IPGRI

Descriptors for Citrus

List of Descriptors

Almond (revised) * (E)	1985
Apple (E)	1982
Apricot * (E)	1984
Avocado (E,S)	1995
Bambara groundnut (E)	1987
Banana (E,S,F)	1996
Barley (E)	1994
Beta (E)	1991
Black pepper (E,S)	1995
Brassica and *Raphanus* (E)	1990
Brassica campestris L. (E)	1987
Buckwheat (E)	1994
Capsicum (E,S)	1995
Cardamom (E)	1994
Carrot (E,S,F)	1998
Cashew (E)	1986
Cherry * (E)	1985
Chickpea (E)	1993
Citrus (E)	1988
Coconut (E)	1992
Coffee (E,S,F)	1996
Colocasia * (E)	1980
Cotton (Revised) (E)	1985
Cowpea (E)	1983
Cultivated potato * (E)	1977
Echinochloa millet * (E)	1983
Eggplant (E,F)	1990
Faba bean * (E)	1985
Finger millet (E)	1985
Forage grass * (E)	1985
Forage legumes * (E)	1984
Grapevine (E,S,F)	1997
Groundnut (E,S,F)	1992
Kodo millet * (E)	1983
Lentil * (E)	1985
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
Panicum miliaceum and *P. sumatrense* (E)	1985
Papaya (E)	1988
Peach * (E)	1985
Pear * (E)	1983
Pearl millet (E,F)	1993
Phaseolus acutifolius (E)	1985
Phaseolus coccineus * (E)	1983
Phaseolus vulgaris * (E)	1982
Pigeonpea (E)	1993
Pineapple (E)	1991
Pistacia (excluding *Pistacia vera*) (E)	1998
Pistachio (E,F)	1997
Plum * (E)	1985
Potato variety * (E)	1985
Quinua * (E)	1981
Rice * (E)	1980
Rocket (*Eruca* spp.)	1999
Rye and Triticale * (E)	1985
Safflower * (E)	1983
Sesame * (E)	1981
Setaria italica and *S. pumilia* (E)	1985
Sorghum (E,F)	1993
Soyabean * (E,C)	1984
Strawberry (E)	1986
Sunflower * (E)	1985
Sweet potato (E,S,F)	1991
Taro (E,S,F)	1999
Tea (E,S,F)	1997
Tomato (E, S, F)	1996
Tropical fruit * (E)	1980
Vigna aconitifolia and *V. trilobata* (E)	1985
Vigna mungo and *V. radiata* (Revised) * (E)	1985
Walnut (E)	1994
Wheat (Revised) * (E)	1985
Wheat and *Aegilops* * (E)	1978
White Clover (E)	1992
Winged Bean * (E)	1979
Xanthosoma (E)	1989
Yam (E,S,F)	1997

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Descriptors for

Citrus

The International Plant Genetic Resources Institute (IPGRI) is an autonomous international scientific organization, supported by the Consultative Group on International Agricultural Research (CGIAR). IPGRI's mandate is to advance the conservation and use of genetic diversity for the well-being of present and future generations. IPGRI's headquarters is based in Rome, Italy, with offices in another 15 countries worldwide. It operates through three programmes: (1) the Plant Genetic Resources Programme, (2) the CGIAR Genetic Resources Support Programme, and (3) the International Network for the Improvement of Banana and Plantain (INIBAP).

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CONTENTS

PREFACE

Descriptors for Citrus is a revision of the original IBPGR publication **Descriptors for Citrus** (1988). The descriptor numbers of the original list are given in parentheses beside the present descriptors for cross-referencing purposes. This descriptor list has been devised to cover members of the tribe Citreae of the Family Rutaceae and subfamily Aurantioideae, all of which have a type of fruit-bearing, juice-filled vesicle known as a hesperidium. Of about 13 genera involved, the most important are *Citrus* (16 species including 10 cultivated, according to Swingle's classification), *Fortunella* and *Poncirus* and their hybrids. This revised descriptor list is based on the work of a team of SRA INRA-CIRAD[1] in Corsica, France and inputs from the EGID[1]-Citrus Network coordinated by Roland Cottin. It also covers Asian crop diversity through contributions provided by UTFANET[1] (coordinated by Dr Nazmul Haq). The UPOV[1] Technical Guidelines for Citrus have been examined and where possible a standardized approach has been considered. 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. A full list of the names and addresses of those involved is given in 'Contributors'.

IPGRI encourages the collecting of data for all five types of descriptors (see 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 curators will characterize accessions of their collection utilizing all descriptors given. Descriptors should be used when they are useful to the curator for the

[1] EGID=**E**valuer, **G**érer, **I**nformatiser, **D**iffuser; SRA INRA-CIRAD = Institut National de la Recherche Agronomique-Centre de Coopération Internationale en Recherche Agronomique pour le Développement; UPOV=International Union for the Protection of New Varieties of plants; UTFANET=Underutilized Fruits in Asia Network.

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 genetic 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 citrus that will facilitate data collecting.

Any suggestions for improvement on the Descriptors for Citrus 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 registration at the genebank and other identification information) and describe parameters that should be observed when the accession is originally collected.

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

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

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

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

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

Highly discriminating descriptors are marked with 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;

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

(d) the three-letter abbreviations from the *International Standard (ISO) Codes for the representation of names of countries* is used;

(e) 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;

(f) when a descriptor is scored using a 1-9 scale, such as in (e), '0' would be scored when (i) the character is not expressed; (ii) a descriptor is inapplicable. In the following example, '0' will be recorded if an accession does not have a central leaf lobe:

Shape of central leaf lobe
1 Toothed
2 Elliptic
3 Linear

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

Terminal leaflet
0 Absent
1 Present

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

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

(j) dates should be 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.

PASSPORT

1. Accession descriptors

1.1 Accession number (1.1) [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 (1.2) [MCPD]

Name of institution or individual responsible for donating the germplasm

1.3 Donor number (1.3) [MCPD]

Number assigned to an accession by the donor

1.4 Other number(s) associated with the accession (1.4) [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 (1.4.1)

1.4.2 Other number 2 (1.4.2)

1.5 Scientific name (1.5)

1.5.1 Genus[2] (1.5.1) [MCPD]

1.5.2 Species (1.5.2) [MCPD]

1.5.3 Subspecies (1.5.3) [MCPD]

1.5.4 Cultivar group (1.5.4)

[2] The taxonomy of citrus crops is still not finally resolved. The classification systems of Swingle, Reece and Tanaka are the most commonly used. A list containing the Citrinae Subtribe Classification (Tanaka's and Swingle's names) is available from the EGID-Citrus Network – see address in the 'Contributors' section.

1.6 Pedigree (1.6)

Parentage or nomenclature, and designations assigned to breeders' material

1.6.1 Variety origin

1 Somatic fusion
2 Artificial mutation
3 Natural mutation
4 Somaclonal variation
5 Hybridization
6 Nucellar selection
7 Open-pollinated seedling
8 Old line
99 Other (specify in descriptor **1.11 Notes**)

1.6.2 Female parent (1.6.1)

1.6.3 Male parent (1.6.2)

1.6.4 Male parent if backcrossed (1.6.3)

1.6.5 Original cultivar name if from a bud mutation (1.6.4)

1.6.6 Original cultivar name if from a nucellar seedling (1.6.5)

1.6.7 Original cultivar name of protoplasts of callus and leaf if from somatic hybridization

1.6.8 Clonal selection

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] (1.7)

Date on which the accession entered the collection

1.9 Accession size (1.9)

Approximate number or weight of seeds or plants of an accession in the genebank

1.10 Type of material received

1 Pollen
2 Seed
3 Shoot/budwood/stem cutting/layer
4 *In vitro* culture
5 Plant
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) (2.2) [MCPD]

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

2.2 Collecting number (2.1) [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] (2.3) [MCPD]

2.4 Country of collecting (2.4) [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 (2.5)

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 (2.6) [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 (2.7) [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 (2.8) [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] (2.9) [MCPD]

2.11 Collecting source (2.10) [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 **2.18 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 (2.11) [MCPD]

0 Unknown
1 Wild
2 Weedy
3 Traditional cultivar/Landrace
4 Breeder's line
5 Advanced cultivar
99 Other (specify in descriptor **2.18 Collector's notes**)

2.14 Type of sample (2.15)

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 Seed
2 Seedling
3 Budwood
4 Graft
5 Rooted cutting
6 Layer
7 Vitroplant
8 Fruit
99 Other (specify which part of the plant in descriptor **2.18 Collector's notes**)

2.15 Number of plants sampled (2.13)

2.16 Ethnobotanical data

2.16.1 Ethnic group (2.16)

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

2.16.2 Local vernacular name (2.12)

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

2.16.3 Translation

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

2.16.4 Citrus varietal name meaning

Does the citrus name have a meaning? If yes, describe it briefly in descriptor **2.18 Collector's notes**

0 No
1 Yes

2.16.5 History of plant use

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

2.16.6 Parts of the plant used

1 Seed
2 Root
3 Trunk
4 Leaf
5 Flower/inflorescence
6 Fruit
99 Other (specify in descriptor **2.18 Collector's notes**)

2.16.7 Plant uses

1 Fresh fruit consumption
2 Juice
3 Cooking
4 Rootstock
5 Distillation/fermentation
6 Essential oils
7 Ornamental
8 Medicinal
99 Other (specify in descriptor **2.18 Collector's notes**)

2.16.8 Frequency of use of the plant

1 Daily
2 Weekly
3 Occasional
99 Other (specify in descriptor **2.18 Collector's notes**)

2.16.9 Main cooking methods

1 Boiling
2 Baking
3 Frying
4 Preserving
99 Other (specify in descriptor **2.18 Collector's notes**)

2.16.9.1 Cooking time [min]

Record the number of minutes for each descriptor state of **2.16.9**, as available

2.16.10 Special uses

1 Children
2 Older person
3 Feasts
4 Religious purpose
5 Chiefs
99 Other (specify in descriptor **2.18 Collector's notes**)

2.16.11 Cultural characteristics

Is there folklore associated with the collected citrus type? (e.g. taboos, stories and/or superstitions). If so, describe it briefly in descriptor **2.18 Collector's notes**

0 No
1 Yes

2.16.12 Juice taste (4.8.3)

According to local preference

1 Insipid
2 Acid
3 Sweet
4 Bitter
99 Other (specify in descriptor **2.18 Collector's notes**)

2.16.12.1 Juice taste evaluation

According to evaluator

1 Unpleasant
2 Fair
3 Pleasant
4 Very good

2.16.13 Pulp consistency

1 Sticky
2 Firm
3 Soft
4 Mealy
99 Other (specify in descriptor **2.18 Collector's notes**)

2.16.14 Fruit aroma

1 Weak
2 Average
3 Strong

2.16.15 Juice aroma (4.8.4)

1 Weak
2 Average
3 Strong
4 Resinous
99 Other (e.g. onion/stale, specify in descriptor **2.18 Collector's notes**)

2.16.16 Leaf aroma (6.2.3)

1 Weak
2 Medium
3 Strong

2.16.17 Flower aroma

1 Weak
2 Average
3 Strong

2.16.18 Citrus popularity

Is the variety popular and widely grown? If yes, describe briefly why in descriptor **2.18 Collector's notes**

0 No
1 Yes

2.16.19 Preferred growing conditions

If yes, describe farmer's perceptions on hardiness of the variety in relation to main stresses in descriptor **2.18 Collector's notes**

0 No
1 Yes

2.16.20 Prevailing stresses

Information on main associated biotic (pests and diseases) and abiotic (drought) stresses

2.16.21 Cultural practices

2.16.21.1 Planting date [YYYYMMDD]

2.16.21.2 First harvest date [YYYYMMDD]

2.16.21.3 Last harvest date [YYYYMMDD]

2.16.22 Cropping system

1 Monoculture
2 Intercropped (specify crop in descriptor **2.18 Collector's notes**)

2.16.23 Associated flora

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

2.16.24 Seasonality

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

2.16.25 Market information

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

0 No
1 Yes

2.16.26 Type of market

1 Local
2 National
3 International

2.17 Photograph (2.14)

Was a photograph(s) taken of the accession or habitat at the time of collecting? If so, provide an identification number(s) in descriptor **2.18 Collector's notes**

0 No
1 Yes

2.18 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 number/location in medium-term and/or long-term storage)

3.4 Type of maintenance

1 Field collection (living plants)
2 Screenhouse
3 Greenhouse
4 Seed
5 Tissue culture
6 Cryogenic storage
99 Other (specify in descriptor **3.10 Notes**)

3.5 Amount of stored plant material [g or number] (Passport 1.9)

3.6 Duplication at other location(s) (Passport 1.4)

0 No
1 Yes

3.7 Propagation method

1 Seed
2 Grafting
3 Cutting
4 Layering
5 Top grafting
6 Tissue culture
99 Other (specify in descriptor **3.10 Notes**)

3.8 *In vitro* conservation

3.8.1 Type of explant

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

3.8.2 Date of introduction *in vitro* [YYYYMMDD]

3.8.3 Type of subcultured material

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

3.8.4 Regeneration process

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

3.8.5 Number of genotypes introduced *in vitro*

3.8.6 Number of replicates per genotype

3.8.7 Last subculture date [YYYYMMDD]

3.8.8 Medium used at the last subculture

3.8.9 Number of plants at the last subculture

3.8.10 Location after the last subculture

3.8.11 Next subculture date [YYYYMMDD]

3.9 Cryopreservation

3.9.1 Type of material for cryopreservation

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

3.9.2 Introduction date in liquid nitrogen [YYYYMMDD]

3.9.3 Number of samples introduced in liquid nitrogen

3.9.4 End of storage period [YYYYMMDD]

3.9.5 Number of samples taken from liquid nitrogen

3.9.6 Type of subcultured material for recovery

(After liquid nitrogen)

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

3.9.7 Regeneration process

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

3.9.8 Number of recovered samples

3.9.9 Location after the last subculture

3.10 Notes
Any additional information may be specified here

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]

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

4.8 Plant/seedling vigour
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 (1.11)

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 (3.1)

(See instructions in descriptor **2.4 Country of collecting**)

5.2 Site (research institute) (3.2)

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 (3.3)

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 Greenhouse
4 Laboratory
99 Other (specify in descriptor **5.12 Notes**)

5.7 Field establishment [%]

Percentage of plants established

5.7.1 Propagation method

Use descriptors as for **3.7**

5.7.2 Days to establishment [d]

Specify number of days from planting after which establishment is measured

5.8 Planting site in the field

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

5.9 Environmental characteristics of site

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

5.10 Fertilizer

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

5.11 Plant protection

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

5.12 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. (From FAO 1990)

1	Flat	0 - 0.5%
2	Almost flat	0.6 - 2.9%
3	Gently undulating	3 - 5.9%
4	Undulating	6 - 10.9%
5	Rolling	11 - 15.9%
6	Hilly	16 - 30%
7	Steeply dissected	>30%, moderate elevation range
8	Mountainous	>30%, great elevation range (>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		

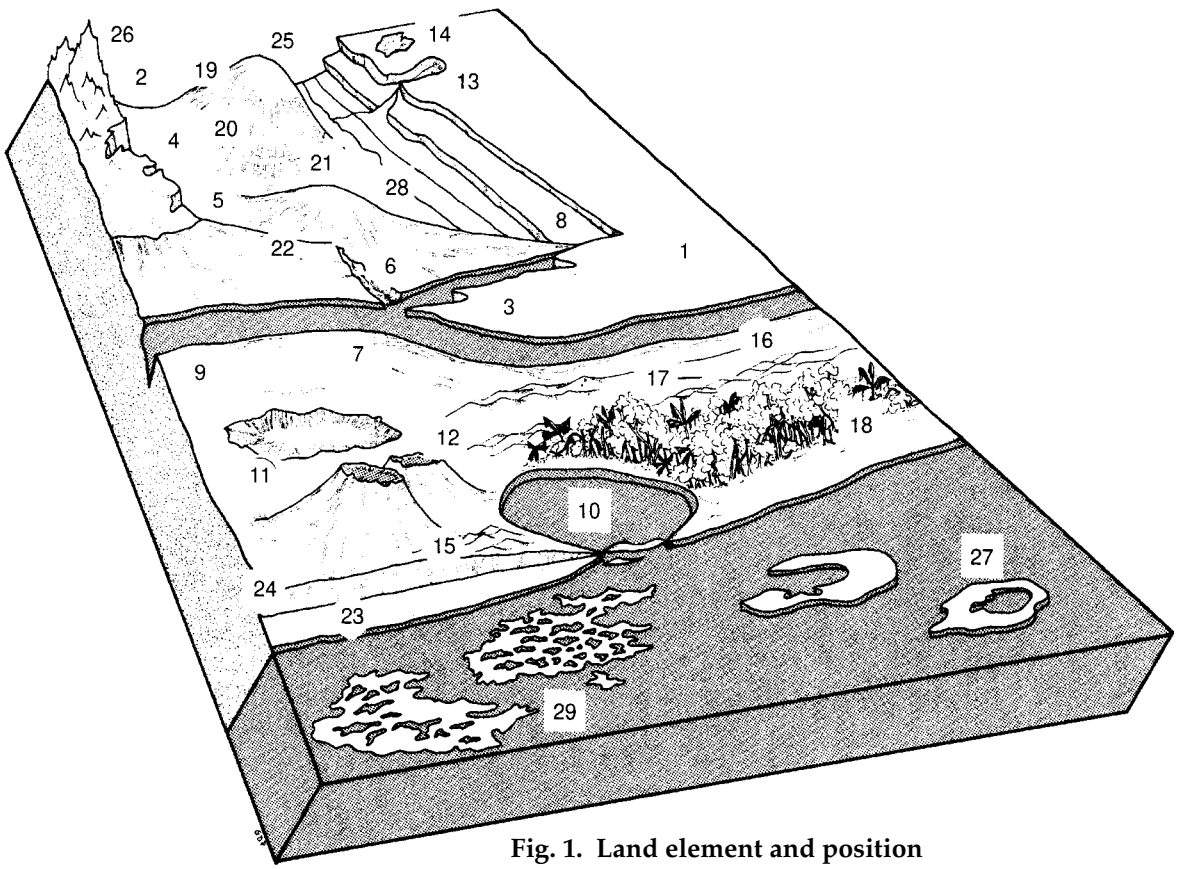

Fig. 1. Land element and position

6.1.4 Slope [º]

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

6.1.6.1 Annual/perennial crops

Provide crops grown in appropriate section's Notes

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)
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
99 Other (specify in appropriate section's Notes)

6.1.8.2 Rock type

(Adapted from FAO 1990)

1 Acid igneous/metamorphic rock
2 Granite
3 Gneiss
4 Granite/gneiss
5 Quartzite
6 Schist
7 Andesite
8 Diorite
9 Basic igneous/metamorphic rock
10 Ultra basic rock
11 Gabbro
12 Basalt
13 Dolerite
14 Volcanic rock
15 Sedimentary rock
16 Limestone
17 Dolomite
18 Sandstone
19 Quartzitic sandstone
20 Shale
21 Marl
22 Travertine
23 Conglomerate
24 Siltstone
25 Tuff
26 Pyroclastic rock
27 Evaporite
28 Gypsum rock
99 Other (specify in appropriate section's Notes)
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
4 481 - 800 ppm
5 >800 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 1975). If there is no dominant soil matrix colour, the horizon is described as mottled and two or more colours are given and should be registered under uniform conditions. Early morning and late evening readings are not accurate. Provide depth of measurement (cm). If colour chart is not available, the following states may be used:

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

6.1.14 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 0-15 cm

6.1.14.2 pH at 16-60 cm

6.1.14.3 pH at 61-90 cm

6.1.14.4 pH at 91-120 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
2 Loam
3 Clay loam
4 Silt
5 Silty clay
6 Silty clay loam
7 Silt loam
8 Sandy clay
9 Sandy clay loam
10 Sandy loam
11 Fine sandy loam
12 Coarse sandy loam
13 Loamy sand
14 Loamy very fine sand
15 Loamy fine sand
16 Loamy coarse sand
17 Very fine sand
18 Fine sand
19 Medium sand
20 Coarse sand
21 Sand, unsorted
22 Sand, unspecified

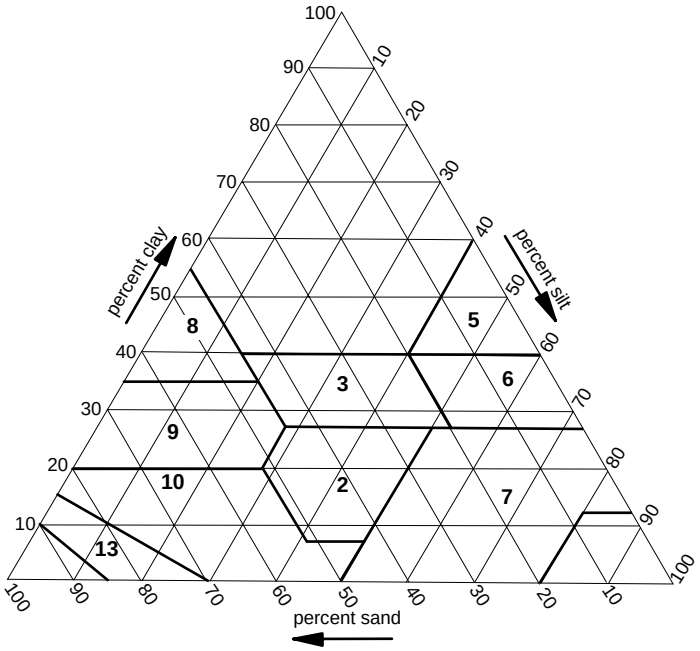

Fig. 2. Soil texture classes

6.1.17.1 Soil particle size classes

(Adapted from FAO 1990)

1	Clay	< 2 µm
2	Fine silt	2 - 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

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 [°C]

Provide either the monthly or the annual mean

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

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 Minimum 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

All observations should be made on plants of the same age (not less than 3 years old)

7.1 Vegetative

7.1.1 Rootstock[3] (4.1.2)

If appropriate

0 None
1 Sour orange
2 Trifoliate orange
3 Trifoliate hybrids
4 Rough lemon
5 Rangpur lime
6 Cleopatra mandarin
7 *Citrus volkameriana*
8 Sweet orange
9 Sweet lime
99 Other (specify in descriptor **7.8 Notes**)

7.1.2 Ratio trunk/rootstock diameter

Recorded at 20 cm above and under grafting line

1 Smaller (<1)
2 Same (1)
3 Larger (>1)

7.1.3 Scion trunk surface (4.1.8)

1 Smooth
2 Grooved and ridged

7.1.4 Tree shape (4.1.4)

Recorded in the natural state. See Fig. 3

1 Ellipsoid
2 Spheroid
3 Obloid
99 Other (specify in descriptor **7.8 Notes**)

[3] A list of all rootstocks recorded in publications can be obtained through the EGID-Citrus Network – See address in the 'Contributors' section

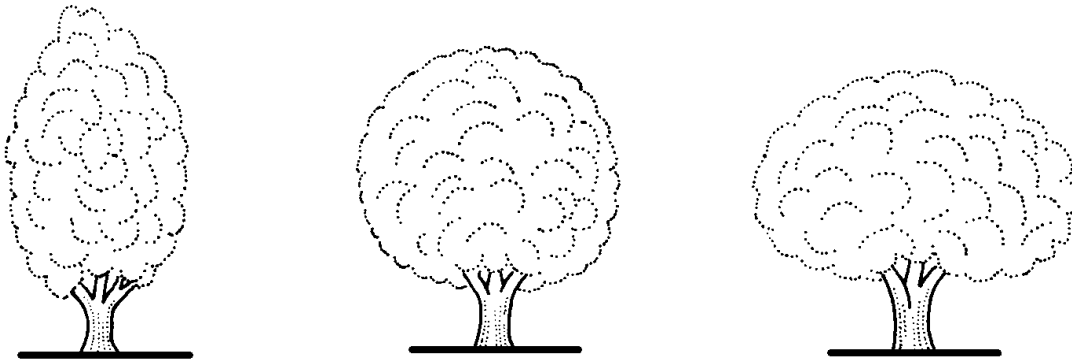

Fig. 3. Tree shape

7.1.5 Tree growth habit (4.1.5)

Recorded in the natural state, immediately after harvest

1 Erect
2 Spreading
3 Drooping
99 Other (specify in descriptor **7.8 Notes**)

7.1.6 Density of branches (4.1.7)

3 Sparse
5 Medium
7 Dense

7.1.7 Branch angle

Attachment to main trunk

3 Narrow
5 Medium
7 Wide

7.1.8 Spine density on adult tree (not on suckers)

0 Absent
3 Low
5 Medium
7 High

7.1.9 Spine length on adult tree (not on suckers) (4.2.11)

Average of 10 spines at leaf axil

1 ≤ 5 mm
2 6 - 15 mm
3 16 - 40 mm
4 >40 mm

7.1.10 Spine shape (4.2.12)

1 Curved
2 Straight

7.1.11 Shoot tip colour (4.1.10)

1 Green
2 Purple
99 Other (specify in descriptor **7.8 Notes**)

7.1.12 Shoot tip surface (4.1.11)

1 Glabrous
2 Intermediate
3 Pubescent

7.2 Leaf

Use 30 mature leaves per adult tree with three replications unless otherwise indicated

7.2.1 Vegetative life cycle (4.2.1)

1 Evergreen
2 Deciduous
3 Semi-persistent

7.2.2 Leaf division (4.2.2)

1 Simple
2 Bifoliate
3 Trifoliate
4 Pentafoliate
99 Other (specify in descriptor **7.8 Notes**)

7.2.3 Intensity of green colour of leaf blade (4.2.3)

Recorded on fully developed leaves

1 Light
2 Medium (green)
3 Dark

7.2.3.1 Leaf colour variegation

0 Absent
1 Present

7.2.4 Leaf lamina attachment (4.2.4)

Length of petiole relative to length of leaf lamina. See Fig. 4

1 Sessile (petiole absent)
2 Brevipetiolate (petiole shorter than leaf lamina)
3 Longipetiolate (petiole longer than or same length as leaf lamina)

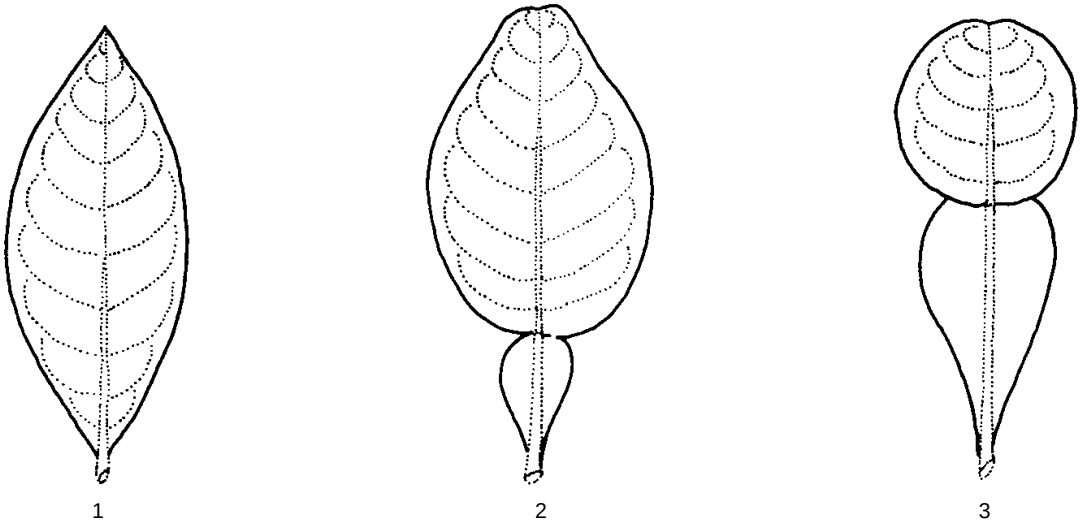

Fig. 4. Leaf lamina attachment

7.2.5 Leaf lamina length [mm] (4.2.8)

Recorded from petiole base to lamina tip. Average of 10 fully developed leaves taken from three different adult trees (not taken from suckers). Use apical leaflet in the case of compound leaf.

7.2.6 Leaf lamina width [mm] (4.2.9)

Recorded at the widest point. Average of 10 fully developed leaves taken from three different adult trees. Use apical leaflet in the case of compound leaf.

7.2.7 Ratio leaf lamina length/width

Calculated as a mean of 10 fully developed leaves taken from three different adult trees.

7.2.8 Leaf thickness [mm]

Recorded at the thickest point. Average of 10 fully developed leaves taken from three different adult trees. Use apical leaflet in the case of compound leaf.

7.2.9 Leaf lamina shape (4.2.7)

See Fig. 5

1 Elliptic
2 Ovate
3 Obovate
4 Lanceolate
5 Orbicular
6 Obcordate
99 Other (specify in descriptor **7.8 Notes**)

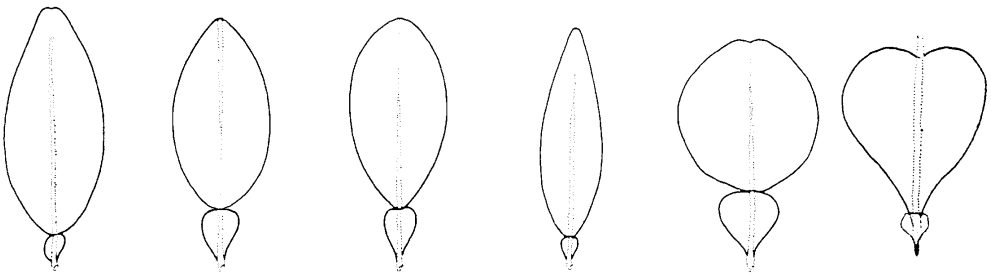

Fig. 5. Leaf lamina shape

7.2.10 Leaf lamina margin (4.2.10)

See Fig. 6

1 Crenate
2 Dentate
3 Entire
4 Sinuate
99 Other (specify in descriptor **7.8 Notes**)

7.2.11 Leaf apex

1 Attenuate
2 Acuminate
3 Acute
4 Obtuse
5 Rounded
6 Emarginate
99 Other (specify in descriptor **7.8 Notes**)

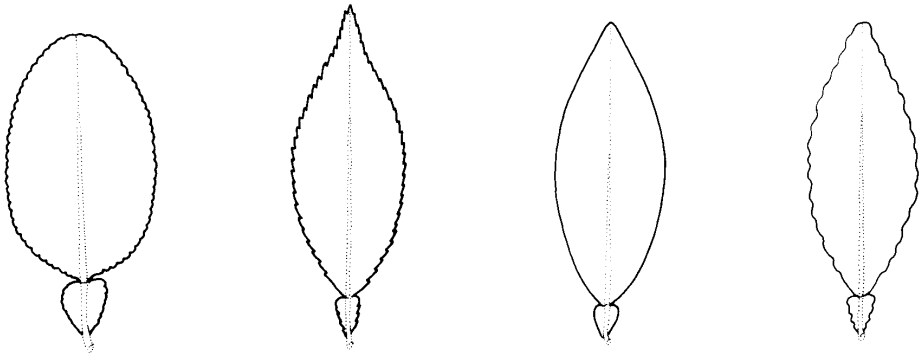

Fig. 6. Leaf lamina margin

7.2.12 Absence/presence of petiole wings

0 Absent
1 Present

7.2.13 Petiole wing width (4.2.5)

Recorded on fully developed leaf

3 Narrow
5 Medium
7 Broad

7.2.14 Petiole wing shape (4.2.6)

See Fig. 7

1 Obcordate
2 Obdeltate
3 Obovate
4 Linear (not illustrated)
99 Other (specify in descriptor **7.8 Notes**)

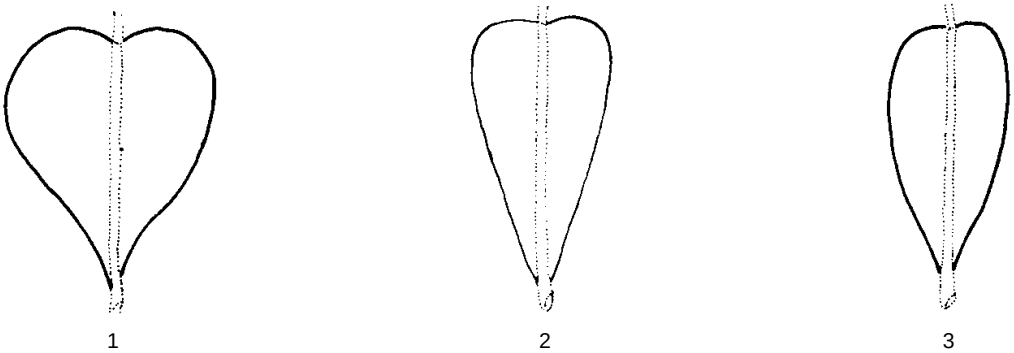

Fig. 7. Petiole wing shape

7.2.15 Junction between petiole and lamina

1 Fused
2 Articulate

7.3 Flower

Data recorded from ten flowers or inflorescences per tree replicated three times. Recorded at full flowering. See Fig. 8

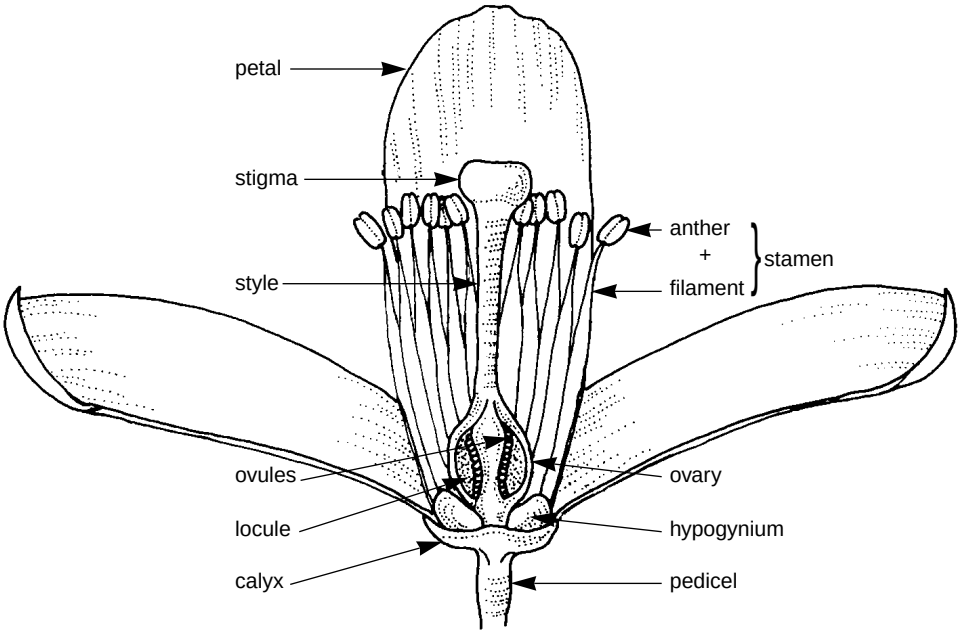

Fig. 8. Vertical cross-section of a flower

7.3.1 Pedicel length [mm] (4.4.6)

See Fig. 8

7.3.2 Calyx diameter

3 Small
5 Medium
7 Large

7.3.3 Length of anthers relative to stigma

3 Shorter
5 Medium
7 Longer

7.3.4 Flower type

1 Hermaphrodite
2 Male
3 Female
99 Other (specify in descriptor **7.8 Notes**)

7.3.5 Colour of open flower (4.4.8)

1 White
2 Light yellow
3 Yellow
4 Purple
99 Other (specify in descriptor **7.8 Notes**)

7.3.6 Colour of anthers

1 White
2 Pale yellow
3 Yellow
99 Other (specify in descriptor **7.8 Notes**)

7.3.7 Number of petals per flower

7.3.8 Petal length [mm] (4.4.9)

7.3.9 Petal width [mm] (4.4.10)

7.3.10 Number of stamens (4.4.11)

1 < 4 per petal
2 4 per petal
3 > 4 per petal

7.3.11 Viable pollen (6.3.1)

Visual observation, *in vitro* after Alexander dying

0 Pollen sterile
3 Sparse pollen (Imperial mandarin)
5 Normal pollen (Valencia orange)
7 Abundant pollen (Pummelo or W.I. Lime)

7.3.12 Flowering month (6.3.2)

1 January
2 February
3 March
4 April
5 May
6 June
7 July
8 August
9 September
10 October
11 November
12 December

7.3.12.1 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).

7.3.12.2 Start date of flowering season [YYYYMMDD]

7.3.12.3 End date of flowering season [YYYYMMDD]

7.4 Fruit

All observations on the fruit should be made at the stage of optimum ripeness (ratio total soluble solids/acid content of juice). Data observed on 10 typical fruits per tree replicated three times

7.4.1 Fruiting season (6.4.2)

Compared with some common standard midseason variety for each family of *Citrus* (orange, lemon, etc.)

1 Early
2 Midseason
3 Late

7.4.2 Fruiting season dates

7.4.2.1 Start of fruiting season [YYYYMMDD]

7.4.2.2 End of fruiting season [YYYYMMDD]

7.4.3 Fruit weight [g]

Record the average

7.4.4 Fruit diameter [mm]

Record the average

7.4.5 Fruit length [mm]

Record the average

7.4.6 Fruit shape (4.5.1)

See Fig. 9

1 Spheroid
2 Ellipsoid
3 Pyriform
4 Oblique (asymmetric)
5 Obloid
6 Ovoid
99 Other (specify in descriptor **7.8 Notes**)

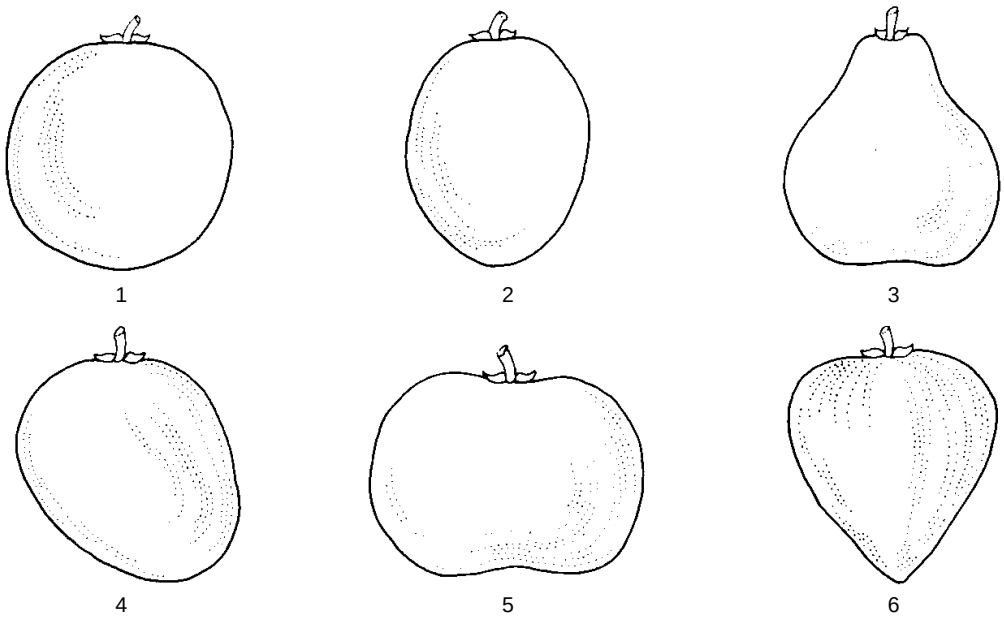

Fig. 9. Fruit shape

7.4.7 Shape of fruit base (4.5.2)

(Stalk end). See Fig. 10

1 Necked
2 Convex
3 Truncate
4 Concave
5 Concave collared
6 Collared with neck
99 Other (specify in descriptor **7.8 Notes**)

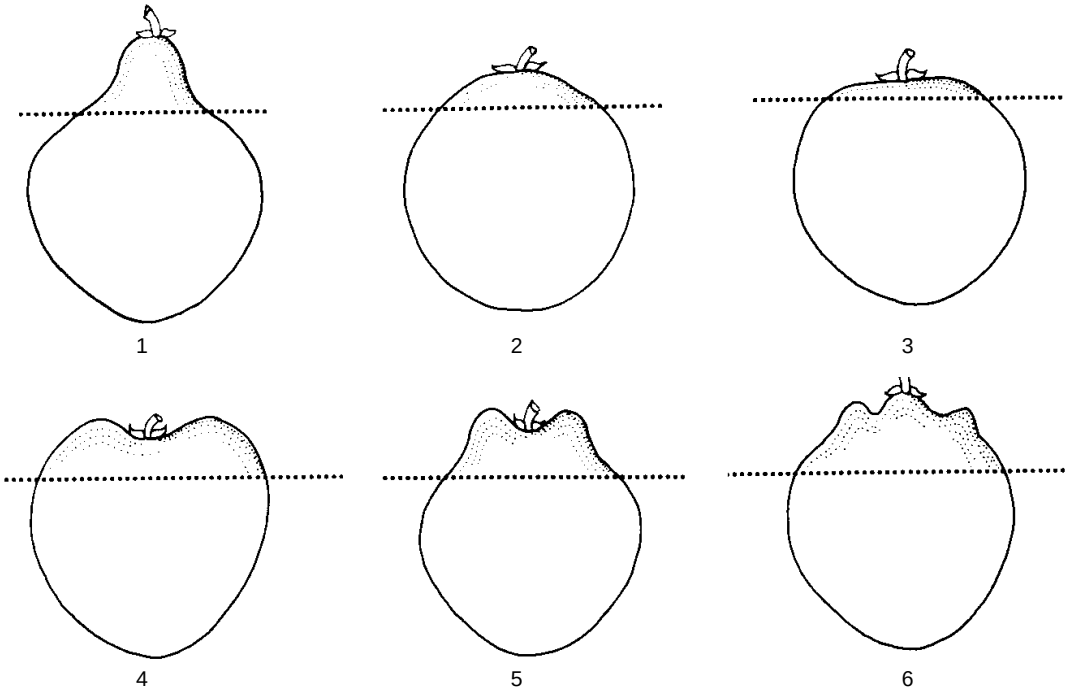

Fig. 10. Shape of fruit base

7.4.8 Shape of fruit apex (4.5.3)

(Stylar end). See Fig. 11

1 Mammiform
2 Acute
3 Rounded
4 Truncate
5 Depressed
99 Other (specify in descriptor **7.8 Notes**)

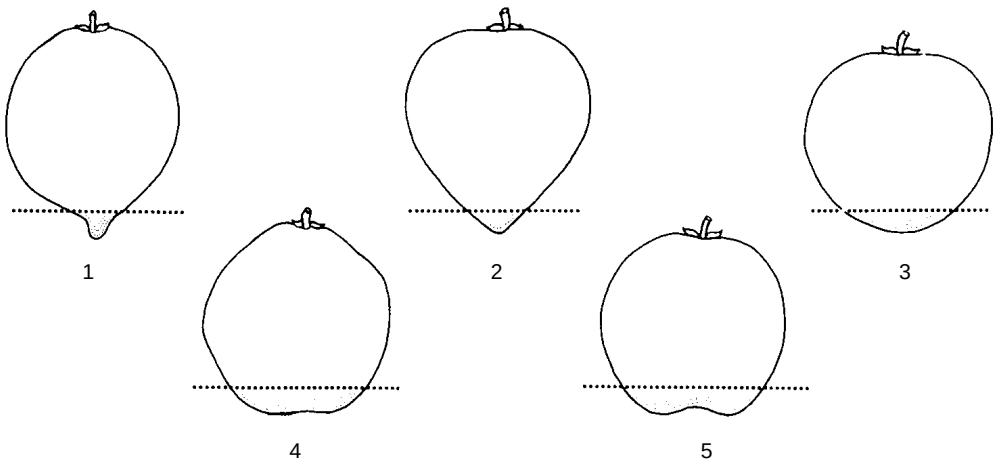

Fig. 11. Shape of fruit apex

7.4.9 Fruit skin (epicarp) colour (4.5.4)

Observe the main colour

1 Green
2 Green-yellow
3 Light yellow
4 Yellow
5 Dark yellow
6 Light orange
7 Orange
8 Dark orange
9 Pink-yellow
10 Pink-orange
11 Red
12 Red-orange
99 Other (specify in descriptor **7.8 Notes**)

7.4.10 Epicarp C.C.I.

(See Jimenez *et al.* 1981)
Citrus Colour Index = 1000 x a / (L x b). With:
a = green/red component under Hunter Lab colorimetric system
b =blue/yellow
L = Luminosity
Negative value of CCI means dark green/green colour
Value around zero means green-yellow colour (intermediate)
Small positive value means yellow colour
High positive value means red-orange colour

7.4.11 Width of epicarp at equatorial area [mm] (4.5.5)

See Fig. 12

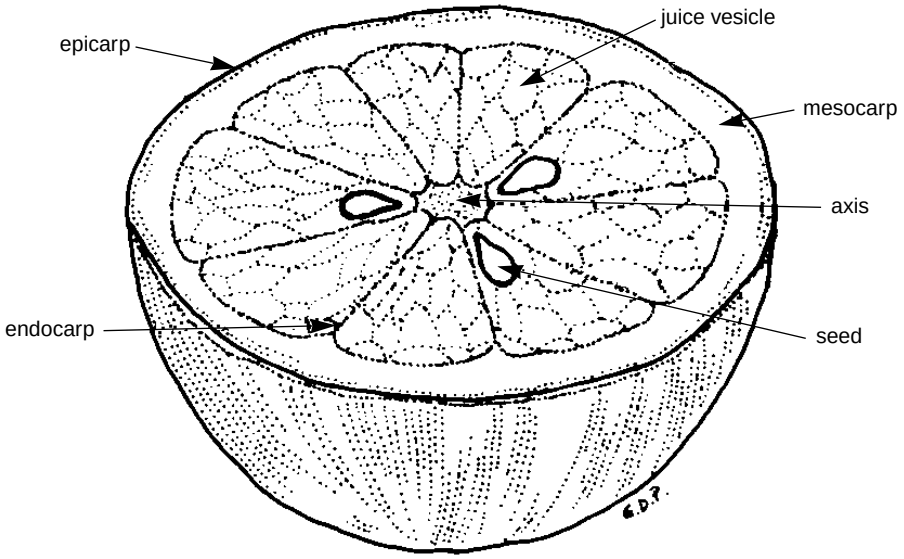

Fig. 12. Cross-section of citrus fruit

7.4.12 Fruit surface texture (4.5.6)

1 Smooth
2 Rough
3 Papillate
4 Pitted
5 Bumpy
6 Grooved
99 Other (specify in descriptor **7.8 Notes**)

7.4.13 Adherence of albedo (mesocarp) to pulp (endocarp) (4.5.7)

3 Weak
5 Medium
7 Strong

7.4.14 Nature (conspicuousness) of oil glands (4.5.8)

1 Inconspicuous or very weakly conspicuous
2 Conspicuous
3 Strongly conspicuous

7.4.15 Density of oil gland on fruit surface

3 Low (<40/cm²)
5 Intermediate (45–65/cm²)
7 High (>70/cm²)

7.4.16 Oil gland size on fruit surface

3 Small (<0.8 mm)
7 Large (≥1.2 mm)

7.4.17 Fruit rind (mesocarp) thickness [mm] (4.5.10)

Measured in the equatorial area. See Fig. 12

7.4.18 Albedo colour (4.5.11)

1 Greenish
2 White
3 Yellow
4 Pink
5 Orange
6 Reddish
99 Other (specify in descriptor **7.8 Notes**)

7.4.19 Absence/presence of areola (6.4.6)

0 Absent
1 Present

7.4.20 Areola diameter [mm] (6.4.7)

7.4.21 Fruit stylar end (6.4.8)

Observe fruits that ripened on the tree

1 Closed
2 Open
3 Persistent style
99 Other (specify in descriptor **7.8 Notes**)

7.4.22 Fruit attachment to stalk (4.8.5)

3 Weak
5 Medium
7 Strong

7.5 Segments

Average of well-developed segments observed on 30 fruits taken from three adult trees

7.5.1 Number of segments per fruit (4.6.1)

1 < 5
2 5–9
3 10–14
4 15–18
5 >18

7.5.2 Adherence of segment walls to each other (4.6.2)

3 Weak
5 Medium
7 Strong

7.5.3 Segment shape uniformity

0 No
1 Yes

7.5.4 Thickness of segment walls (4.6.3)

Nature of segment membrane

3 Thin
5 Medium
7 Thick

7.5.5 Fruit axis (4.6.4)

See Fig. 12

1 Solid
2 Semi-hollow
3 Hollow

7.5.6 Cross-section shape of axis (4.6.5)

1 Round
2 Irregular

7.5.7 Diameter of fruit axis [mm] (4.6.6)

7.6 Pulp

7.6.1 Pulp (flesh) colour (4.7.1)

1 White
2 Green
3 Yellow
4 Orange
5 Pink
6 Light red
7 Orange–red
8 Red
9 Purple
99 Other (specify in descriptor **7.8 Notes**)

7.6.1.1 Pulp colour intensity

3 Light
7 Dark

7.6.2 Pulp colour uniformity (4.7.2)

0 No (streaked)
1 Yes

7.6.3 Pulp C.C.I.

Same as for descriptor **7.4.10**

7.6.4 Pulp firmness (4.7.3)

3 Soft
5 Intermediate
7 Firm

7.6.4.1 Pulp texture

1 Crispy
2 Fibrous
3 Fleshy
99 Other (specify in descriptor **7.8 Notes**)

7.6.5 Vesicle length (4.7.4)

Indicate location of determination (stem end, stylar end or centre of segment), in descriptor **7.8 Notes**

3 Short
5 Medium
7 Long

7.6.6 Vesicle thickness (4.7.5)

3 Thin
5 Medium
7 Thick

7.6.7 Juice content in endocarp (4.8.1)

Quantity related to total fruit weight

3 Low
5 Medium
7 High

7.6.8 Juice C.C.I.

Same as for descriptor **7.4.10**

7.7 Seed

Fully developed seeds extracted from 30 full ripe fruits (unless otherwise specified), taken from three trees randomly selected in solid blocks

7.7.1 Average number of seeds per fruit (4.9.1)

Observe only fully developed seeds taken on trees in open pollination

0 None
1 1 - 4
2 5 - 9
3 10 - 19
4 20 - 50
5 > 50

7.7.2 Seedless test

Number of seeds present in fruits under self-pollination conditions (solid blocks)

0 None
1 1 - 4
2 5 - 9
3 10 - 19
4 20 – 50
5 >50

7.7.3 Seed shape (4.9.5)

Observed on 20 seeds. See Fig. 13

1 Fusiform
2 Clavate
3 Cuneiform
4 Ovoid
5 Semi-deltoid
6 Spheroid
7 Semi-spheroid
99 Other (specify in descriptor **7.8 Notes**)

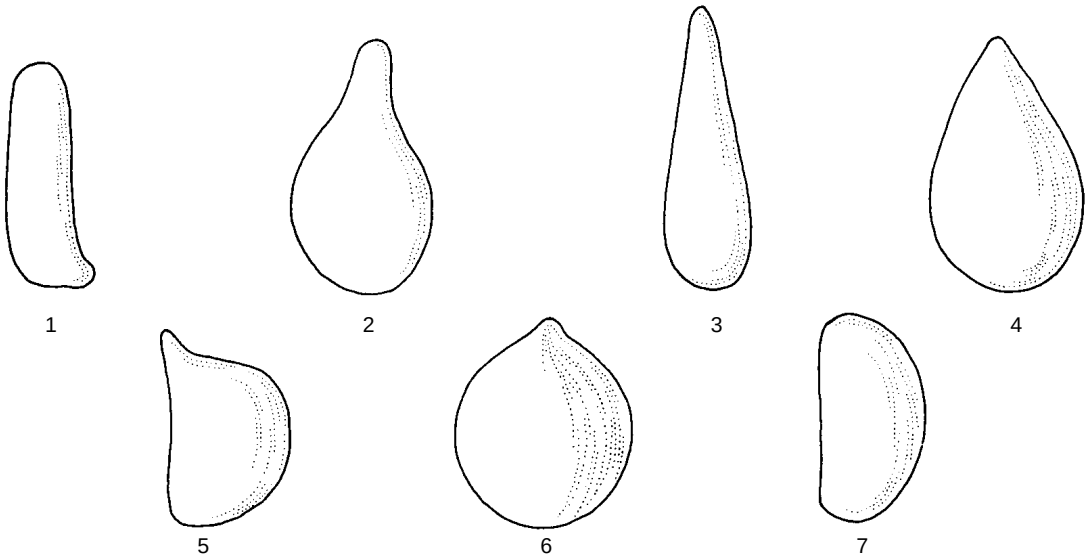

Fig. 13. Seed shape

7.7.4 Seed surface (4.9.6)

Observed on 20 fresh seeds

1 Smooth
2 Wrinkled
3 Hairy
99 Other (specify in descriptor **7.8 Notes**)

7.7.5 Seed colour (4.9.7)

Observed on 20 fresh seeds. Visual observation through the seed testa

1 White
2 Cream
3 Yellowish
4 Green
5 Brown
99 Other (specify in descriptor **7.8 Notes**)

7.7.6 Cotyledon colour (4.9.8)

1 White
2 Light yellow–cream
3 Light green
4 White and green
5 Green (medium)
6 Dark green
7 Purple
8 Pinkish
99 Other (specify in descriptor **7.8 Notes**)

7.7.7 Chalazal spot colour (4.9.9)

1 White
2 Cream
3 Yellow
4 Light brown (beige)
5 Brown
6 Reddish
7 Purple
99 Other (specify in descriptor **7.8 Notes**)

7.7.8 Seed embryony (4.9.10)

Number of embryos per seed observed using a stereoscope. Average number of 30 seeds

1 Monoembryonic
2 Polyembryonic
3 Mixture of both

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 VEGETATIVE

8.1.1 Tree age [y] (4.1.3)

State age of tree at the time of evaluating

8.1.2 Scion/rootstock compatibility (6.1.1)

0 Absent
1 Poor
2 Intermediate
3 Good
4 Bud-union ring

8.1.3 Tree vigour (6.1.2)

Against tree grafted on *Citrus aurantium* "comun"

3 Low
5 Intermediate
7 High

8.1.4 Tree height [m] (4.1.6)

Recorded from ground level up to highest point of canopy measured with material or optical tool (e.g. forestry tools)

8.1.5 Canopy diameter [m]

Recorded at the widest point

8.2 Leaf

Record the average of ten fully developed leaves taken from three trees, unless otherwise specified

8.2.1 Number of oil glands (6.2.2)

Number per cm^2, observed on the leaf lower surface under stereoscope, in a 0.5 x 0.5 cm window

8.2.2 Oil gland size on fruit surface

1 Small (≤ 0.8 mm)
2 Intermediate (0.9 – 1 mm)
3 Large (>1 mm)

8.2.3 Colour of leaf upper/lower surface

1 Same
2 Lighter (upper surface lighter than lower surface)
3 Darker (upper surface darker than lower surface)

8.2.4 Nerves on leaf upper surface

1 Protuberant
2 Flat

8.2.5 Angle of leaf bases

1 Acute
2 Obtuse

8.2.6 Angle of leaf apex

1 Acute
2 Obtuse

8.2.7 Petiole attachment to twigs

1 Straight
2 Curved

8.2.8 Petiole length

Average of ten fully developed leaves taken from three trees
1 0 - 10 mm
2 11 - 15 mm
3 > 15 mm

8.3 Flower

8.3.1 Arrangement of flowers (4.4.1)

1 Solitary
2 Inflorescence
3 Both

8.3.2 Flower/inflorescence position (4.4.2)

1 Axillary
2 Terminal
3 Both

8.3.3 Inflorescence type (4.4.3)

1 Panicle
2 Raceme
3 Corymb
99 Other (specify in descriptor **8.7 Notes**)

8.3.4 **Number of flower buds per inflorescence** (4.4.4)

8.3.5 **Stamina length**

3 Short
5 Medium
7 Long

8.3.6 **Separation of filament**

1 Separated
2 Partially united
3 United

8.3.7 **Anther length** [mm] (4.4.12)

8.3.8 **Anther dehiscence**

3 Poor
5 Moderate
7 Good

8.3.9 **Style shape**

1 Straight
2 Arched
3 Crooked

8.3.10 **Flowering regularity** (6.3.5)

0 No
1 Yes

8.3.11 **Flowering abundance** (6.3.6)

0 No
1 Poor
2 Abundant

8.3.12 **Secondary flowering** (6.3.7)

0 Absent
1 Present

8.3.13 **Number of days to secondary flowering** [d]

8.4 Fruit

8.4.1 Bearing cycle [d] (6.4.1)
Number of days from flowering to ripening

8.4.2 Bearing habit
1 Inside canopy
2 Outside
3 Both

8.4.3 Yield behaviour (6.4.5)
1 Regular
2 Irregular

8.4.4 Alternation
0 Absent
1 Regular
2 Irregular

8.4.5 Amount of essential oil in fruit skin [ml/kg] (6.4.10)
Amount of oil extracted from epicarp per fruit by mechanical tools at room temperature

8.4.6 Oil Brix (6.4.11)
Evaluated by optical density (oil refractometer) at 20°C

8.4.7 Yield per tree [kg/tree] (6.4.4)

8.4.8 Yield efficiency
0 No
1 Yes

8.5 Juice

8.5.1 Titratable acids content (6.5.1)
Expressed in meq of citric acid/100 ml juice. Define protocol (i.e. soluble solids and acidity)

8.5.2 pH
Real value of pH as given by pH meter—with one digit after decimal separator (##.#)

8.5.3 Sugar content [%] (6.5.2)
Refractometer

8.5.4 Ratio of soluble solids to titratable acids (6.5.3)

8.5.5 Ascorbic acid content [mg/100 g FW]

8.6 Seeds

Average of 20 seeds

8.6.1 Seed length [mm] (4.9.2)

8.6.2 Seed width [mm] (4.9.3)

8.6.3 Seed weight [g] (4.9.4)

8.7 Notes

Specify here any other additional information

9. Abiotic stress susceptibility

(Only for varieties used as rootstock). Scored under artificial and/or natural conditions, which should be clearly specified. These are coded on a susceptibility scale from 1 to 9, viz.:

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

9.1 Reaction to low temperature (7.1)

Scored under natural conditions during the cold season

9.2 Reaction to high temperature (7.2)

Scored under natural conditions during the hot season

9.3 Reaction to drought (7.4)

Scored under natural conditions during daytime for at least four weeks

9.4 Reaction to wet soil (7.5)

9.5 Reaction to soil alkalinity (7.3)

9.6 Reaction to salinity

9.7 Reaction to frost

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 **10.18 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 Scales

	Causal organism	Common name
10.1.1	*Aonidiella aurantii*	California red scale
10.1.2	*Aonidiella citrina*	Citrus yellow scale
10.1.3	*Ceroplastes sinensis*	Chinese wax scale
10.1.4	*Ceroplastes destructor*	Soft wax scale
10.1.5	*Coccus hesperidum*	Scale
10.1.6	*Saissetia oleae*	Black scale
10.1.7	*Aspidiotus nerii*	White scale
10.1.8	*Chrysomphalus aonidum*	Citrus black scale
10.1.9	*Chrysomphalus dictyospermi*	Spanish red scale
10.1.10	*Lepidosaphes beckii*	Purple scale
10.1.11	*Lepidosaphes gloveri*	Glover scale
10.1.12	*Parlatoria pergandei*	Chaff scale
10.1.13	*Parlatoria ziziphi*	Black scale
10.1.14	*Selenaspidus articulatus*	Brown scale
10.1.15	*Unaspis citri*	Snow scale
10.1.16	*Unaspis yanonensis*	Arrowhead scale
10.1.17	*Icerya purchasi*	Cottony cushion scale

10.2 Mealybugs

10.2.1	*Planococcus citri*	Citrus mealybug
10.2.2	*Pseudococcus longispinus*	Long-tailed mealybug

10.3	**Aphids**		
	10.3.1	*Aphis citricola*	Green citrus aphid
	10.3.2	*Aphis gossypi*	Cotton aphid
	10.3.3	*Myzus persicae*	Green peach aphid
	10.3.4	*Toxoptera aurantii*	Black citrus aphid
	10.3.5	*Toxoptera citricidus*	Brown citrus aphid
10.4	**Whiteflies**		
	10.4.1	*Aleurocanthus woglumi*	Citrus blackfly
	10.4.2	*Aleurothrixus floccosus*	Woolly whitefly
	10.4.3	*Dialeurodes citri*	Citrus whitefly
	10.4.4	*Dialeurodes citrifolii*	Cloudy-winged whitefly
10.5	**Leafhoppers**		
	10.5.1	*Empoasca smithi*	Australian leafhopper
	10.5.2	*Neoaliturus haematoceps*	Leafhopper
	10.5.3	*Neoaliturus tenellus*	Beet leafhopper
10.6	**Fruit flies**		
	10.6.1	*Ceratitis capitata*	Mediterranean fruit fly
	10.6.2	*Anastrepha fraterculus*	South American fruit fly
	10.6.3	*Dacus dorsalis*	Oriental fruit fly
10.7	**Lepidoptera**		
	10.7.1	*Phyllocnistis citrella*	Citrus leaf miner
	10.7.2	*Prays citri*	Citrus flower moth
10.8	**Thrips**		
	10.8.1	*Scirtothrips citri*	Citrus thrip
	10.8.2	*Scirtothrips aurantiii*	South African citrus thrip
	10.8.3	*Heliothrips haemorrhoidalis*	Black tea thrip
10.9	**Psyllids**		
	10.9.1	*Diaphorina citri*	Citrus psylla
	10.9.2	*Trioza erytrea*	Citrus psylla
10.10	**Mites**		
	10.10.1	*Phyllocoptrupta oleivora*	Citrus rust mite
	10.10.2	*Panonychus citri*	Citrus red mite
	10.10.3	*Aceria sheldoni*	Citrus bud mite
	10.10.4	*Brevipalpus lewisi*	Citrus flat mite
	10.10.5	*Brevipalpus californicus*	Citrus red flat mite
	10.10.6	*Eutetranychus orientalis*	Citrus brown mite
	10.10.7	*Polyphagotarsonemus latus*	Citrus silver mite

10.11 Nematodes

10.11.1	*Pratylenchus* spp.	Lesion nematode/citrus slump
10.11.2	*Tylenchulus semipenetrans*	Slow decline/ root nematode
10.11.3	*Radopholus similis (R. citrophilus)*	Burrowing nematode

10.12 Fungi

10.12.1	*Alternaria citri*	Stem-end rot/leaf-fruit spot
10.12.2	*Botrydiplodia theobromae*	Stem-end rot
10.12.3	*Botrytis cinerea*	Blossom and twig blight
10.12.4	*Colletotrichum gloeosporioides*	Anthracnose
10.12.5	*Diaporthe citri*	Melanose
10.12.6	*Geotrichum candidum*	Sour rot
10.12.7	*Mycosphaerella citri*	Greasy spot/rind blotch
10.12.8	*Penicillium digitatum*	Green mold
10.12.9	*Penicillium italicum*	Blue mold
10.12.10	*Phyllosticta citricarpa*	Black spot
10.12.11	*Phoma tracheiphila*	Mal secco, citrus wilt
10.12.12	*Phytophthora citrophthora*	Brown rot
10.12.13	*Phytophthora nicotianae*	Foot rot, gummosis, root rot
10.12.14	*Thanatephorus cucumeris*	Areolate leaf spot
10.12.15	*Thielaviopsis basicola*	Black root rot

10.13 Bacteria

10.13.1	*Pseudomonas syringae*	Citrus blast/black pit (fruit)
10.13.2	*Xanthomonas axonopodis* pv. *citri*	Citrus canker

10.14 Phytoplasma

10.14.1	*Spiroplasma citri*	Citrus stubborn

10.15 Viruses

	Causal organism	**Acronym**
10.15.1	Citrus leaf rugose ilarvirus	CiLRV
10.15.2	Citrus leprosis rhabdovirus	CLV
10.15.3	Citrus psorosis virus	CPV
10.15.4	Citrus tatter leaf capillovirus	CTLV
10.15.5	Citrus tristeza closterovirus	CTV
10.15.6	Citrus variegation ilarvirus	CVV
10.15.7	Satsuma dwarf nepovirus	SDV

10.16 Virus-like agents

10.16.1	Cristacortis agent
10.16.2	Impietratura agent

10.17 Viroids

10.17.1	Citrus bent leaf viroid	CBLVd
10.17.2	Citrus cachexiaviroid	CCaVd
10.17.3	Citrus xyloporosis viroid	CXyVd
10.17.4	Citrus exocortis viroid	CEVd
10.17.5	Citrus viroid IV	CVd-IV

10.18 Notes

Specify here any additional information

11. Biochemical markers

11.1 Isozyme (9.1)

For each enzyme, indicate the tissue analyzed and the electrophoresis method used related to *Citrus medica, Citrus reticulata, Citrus maxima, Fortunella japonica* and *Poncirus trifoliata*. Since variation occurs within species, it is suggested to nominate specific genotypes widely known and available for use as standards. A particular enzyme can be recorded as 11.1.1; 11.1.2, etc. Examples include: Acid phosphatase (ACPH); Esterases α and β (EST A and B); Glutamate oxaloacetate transaminase (GOT); Isocitrate dehydrogenase (ICD); Malate dehydrogenase (MDH); Phosphogluconate dehydrogenase (PGD); Phosphoglucose isomerase (PGI); Phosphoglucose mutase (PGM); Peroxidases (see Torres *et al.* 1978)

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 mitochondria 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 (10.1)

13.2 Ploidy level (10.2)
(2x, 3x, 4x, etc. and aneuploidy)

13.3 Meiosis chromosome associations
Average of 50 microspore mother cells, observed during metaphase 1

13.4 Normal tetrads [%]
Record the average of 50 tetrads

13.5 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.

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

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MULTICROP PASSPORT DESCRIPTORS
1. Institute code (INSTCODE) 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.
2. Accession number (ACCENUMB) 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).
3. Collecting number (COLLNUMB) 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 identify-ing duplicates held in different collections. It should be unique and always accompany subsamples wherever they are sent.
4. Genus (GENUS) Genus name for taxon. Initial uppercase letter required.
5. Species (SPECIES) Specific epithet portion of the scientific name in lowercase letters plus authority[1]. Following abbreviation is allowed: "sp."
6. Subtaxa (SUBTAXA) Subtaxa can be used to store any additional taxonomic identifier plus authority[1]. Following abbreviations are allowed: "ssp." (for subspecies); "var." (for variety); "convar." (for convariety); "f." (for form).
7. Accession name (ACCNAME) Either a registered or other formal designation given to the accession. First letter uppercase. Multiple names separated with semicolon.
8. Country of origin (ORIGCTY) 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)
9. Location of collecting site (COLLSITE) 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)
10. Latitude of collecting site (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).

[1] Authority is only provided at the most detailed taxonomic level

11. Longitude of collecting site **(LONGITUDE)**

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).

12. Elevation of collecting site [m asl] **(ELEVATION)**

Elevation of collecting site expressed in meters above sea level. Negative values allowed.

13. Collecting date of original sample [YYYYMMDD] **(COLLDATE)**

Collecting date of the original sample where YYYY is the year, MM is the month and DD is the day.

14. Status of sample **(SAMPSTAT)**

1	Wild	0	Unknown
2	Weedy		
3	Traditional cultivar/Landrace	99	Other (Elaborate in REMARKS field)
4	Breeder's line		
5	Advanced cultivar		

15. Collecting source **(COLLSRC)**

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				

16. Donor institute code **(DONORCODE)**

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.

17. Donor number **(DONORNUMB)**

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)

18. Other number(s) associated with the accession **(OTHERNUMB)**

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

19. Remarks **(REMARKS)**

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.

FAO WIEWS DESCRIPTORS
1. Location of safety duplicates (DUPLSITE) 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.
2. Availability of passport data (PASSAVAIL) (i.e. in addition to what has been provided) 0 Not available 1 Available
3. Availability of characterization data (CHARAVAIL) 0 Not available 1 Available
4. Availability of evaluation data (EVALAVAIL) 0 Not available 1 Available
5. Acquisition type of the accession (ACQTYPE) 1 Collected/bred originally by the institute 2 Collected/bred originally by joint mission/institution 3 Received as a secondary repository
6. Type of storage (STORTYPE) 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 *In vitro* collection 5 Field genebank collection 6 Cryopreserved 99 Other (elaborate in REMARKS field)

COLLECTING FORM for citrus

SAMPLE IDENTIFICATION

COLLECTING NAME(S)/INSTITUTE(S) (2.2):

COLLECTING No. (2.1) PHOTOGRAPH No. (2.17):

COLLECTING DATE [YYYYMMDD] (2.3):

GENUS (1.5.1): SPECIES (1.5.2):

SAMPLE

STATUS OF SAMPLE (2.13):
0. Unknown 1. Wild 2. Weedy 3. Traditional cultivar/Landrace
4. Breeder's line 5. Advanced cultivar 99. Other (specify):

TYPE OF SAMPLE (2.14):
1. Seed 2. Seedling 3. Budwood 4. Graft 5. Rooted cutting
6. Layer 7. Vitroplant 8 Fruit 99. Other (specify)

NUMBER OF PLANTS SAMPLED (2.15):

PREVAILING STRESSES (2.16.20):
Mention the types of major stresses, i.e. abiotic (drought), biotic (pests, diseases, etc.)

ETHNOBOTANICAL DATA

LOCAL/VERNACULAR NAME (2.16.2):

ETHNIC GROUP (2.16.1):

PARTS OF PLANT USED (2.16.6):
1. Seed 2. Root 3. Trunk 4. Leaf 5. Flower/inflorescence
6. Fruit 99. Other (specify):

PLANT USES (2.16.7)
1. Fresh fruit consumption 2. Juice 3. Cooking 4. Rootstock
5. Distillation/fermentation 6. Essential oils 7. Ornamental 8. Medicinal
99. Other (specify):

ASSOCIATED FLORA (2.16.23):

CHARACTERIZATION

Vegetative
Rootstock (7.1.1):
Tree growth habit (7.1.5): 1. Erect 2. Spreading 3. Drooping
99. Other (specify):
Shoot tip colour (7.1.11): 1. Green 2. Purple 99. Other (specify):

Leaf
Vegetative life cycle (7.2.1): 1. Evergreen 2. Deciduous 3. Semi-persistent
Leaf division (7.2.2): 1. Simple 2. Bifoliate 3. Trifoliate
4. Pentafoliate 99. Other (e.g. mixture; specify):

Fruit
Fruiting season (7.4.1): 1. Early 2. Midseason 3. Late
Fruit diameter [mm] (7.4.4):
Fruit length [mm] (7.4.5):
Fruit shape (7.4.6): 1. Spheroid 2. Ellipsoid 3. Pyriform
4. Oblique (asymmetric) 5. Obloid
6. Ovoid 99. Other (specify):
Shape of fruit base (7.4.7): 1. Necked 2. Convex 3. Truncate
4. Concave 5. Concave collared 6. Collared with neck
99. Other (specify):

Shape of fruit apex (7.4.8): 1. Mammiform 2. Acute 3. Rounded 4. Truncate 5. Depressed 99. Other (specify):

Fruit skin (epicarp) colour (7.4.9):

Fruit surface texture (7.4.12): 1. Smooth 2. Rough 3. Papillate 4. Pitted 5. Bumpy 6. Grooved 99. Other (specify):

Adherence of albedo to pulp (7.4.13): 3 Weak 5. Medium 7. Strong

Fruit stylar end (7.4.21): 1. Closed 2. Open 3. Persistent style 99. Other (specify):

Pulp

Pulp (flesh) colour (7.6.1):

Seed

Average number of seeds per fruit (7.7.1): 0. None 1. 1–4 2. 5–9 3. 10–19 4. 20–50 5 . >50

Seed embryony (7.7.8): 1. Monoembryonic 2. Polyembryonic 3. Mixture of both

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Juice

Juice taste (2.16.12): 1. Insipid 2. Acid 3. Sweet 4. Bitter 99. Other (specify):

Juice aroma (2.16.15): 1. Weak 2. Average 3. Strong 4. Resinous 99. Other (e.g. onion/stale; specify):

Juice content in endocarp (7.6.7): 3. Low 5. Medium 7. High

Juice pH (8.5.2):

Sugar content [%] (8.5.3):

COLLECTING SITE LOCATION

COUNTRY (2.4):

PROVINCE/STATE (2.5): DEPARTMENT/COUNTY (2.6):

LOCATION (2.7): km: direction: from:

LATITUDE (2.8): LONGITUDE (2.9): ELEVATION (2.10): m asl

COLLECTING SITE ENVIRONMENT

COLLECTING SOURCE (2.11):

0. Unknown 1. Wild habitat 2. Farm 3. Market 4. Institute/Research organization 99. Other (specify):

HIGHER LEVEL LANDFORM (6.1.2):

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

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

SOIL FERTILITY (6.1.21): (code: 3=Low ; 5=Moderate; 7=High)

SOIL TEXTURE CLASSES (6.1.17): State class (e.g. Clay, Loam, Silt)

SOIL TAXONOMIC CLASSIFICATION (6.1.19): State class (e.g. Alfisols, Spodosols, Vertisols)

WATER AVAILABILITY (6.1.20):

1. Rain-fed 2. Irrigated 3. Flooded 4. River banks 5. Sea coast 99. Other (specify):

RAINFALL (6.1.22.3): Annual mean: ☐ mm

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly mean [mm]:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

TEMPERATURE (6.1.22.1): Seasonal mean: °C

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly mean [°C]:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐