- 6 Red
- 7 Brownish
- 8 Purple
- 99 Other (specify in descriptor 7.8 Notes)

**7.2.11.1 Leaf main vein variegation**

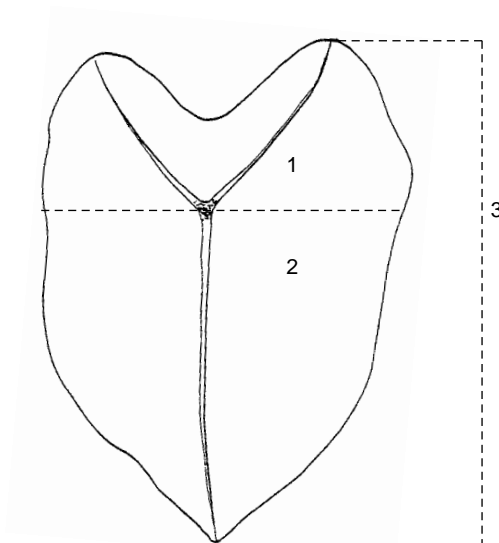
Observe the upper side of leaf blade

- 0 Absent
- 1 Present

**7.2.12 Vein pattern** (2.9.15)

(Shape of pigmentation on veins on leaf lower surface). See Fig. 7

- 1 V pattern (in a 'V' space)
- 2 I pattern (in an 'I' shape)
- 3 Y pattern (in a 'Y' shape)
- 4 Y pattern and extending to secondary veins
- 99 Other (specify in descriptor 7.8 Notes)



**Fig. 7. Vein pattern**

**7.2.13 Petiole/lamina length ratio** (2.9.18)

**7.2.14 Petiole colour** (2.9.19)

**7.2.14.1 Colour of top third**

- 1 Whitish
- 2 Yellow
- 3 Orange
- 4 Light green
- 5 Green
- 6 Red
- 7 Brown
- 8 Purple
- 99 Other (e.g. 'bronze', black specify on **descriptor 7.8 Notes**)

**7.2.14.2 Colour of middle third**

Same colours as for 7.2.14.1

**7.2.14.3 Colour of basal third**

Same colours as for 7.2.14.1

**7.2.15 Petiole stripe**

- 0 Absent
- 1 Present

**7.2.15.1 Petiole stripe colour**

Same colours as for 7.2.14.1

**7.2.16 Petiole basal-ring colour** (2.9.20)

- 1 White
- 2 Green (yellow green)
- 3 Pink
- 4 Red
- 5 Purple
- 99 Other (specify on descriptor 7.8 Notes)

**7.2.17 Cross-section of lower part of petiole** (2.9.23)

Observed on healthy and fully developed leaves of the same age. See Fig. 8

- 1 Open
- 2 Closed

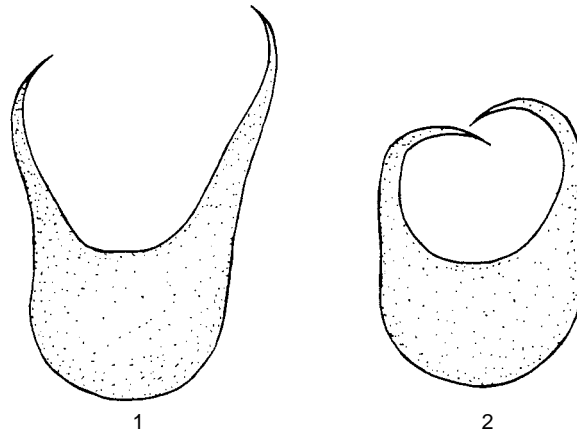


Fig. 8. Cross-section of lower part of petiole

**7.2.18 Ratio of sheath length /total petiole length** (2.9.26)

**7.2.19 Leaf sheath colour** (2.9.28)

- 1 Whitish
- 2 Yellow
- 3 Light green
- 4 Red purple
- 5 Brownish
- 99 Other (specify in descriptor 7.8 Notes)

**7.2.19.1 Leaf sheath edge colour**

- 1 Dark brown (continuous)
- 2 Dark brown (not continuous)
- 99 Other (specify in descriptor 7.8 Notes)

**7.2.20 Leaf waxiness**

- 0 Absent
- 3 Low
- 5 Medium
- 7 High

### 7.3 Inflorescence

#### 7.3.1 Flower formation (2.10.1)

- 0 Absent
- 1 Rarely flowering (less than 10% of plants flowering)
- 2 Flowering (more than 10%<sup>1</sup> of plants flowering)

#### 7.3.2 Inflorescence stalk colour

As in Petiole colour (7.2.14.1)

#### 7.3.3 Number of inflorescences/leaf axis (2.10.2)

(Per cluster)

- 1 One
- 2 Two
- 3 Three
- 4 Four
- 5 Five or more

#### 7.3.4 Number of floral clusters per plant

- 1 One
- 2 2 – 3
- 3 4 – 6
- 4 7 – 10
- 5 >10

#### 7.3.5 Male portion of inflorescence (2.10.3)

- 1 Enclosed
- 2 Exposed

#### 7.3.6 Pollen production

- 0 Absent
- 1 Present

#### 7.3.7 Pollen colour

- 1 Light yellow
- 2 Brownish yellow
- 3 Pink or red
- 4 Purple or purple-blue
- 99 Other (e.g. colour not uniform: pollen grains from the same spadix differ in colour, specify in descriptor 7.8 Notes)

---

<sup>1</sup> 10% is considered to be the level of frequent flowering.



**7.3.8 Fertility of female part of the inflorescence**

- 0 None
- 1 Low (less than 40% fertile flowers)
- 2 Intermediate (less than 80% fertile flowers)
- 3 High (almost 100% fertile flowers)

**7.3.9 Sterile appendage/male portion ratio** (2.10.4)

- 1 <0.2
- 2 0.2 – 0.5
- 3 0.6 - 1
- 4 1.1 – 1.5
- 5 >1.5

**7.3.10 Pigmentation of male portion**

Recorded during anthesis

- 0 Absent
- 1 Present

**7.3.11 Peduncle length/inflorescence length ratio** (2.10.5)**7.3.12 Limb colour (upper part of spathe)** (2.10.6)

Recorded at anthesis

- 1 Light yellow
- 2 Yellow-orange
- 3 Yellow with green or green-purple blotches
- 4 Yellow with red or purple-red blotches
- 5 Orange-red
- 6 Red
- 7 Purple or purple-blue
- 99 Other (specify in descriptor 7.8 Notes)

**7.3.13 Tube colour (lower part of spathe enclosing the flowers)** (2.10.7)

- 1 Green
- 2 Green with light (yellow) stripes or blotches
- 3 Green with dark (red, purple or brownish) stripes or blotches
- 4 Red
- 5 Purple
- 6 Brownish
- 99 Other (specify in descriptor 7.8 Notes)

**7.3.14 Flag leaf colour**

(2.10.8)

Predominant colour after full emergence

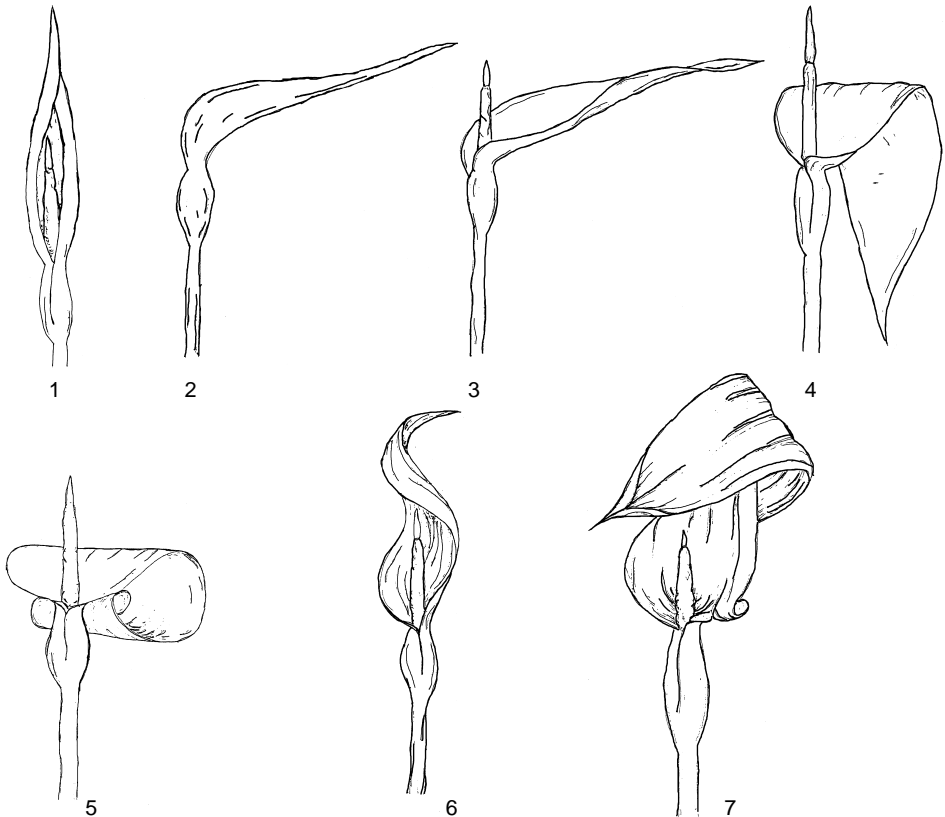
- 1 Whitish (or transparent)
- 2 Light yellow
- 3 Light green
- 4 Pinkish
- 5 Purplish
- 99 Other (specify in descriptor 7.8 Notes)

**7.3.15 Spathe shape at male anthesis**

(2.10.9/10)

See Fig. 9

- 1 Hooded
- 2 Keeled
- 3 Flat
- 4 Fully open and drooping
- 5 Rolled backward
- 6 Twisted
- 7 Rolled and twisted
- 8 Unopened and twisted (not illustrated)



**Fig. 9. Spathe shape at male anthesis**

## 7.4 Fruit

(Fruit cluster, fruit head)

### 7.4.1 Fruit formation (2.11.1)

- 0 No
- 1 Yes
- 2 Rare

### 7.4.2 Fruit colour (2.11.2)

Observed on fully mature and healthy fruit heads; individual berries have to be soft

- 1 Whitish
- 2 Yellow
- 3 Orange
- 4 Light green
- 5 Dark green
- 6 Red
- 7 Purple
- 99 Other (specify in descriptor 7.8 Notes)

### 7.4.3 Number of berries per fruit bunch

### 7.4.4 Seed coat colour

Observed on dry seeds

- 1 Whitish
- 2 Light brown
- 3 Dark brown
- 4 Light red
- 5 Dark red or purple
- 99 Other (e.g. when more than one colour is found within one fruiting head, specify in descriptor 7.8 Notes)

### 7.4.5 Seed shape

Observed on dry seeds. See Fig. 10

- 1 Elongate
- 2 Elliptic
- 3 Oval
- 4 With 'bottle neck'
- 5 Conical
- 6 Twisted
- 99 Other (specify in descriptor 7.8 Notes)

### 7.4.6 Number of seeds per berry

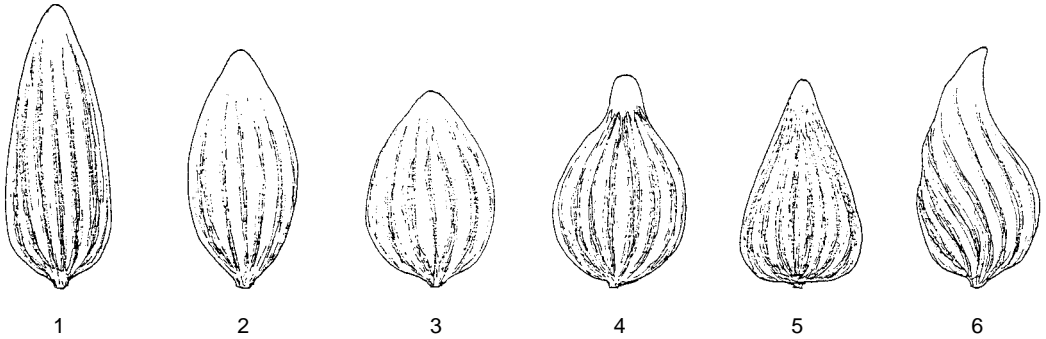


Fig. 10. Seed shape

**7.5 Corm**

**7.5.1 Corm manifestation**

(2.12.1)

- 0 No
- 1 Yes

**7.5.2 Corm length**

Measured on fully mature plants

- 3 Short (8 cm)
- 5 Intermediate (12 cm)
- 7 Long (18 cm)

**7.5.3 Corm branching**

(2.12.2)

See Fig. 11

- 0 Unbranched
- 1 Branched

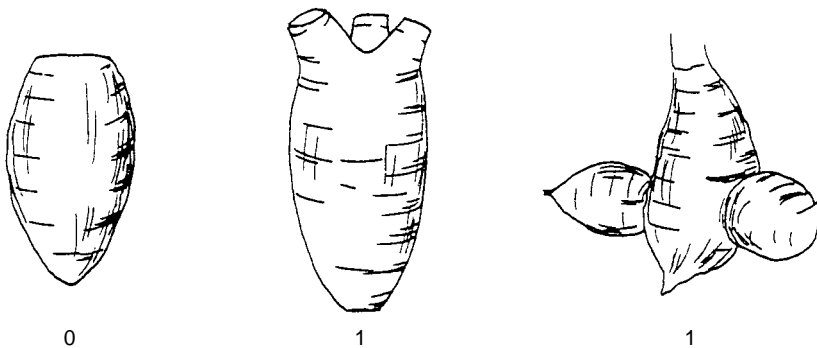


Fig. 11. Corm branching

**7.5.4 Corm shape** (2.12.2)

See Fig. 12

- 1 Conical
- 2 Round
- 3 Cylindrical
- 4 Elliptical
- 5 Dumb-bell
- 6 Elongated
- 7 Flat and multifaced
- 8 Clustered
- 9 Hammer-shaped (not illustrated)
- 99 Other (specify in descriptor 7.8 Notes)

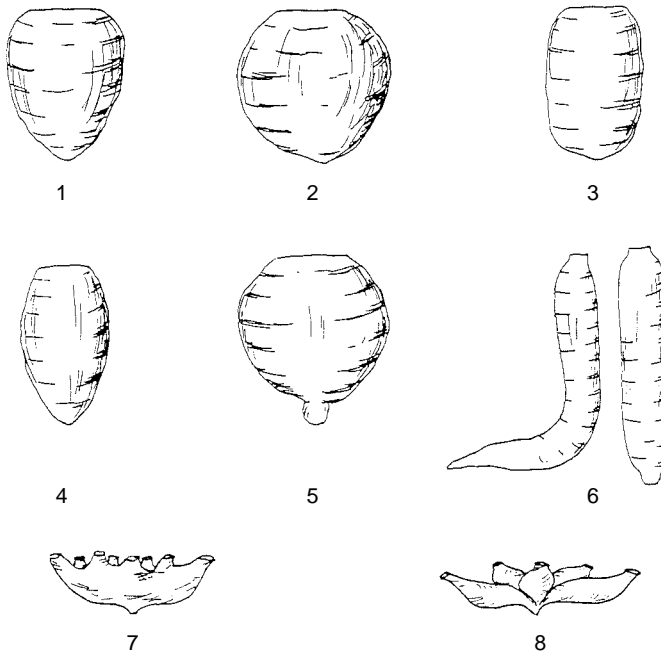


Fig. 12. Corm shape

**7.5.5 Corm weight** (2.12.3)

Recorded at maturity

- 3 (0.5 kg)
- 5 (2.0 kg)
- 7 (4.0 kg)

**7.5.6 Corm cortex colour** (2.12.4)

- 1 White
- 2 Yellow or yellow-orange
- 3 Red
- 4 Pink
- 5 Brown
- 6 Purple
- 7 Blackish
- 99 Other (specify in descriptor 7.8 Notes)

**7.5.7 Corm flesh colour of central part** (2.12.5)

- 1 White
- 2 Yellow
- 3 Orange
- 4 Pink
- 5 Red
- 6 Red-purple
- 7 Purple
- 99 Other (e.g. if colour is not uniform – blotches of lighter or darker pigmentation – specify in descriptor 7.8 Notes)

**7.5.8 Corm flesh fibre colour** (2.12.6)

- 1 White
- 2 Light yellow
- 3 Yellow or orange
- 4 Red
- 5 Brown
- 6 Purple
- 99 Other (specify in descriptor 7.8 Notes)

**7.5.9 Corm skin surface** (2.12.7)

See Fig. 13

- 1 Smooth
- 2 Fibrous
- 3 Scales present
- 4 Fibrous and scales present (not illustrated)
- 99 Other (e.g. upper part smooth, specify in descriptor 7.8. Notes)

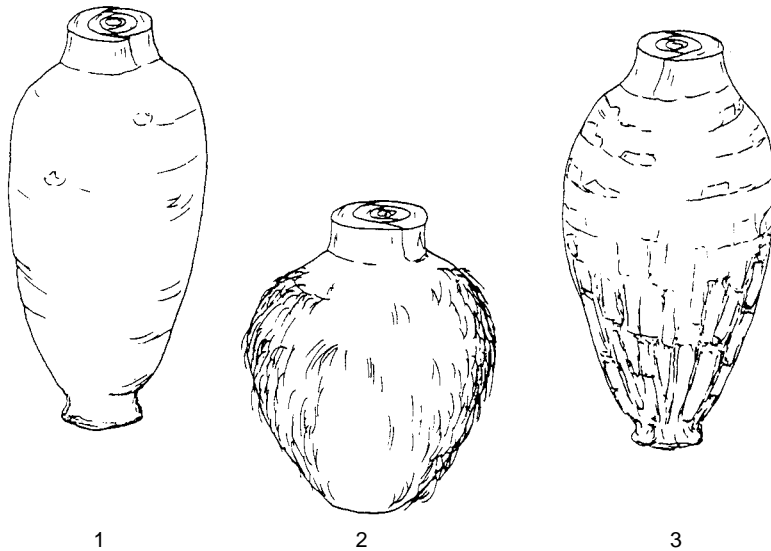


Fig. 13. Corm skin surface

**7.5.10 Corm skin thickness**

- 1 Thin
- 2 Thick

**7.5.11 Degree of fibrousness of corm**

(2.12.8)

- 0 Absent
- 1 Slightly fibrous
- 2 Very fibrous

**7.5.12 Bud colour**

- 1 White
- 2 Yellow-green
- 3 Pink/red
- 4 Purple
- 99 Other (specify in descriptor 7.8 Notes)

**7.6 Cormels**

**7.6.1 Number of cormels**

(2.13.1)

- 1 Less than 5
- 2 5 to 10
- 3 More than 10

**7.6.2 Weight of cormels** (2.13.2)

(Including cormels from *antiquorum* types)

- 3 100 g
- 5 250 g
- 7 500 g

**7.6.3 Shape of cormels** (2.13.4)

(Including the shape of cormels from *antiquorum* types)

- 1 Conical
- 2 Round
- 3 Cylindrical
- 4 Elliptical
- 5 Elongated
- 6 Elongated and curved
- 99 Other (specify in descriptor 7.8 Notes)

**7.6.4 Flesh colour of cormels** (2.13.5)

Including the flesh colours of cormels and suckers as well as the cormels from *antiquorum* types

- 1 White
- 2 Yellow
- 3 Orange
- 4 Pink
- 5 Red
- 6 Red-purple
- 7 Purple
- 8 Colour not uniform (with blotches of lighter or darker pigmentation)
- 99 Other (specify in descriptor 7.8 Notes)

**7.7 Root**

**7.7.1 Root colour** (2.14.1)

- 1 White
- 2 Red (orange-red)
- 3 Brown (greyed-red)
- 99 Other (specify in descriptor 7.8 Notes)

**7.7.2 Uniformity of root colour**

- 0 No
- 1 Yes

**7.8 Notes**

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



## EVALUATION

### 8. Plant descriptors

#### 8.1 Chemical analysis

Specify storage conditions of the material for the following tests:

##### 8.1.1 Starch content [mg/100 g, DW]

Specify the part of the plant used in descriptor **8.5 Notes**

##### 8.1.2 Dry matter content of corms [mg/100 g, DM]

At short storage (<1 week)

##### 8.1.3 Dry matter content of cormels [mg/100 g, DM]

At short storage (<1 week)

##### 8.1.4 Dry matter content of corms [mg/100 g, DM]

After storage (>1 week)

##### 8.1.5 Corm acidity [mg/100 g DM]

- |   |              |              |
|---|--------------|--------------|
| 1 | Very low     | ≤ 50 mg      |
| 2 | Low          | 51 - 100 mg  |
| 3 | Intermediate | 101 - 300 mg |
| 4 | High         | > 300 mg     |

##### 8.1.6 Cormel acidity [mg/100 g DM]

- |   |              |              |
|---|--------------|--------------|
| 1 | Very low     | ≤ 50 mg      |
| 2 | Low          | 51 - 100 mg  |
| 3 | Intermediate | 101 - 300 mg |
| 4 | High         | > 300 mg     |

##### 8.1.7 Palatability

Taste panel test

- |   |      |
|---|------|
| 3 | Bad  |
| 5 | Fair |
| 7 | Good |

#### 8.2 Self-compatibility

- 1 Self-compatible (normal seed set under isolation, self-pollination)
- 2 Semi-self-compatible (number of seeds reduced)
- 3 Self-incompatible (no seeds)

### 8.3 Agronomic characteristics

#### 8.3.1 Plant maturity (earliness) (2.3)

- 1 Very early (<4 months)
- 2 Early (4 to 6 months)
- 3 Intermediate (6 to 8 months)
- 4 Late (8 to 10 months)
- 5 Very late (>10 months)
- 6 Undetermined growth (wild types)

### 8.4. Inflorescence

#### 8.4.1 Pollen stainability in acetocarmine [%]

#### 8.4.2 Duration of male phase [h]

#### 8.4.3 Viability of pollen [h]

### 8.5 Notes

Specify here any other additional information

## 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 high temperature

Scored under natural conditions during the hot season

### 9.2 Reaction to drought

Scored under natural conditions during day period for at least four weeks

### 9.3 Reaction to high soil moisture

Scored under paddy conditions

### 9.4 Reaction to soil salinity

### 9.5 Reaction to high soil acidity

(pH <4.5)

(1.14)

**9.6 Reaction to alkalinity****9.7 Reaction to shade****9.8 Reaction to constant winds****9.9 Notes**

Specify any additional information here

**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 Notes**. 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

**10.1 Pests**

- |                |                           |                                      |
|----------------|---------------------------|--------------------------------------|
| <b>10.1.1</b>  | <i>Papuana</i> spp.       | Beetles (4.1)                        |
| <b>10.1.2</b>  | <i>Spodoptera</i> spp.    | Caterpillar, Armyworm                |
| <b>10.1.3</b>  | <i>Hippotion swinhoel</i> | Papuan horn worm (or hawkmoth) (4.3) |
| <b>10.1.4</b>  |                           | Grasshopper (4.4)                    |
| <b>10.1.5</b>  |                           | Aphids (4.5)                         |
| <b>10.1.6</b>  |                           | Mites (4.6)                          |
| <b>10.1.7</b>  | <i>Tarophagus</i> spp.    | Taro leaf hopper                     |
| <b>10.1.8</b>  |                           | White flies                          |
| <b>10.1.9</b>  |                           | Nematodes                            |
| <b>10.1.10</b> |                           | Thrips                               |

**10.2 Diseases**

- |               |  |                             |
|---------------|--|-----------------------------|
| <b>10.2.1</b> | <i>Phytophthora colocasiae</i>                                 | Taro leaf blight (5.2)      |
| <b>10.2.2</b> | <i>Pythium</i> spp.  | Pythium root rot (5.3)      |
| <b>10.2.3</b> | <i>Erwinia carotovora</i>                                      | (5.4)                       |
| <b>10.2.4</b> | Dasheen mosaic virus (DsMV)                                    |                             |
| <b>10.2.5</b> | Alomae-bobone virus complex (ABVC)                             | Lethal disease              |
| <b>10.2.6</b> | <i>Colocasia</i> veinal chlorosis rhabdovirus                  |                             |
| <b>10.2.7</b> | <i>Phyllostychta</i> spp.                                      | Leaf spot or shot hole spot |
| <b>10.2.8</b> | <i>Cladosporium colocasiae</i>                                 | Ghost or False spot         |
| <b>10.2.9</b> | <i>Lasiodiplodia theobromae</i> , <i>Fusarium proliferatum</i> | Storage rot of taro         |

### 10.3 Notes

Specify here any additional information

## 11. Biochemical markers

### 11.1 Isozyme

For each enzyme, indicate the tissue analyzed and the zymogram type. A particular enzyme can be recorded as 11.1.1; 11.1.2, etc. Examples include: Acid phosphatase (ACPH); Esterases  $\alpha$  and  $\beta$  (EST A and B); Isocitrate dehydrogenase (ICD); Malate dehydrogenase (MDH); Phosphogluconate dehydrogenase (PGD); Phosphoglucose isomerase (PGI); Phosphoglucose mutase (PGM); Peroxidases

### 11.2 Other biochemical markers

(e.g. Polyphenol profile)

## 12. Molecular markers

Describe any specific discriminating or useful trait for this accession. Report probe-enzyme combination analyzed. Below are listed some of the basic methods most commonly used

### 12.1 Restriction fragment length polymorphism (RFLP)

Report probe/enzyme combination (approach can be used for nuclear, chloroplast or mitochondrial genomes)

### 12.2 Amplified fragment length polymorphism (AFLP)

Report primer pair combinations and accurate molecular size of products (used for nuclear genomes)

### 12.3 DNA amplification fingerprinting (DAF); random amplified polymorphic DNA (RAPD); AP-PCR

Accurately report experimental conditions and molecular size of products (used for nuclear genomes)

### 12.4 Sequence-tagged microsatellites (STMS)

Report primer sequences, and accurate product sizes (can be used for nuclear or chloroplast genomes)

### 12.5 PCR-sequencing

Report PCR primer sequences, and derived nucleotide sequence (can be used for single copy nuclear, chloroplast or mitochondrial genomes)

### 12.6 Other molecular markers

### 13. Cytological characters

**13.1 Chromosome number** (2.2)

**13.2 Ploidy level**

(2x, 3x, 4x, etc.)

**13.3 Meiosis chromosome associations**

Average of 50 microspore mother cells, observed during metaphase 1

**13.4 Other cytological characters**

### 14. Identified genes

Describe any known specific mutant present in the accession

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## ANNEX I. Multicrop Passport Descriptors

This list of multicrop passport descriptors has been developed jointly by IPGRI and FAO to provide consistent coding schemes for common passport descriptors across crops. These descriptors aim to be compatible with future IPGRI crop descriptor lists and with the descriptors to be used for the FAO World Information and Early Warning System (WIEWS) on plant genetic resources.

The list should NOT be regarded as a minimum descriptor list, since many additional passport descriptors are essential for the description of crops and need to be recorded. This document lists an initial set of common passport descriptors at the multicrop level. At a later stage the list could be expanded with additional multicrop descriptors. For example, descriptors dealing with the use of germplasm are currently not included, but their suitability for inclusion at the multicrop level will be investigated. Future expansion could even result in the development of more specialized lists of common descriptors at the crop group level.

Printed here is the latest version of the list (1997) which contains two sections. The latter one (FAO WIEWS DESCRIPTORS) lists a number of optional descriptors used in the FAO WIEWS. The list provides descriptions of content and coding schemes, but also provides *suggested* fieldnames (in parentheses) that can assist in the computerized exchange of this type of data.

## MULTICROP PASSPORT DESCRIPTORS

|   |                   |
|---|-------------------|
| <b>1. Institute code</b>  | <b>(INSTCODE)</b> |
| 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 number or an acronym as specified in the Institute database that will be made available by FAO. Preliminary codes (i.e. codes not yet incorporated in the FAO Institute database) start with an asterisk followed by a 3-letter ISO 3166 country code and an acronym.   |                   |
| <b>2. Accession number</b>  | <b>(ACCENUMB)</b> |
| 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 should never be reused. Letters should be used before the number to identify the genebank or national system (e.g. IDG indicates an accession that comes from the genebank at Bari, Italy; CGN indicates an accession from the genebank at Wageningen, The Netherlands; PI indicates an accession within the USA system). |                   |
| <b>3. Collecting number</b>   | <b>(COLLNUMB)</b> |
| 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. It should be unique and always accompany subsamples wherever they are sent.  |                   |
| <b>4. Genus</b>   | <b>(GENUS)</b>    |
| Genus name for taxon. Initial uppercase letter required.  |                   |
| <b>5. Species</b>   | <b>(SPECIES)</b>  |
| Specific epithet portion of the scientific name in lowercase letters plus authority <sup>1</sup> . Following abbreviation is allowed: "sp."   |                   |
| <b>6. Subtaxa</b>   | <b>(SUBTAXA)</b>  |
| Subtaxa can be used to store any additional taxonomic identifier plus authority <sup>1</sup> . Following abbreviations are allowed: "ssp." (for subspecies); "var." (for variety); "convar." (for convariety); "f." (for form).   |                   |
| <b>7. Accession name</b>  | <b>(ACCNAME)</b>  |
| Either a registered or other formal designation given to the accession. First letter uppercase. Multiple names separated with semicolon.  |                   |
| <b>8. Country of origin</b>   | <b>(ORIGCTY)</b>  |
| Name of the country in which the sample was originally collected or derived. Use the ISO 3166 extended codes, (i.e. current and old 3 letter ISO 3166 country codes)  |                   |
| <b>9. Location of collecting site</b>   | <b>(COLLSITE)</b> |
| Location information below the country level that describes where the accession was collected starting with the most detailed information. Might include the distance in kilometers and direction from the nearest town, village or map grid reference point, (e.g. CURITIBA 7S, PARANA means 7 km south of Curitiba in the state of Parana)  |                   |
| <b>10. Latitude of collecting site</b>  | <b>(LATITUDE)</b> |
| Degrees and minutes followed by N (North) or S (South) (e.g. 1030S). Missing data (minutes) should be indicated with hyphen (e.g. 10–S).  |                   |

<sup>1</sup> Authority is only provided at the most detailed taxonomic level

|  |                                       |                           |                                       |
|--|---------------------------------------|---------------------------|---------------------------------------|
| <b>11. Longitude of collecting site</b>  | <b>(LONGITUDE)</b>                    |                           |                                       |
| Degrees and minutes followed by E (East) or W (West) (e.g. 07625W). Missing data (minutes) should be indicated with hyphen (e.g. 076–W).   |                                       |                           |                                       |
| <b>12. Elevation of collecting site [m asl]</b>  | <b>(ELEVATION)</b>                    |                           |                                       |
| Elevation of collecting site expressed in meters above sea level. Negative values allowed.   |                                       |                           |                                       |
| <b>13. Collecting date of original sample [YYYYMMDD]</b>   | <b>(COLLDATE)</b>                     |                           |                                       |
| Collecting date of the original sample where YYYY is the year, MM is the month and DD is the day.  |                                       |                           |                                       |
| <b>14. Status of sample</b>  | <b>(SAMPSTAT)</b>                     |                           |                                       |
| 1 Wild   | 0 Unknown                             |                           |                                       |
| 2 Weedy  |                                       |                           |                                       |
| 3 Traditional cultivar/Landrace  | 99 Other (Elaborate in REMARKS field) |                           |                                       |
| 4 Breeder's line   |                                       |                           |                                       |
| 5 Advanced cultivar  |                                       |                           |                                       |
| <b>15. Collecting source</b>   | <b>(COLLSRC)</b>                      |                           |                                       |
| The coding scheme proposed can be used at 2 different levels of detail: Either by using the global codes such as 1, 2, 3, 4 or by using the more detailed coding such as 1.1, 1.2, 1.3 etc.  |                                       |                           |                                       |
| 1 Wild habitat   | 2 Farm                                | 3 Market                  | 4 Institute/Research organization     |
| 1.1 Forest/woodland  | 2.1 Field                             | 3.1 Town                  |                                       |
|  | 2.2 Orchard                           | 3.2 Village               |                                       |
| 1.2 Shrubland  | 2.3 Garden                            | 3.3 Urban                 | 0 Unknown                             |
| 1.3 Grassland  | 2.4 Fallow                            | 3.4 Other exchange system |                                       |
| 1.4 Desert/tundra  | 2.5 Pasture                           |                           | 99 Other (Elaborate in REMARKS field) |
|  | 2.6 Store                             |                           |                                       |
| <b>16. Donor institute code</b>  | <b>(DONORCODE)</b>                    |                           |                                       |
| Code for the donor institute. The codes consist of the 3-letter ISO 3166 country code of the country where the institute is located plus number or an acronym as specified in the Institute database that will be made available by FAO. Preliminary codes (i.e. codes not yet incorporated in the FAO Institute database) start with an asterisk followed by a 3-letter ISO 3166 country code and an acronym.   |                                       |                           |                                       |
| <b>17. Donor number</b>  | <b>(DONORNUMB)</b>                    |                           |                                       |
| Number assigned to an accession by the donor. Letters should be used before the number to identify the genebank or national system (e.g. IDG indicates an accession that comes from the genebank at Bari, Italy; CGN indicates an accession from the genebank at Wageningen, The Netherlands; PI indicates an accession within the USA system)   |                                       |                           |                                       |
| <b>18. Other number(s) associated with the accession</b>   | <b>(OTHERNUMB)</b>                    |                           |                                       |
| Any other identification number known to exist in other collections for this accession. Letters should be used before the number to identify the genebank or national system (e.g. IDG indicates an accession that comes from the genebank at Bari, Italy; CGN indicates an accession from the genebank at Wageningen, The Netherlands; PI indicates an accession within the USA system). Multiple numbers can be added and should be separated with a semicolon |                                       |                           |                                       |
| <b>19. Remarks</b>   | <b>(REMARKS)</b>                      |                           |                                       |
| The remarks field is used to add notes or to elaborate on descriptors with value "99" (=Other). Prefix remarks with the field name they refer to and a colon (e.g. COLLSRC: roadside). Separate remarks referring to different fields are separated by semicolons.   |                                       |                           |                                       |

| <b>FAO WIEWS DESCRIPTORS</b>  |                    |
|---|--------------------|
| <b>1. Location of safety duplicates</b>   | <b>(DUPLSITE)</b>  |
| Code of the institute where a safety duplicate of the accession is maintained. The codes consist of 3-letter ISO 3166 country code of the country where the institute is located plus number or an acronym as specified in the Institute database that will be made available by FAO. Preliminary codes (i.e. codes not yet incorporated in the FAO Institute database) start with an asterisk followed by a 3-letter ISO 3166 country code and an acronym. Multiple numbers can be added and should be separated with a semicolon. |                    |
| <b>2. Availability of passport data</b>   | <b>(PASSAVAIL)</b> |
| (i.e. in addition to what has been provided)  |                    |
| 0 Not available   |                    |
| 1 Available   |                    |
| <b>3. Availability of characterization data</b>   | <b>(CHARAVAIL)</b> |
| 0 Not available   |                    |
| 1 Available   |                    |
| <b>4. Availability of evaluation data</b>   | <b>(EVALAVAIL)</b> |
| 0 Not available   |                    |
| 1 Available   |                    |
| <b>5. Acquisition type of the accession</b>   | <b>(ACQTYPE)</b>   |
| 1 Collected/bred originally by the institute  |                    |
| 2 Collected/bred originally by joint mission/institution  |                    |
| 3 Received as a secondary repository  |                    |
| <b>6. Type of storage</b>   | <b>(STORATYPE)</b> |
| Maintenance type of germplasm. If germplasm is maintained under different types of storage, multiple choices are allowed, separated by a semicolon (e.g. 2;3). (Refer to FAO/IPGRI Genebank Standards 1994 for details on storage type)   |                    |
| 1 Short-term  |                    |
| 2 Medium-term   |                    |
| 3 Long-term   |                    |
| 4 <i>In vitro</i> collection  |                    |
| 5 Field genebank collection   |                    |
| 6 Cryopreserved   |                    |
| 99 Other (elaborate in REMARKS field)   |                    |

Please forward your feedback on the use of this list to:

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