Descriptors for

Tomato

(Lycopersicon spp.)
Descriptors for Tomato
DEFINITIONS AND USE OF THE DESCRIPTORS

IPGRI now 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: Many of the descriptors in this category are susceptible to environmental differences but are generally useful in crop improvement and others may involve complex biochemical or molecular characterization. They include yield, agronomic performance, stress susceptibilities and biochemical and cytological traits.

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.

Minimum highly discriminating descriptors are marked with a star (★).

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

(a) the Système International d’Unités (SI system) is used. The units to be applied are given in square brackets following the descriptor name;

(b) 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);
4 Descriptors for Tomato

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very low</td>
</tr>
<tr>
<td>2</td>
<td>Very low to low</td>
</tr>
<tr>
<td>3</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>Low to intermediate</td>
</tr>
<tr>
<td>5</td>
<td>Intermediate</td>
</tr>
<tr>
<td>6</td>
<td>Intermediate to high</td>
</tr>
<tr>
<td>7</td>
<td>High</td>
</tr>
<tr>
<td>8</td>
<td>High to very high</td>
</tr>
<tr>
<td>9</td>
<td>Very high</td>
</tr>
</tbody>
</table>

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;

(d) when a descriptor is scored using a 1-9 scale, such as in (c), ‘0’ would be scored when (i) the character is not expressed; (ii) when 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**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Toothed</td>
</tr>
<tr>
<td>5</td>
<td>Elliptic</td>
</tr>
<tr>
<td>7</td>
<td>Linear</td>
</tr>
</tbody>
</table>

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

**Absence/presence of terminal leaflet**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Absent</td>
</tr>
<tr>
<td>1</td>
<td>(or +) Present</td>
</tr>
</tbody>
</table>

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

(g) 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 van Hintum (1993), that clearly state a method for scoring heterogeneous accessions;

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD</td>
<td>2 digits to represent the day</td>
</tr>
<tr>
<td>MM</td>
<td>2 digits to represent the month</td>
</tr>
<tr>
<td>YYYY</td>
<td>4 digits to represent the year</td>
</tr>
</tbody>
</table>
1. **Accession descriptors**

**1.1 Accession number**

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

Number assigned to an accession by the donor

**1.4 Other number(s) associated with the accession**

Any other identification number known to exist in other collections for this accession, e.g. USDA Plant Inventory number (not Collecting number, see descriptor 2.3). 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
1.5.2 Species
1.5.3 Subspecies
1.5.4 Botanical variety

**1.6 Pedigree**

Parentage or nomenclature, and designations assigned to breeders’ material

1.6.1 Male parent
1.6.2 Female parent
1.6.3 Other (specify in descriptor 1.12 Notes)

**1.7 Cultivar**

1.7.1 Cultivar name

Either a registered or other formal cultivar designation given to the accession

1.7.2 Translation/Transliteration

Provide translation of the local cultivar name into English
1.7.3  **Synonyms**
Include here any previous identification other than the current name. Collecting number or newly assigned station name are frequently used as identifiers.

1.8  **Breeding method**
(Self)  1  Pedigree selection  
2  Bulk  
3  Single seed descent  
4  Backcross  
(Outcrossing)  5  Mass selection  
6  Selection with progeny testing (includes: Ear to row; Top cross progeny test; Ear to row to ear; Full sib, and Half sib)  
7  Recurrent selection (includes: Reciprocal recurrent selection)  
(Both)  8  Other (specify in descriptor 1.12  Notes)

1.9  **Acquisition date** [DDMMYYYY]
Date on which the accession entered the collection

1.10  **Accession size**
Approximate number or weight of seeds of an accession in the genebank

1.11  **Type of material received**
1  Zygotic embryo  
2  Seed  
3  Plant (including seedling)  
4  Fruit/berry  
5  Shoot/bud  
6  Pollen  
7  *In vitro* propagates  
8  Other (specify in descriptor 1.12  Notes)

1.12  **Notes**
Any additional information may be specified here
2. Collecting descriptors

2.1 **Collecting institute(s)**
Institute(s) and people collecting/sponsoring the sample collection

2.2 **Site number**
Number assigned to the physical site by the collector

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

2.4 **Collecting date of original sample** [DDMMYYYY]

2.5 **Country of collecting**
Name of the country in which the sample was collected or bred. 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: Deutsche Institut für Normung e.V., 10772 Berlin, Germany; Tel. 30-2601-2860; Fax 30-2601-1231, Tlx. 184 273-din-d.

2.6 **Province/State**
Name of the primary administrative subdivision of the country in which the sample was collected

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

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

2.9 **Latitude of collecting site**
Degrees and minutes followed by N (North) or S (South) (e.g. 1030S)

2.10 **Longitude of collecting site**
Degrees and minutes followed by E (East) or W (West) (e.g. 07625W)

2.11 **Elevation of collecting site** [m asl]
8 Descriptors for Tomato

2.12 Collecting source (2.10)
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
   3.4 Other exchange system
4 Institute/Research organization
5 Other (specify in descriptor 2.31 Collector’s notes)

2.13 Status of sample (2.11)
1 Wild
2 Weedy
3 Primitive cultivar/Landrace
4 Breeders line
5 Advanced cultivar
6 Unknown
7 Other (specify in descriptor 2.31 Collector’s notes)

2.14 Number of plants sampled

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

2.16 Ethnic group
Name of the tribe of the farmer donating the sample or of the people living in the area of collecting

2.17 Number of seeds collected [number]
2.18 **Plant population density**
3 Low
5 Intermediate
7 High

2.19 **General appearance of population**
Provide a subjective assessment of the general appearance of the population
3 Poor
5 Medium
7 Good

2.20 **Population isolation** [km]
Straight-line distance between two adjacent collecting sites

2.21 **Cropping system**
1 Monoculture
2 Intercropped (specify crop in descriptor 2.31 Collector’s notes)

2.22 **Cultural practices**
2.22.1 **Sowing date** [DDMMYYYY]
2.22.2 **Transplanting date** [DDMMYYYY]
2.22.3 **Harvest date** [DDMMYYYY]
2.22.4 **Irrigation**
Specify amount, frequency and method of application

2.23 **Genetic erosion**
Estimate of the rate at which genetic erosion of the species is occurring in the region of collecting
3 Slow
5 Intermediate
7 Rapid

2.24 **Associated flora**
Other dominant crop/plant species, found in and around the collecting site

2.25 **Population competition with associated flora**
Specify the major floristic elements in descriptor 2.31 Collector’s notes
3 Low
5 Intermediate
7 High
2.26 **Uses of the accession**
1. Fresh consumption
2. Industrial (canning, fruit processing)
3. Medicinal (vitamin)
4. Ornamental
5. Other (specify in descriptor 2.31 Collector’s notes)

2.27 **Collecting source environment**
Use descriptors 6.1.1 to 6.1.22 in section 6

2.28 **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 2.31 Collector’s notes.

- 0 No
- 1 Yes

2.29 **Herbarium specimen**
Was a herbarium specimen collected? If so, provide an identification number in descriptor 2.31 Collector’s notes.

- 0 No
- 1 Yes

2.30 **Prevailing stresses**
Information on associated biotic and abiotic stresses and the accession’s reaction. Indicate if disease indexing was done at the time of collecting in descriptor 2.31 Collector’s notes.

2.31 **Collector’s notes**
Additional information recorded by the collector or any specific information on any state in any of the above descriptors
3. Seed storage descriptors

3.1 Accession number (Passport 1.1)

3.2 Storage address
(Location in medium- and/or long-term storage and building, room, shelf numbers)

3.3 Storage date [DDMMYYYY]

3.4 Germination at storage [%]

3.5 Date of last germination test [DDMMYYYY]

3.6 Germination at the last test [%]

3.7 Date of next test [DDMMYYYY]
Date (estimate) when the accession should next be tested

3.8 Moisture content at harvest [%]

3.9 Moisture content at storage (initial) [%]

3.10 Amount of seeds in storage(s) [g or number] (Passport 1.10)

3.11 Location of duplicates of this accession
4. Multiplication/Regeneration descriptors

4.1 Accession number (Passport 1.1)

4.2 Field plot number

4.3 Location

4.4 Collaborator

4.5 Cultural practices
   4.5.1 Sowing date [DDMMYYYY]
   4.5.2 Transplanting date [DDMMYYYY]
   4.5.3 Harvest date [DDMMYYYY]
   4.5.4 Irrigation
      Specify amount, frequency and method of application

4.6 Sowing density [%]

4.7 Fertilizer application [g/m²]

4.8 Germination in the field [%]

4.9 Seedling vigour
   Assessed at 18 days after emergence

4.10 Number of established plants per hectare

4.11 Number of plants used as seed source for each regeneration

4.12 Breeding method (Passport 1.8)
   (Self) 1 Pedigree selection
          2 Bulk
          3 Single seed descent
          4 Backcross
   (Outcrossing) 5 Mass selection
                 6 Selection with progeny testing (includes: Ear to row;
                  Top cross progeny test; Ear to row to ear; Full sib, and
                  Half sib)
                 7 Recurrent selection (includes: Reciprocal recurrent
                  selection)
   (Both) 8 Other (specify in descriptor 4.18 Notes)
4.13 Pollination method
1 Self-pollinated
2 Often cross-pollinated
3 Cross-pollinated

4.14 Pollen viability
3 Low
5 Intermediate
7 High

4.15 Previous multiplication and/or regeneration
4.15.1 Location
4.15.2 Sowing date [DDMMYYYY]
4.15.3 Plot number
4.15.4 Biotic stress
0 Absent
1 Present

4.16 Date of last regeneration or multiplication [DDMMYYYY] (1.3)

4.17 Number of times accession regenerated
Since the date of acquisition

4.18 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 2.5 Country of collecting)

5.2 Site (research institute) (3.1)
  5.2.1 Latitude
  Degrees and minutes followed by N (North) or S (South) (e.g. 1030S)

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

  5.2.3 Elevation [m asl]

  5.2.4 Name of farm or institute

5.3 Evaluator’s name and address

5.4 Sowing date [DDMMYYYY]

5.5 Planting date [DDMMYYYY] (3.2)

5.6 Modality of sowing
  1 Greenhouse
  2 Open air
  3 Heated bed
  4 Field
  5 Other (specify in descriptor 5.18 Notes)

5.7 Transplanting date [DDMMYYYY]

5.8 First harvest date [DDMMYYYY] (3.3)

5.9 Last harvest date [DDMMYYYY]
5.10 **Evaluation environment**
Environment in which characterization/evaluation was carried out

1. Field
2. Screenhouse
3. Glasshouse
4. Laboratory
5. Other (specify in descriptor 5.18 Notes)

5.11 **Seed germination [%]**
Specify number of days over which germination is measured

5.12 **Field establishment [%]**

5.13 **Sowing/transplanting site in the field**
Give block, strip and/or row/plot numbers as applicable, plants/plot, replication

5.14 **Field spacing**

5.14.1 Distance between plants in a row [m]
5.14.2 Distance between rows [m]

5.15 **Environmental characteristics of site**
Use descriptors 6.1.1 to 6.1.22 in section 6

5.16 **Fertilizer**
Specify types, doses, frequency of each and method of application

5.17 **Plant protection**
Specify pesticides used, doses, frequency of each and method of application

5.18 **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)
9. 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
2. Escarpment
3. Interfluve
4. Valley
5. Valley floor
6. Channel
7. Levee
8. Terrace
9. Floodplain
10. Lagoon
11. Pan
12. Caldera
13. Open depression
14. Closed depression
15. Dune
16. Longitudinal dune
17. Interdunal depression
18. Mangrove
19. Upper slope
20. Midslope
21. Lower slope
22. Ridge
23. Beach
24. Beachridge
25. Rounded summit
26. Summit
27. Coral atoll
28. Drainage line (bottom position in flat or almost-flat terrain)
29. Coral reef
30. Other (specify in appropriate section’s Notes)
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

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**Fig. 1 Land element and position**
6.1.7 Overall vegetation surrounding and at the site
(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)
7 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 in situ weathered
8 Alluvial deposits 17 Saprolite
9 Unconsolidated (unspecified) 18 Other (specify in appropriate section’s Notes)
6.1.8.2 Rock type

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
29 Other (specify in appropriate section’s Notes)
30 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
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

6.1.14.1 pH at 10-15 cm
6.1.14.2 pH at 16-30 cm
6.1.14.3 pH at 31-60 cm
6.1.14.4 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 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 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.).

6.1.19 Water availability
1 Rainfed
2 Irrigated
3 Flooded
4 River banks
5 Sea coast
6 Other (specify in appropriate section’s Notes)

6.1.20 Soil fertility
General assessment of the soil fertility based on existing vegetation
3 Low
5 Moderate
7 High

6.1.21 Climate of the site
Should be assessed as close to the site as possible

6.1.21.1 Temperature [°C]
Provide either the diurnal (mean, maximum, minimum) or the seasonal (mean, maximum, minimum)

6.1.21.2 Rainfall [mm]
Annual average (state number of recorded years)
6.1.21.3  **Wind**  [km/s]
Annual average (state number of years recorded)
- 6.1.21.3.1  Frequency of typhoons or hurricane force winds
- 6.1.21.3.2  Date of most recent typhoons or hurricane force winds  [DDMMYYYY]
- 6.1.21.3.3  Annual maximum wind velocity  [km/s]

6.1.21.4  **Frost**
- 6.1.21.4.1  Date of most recent frost  [DDMMYYYY]
- 6.1.21.4.2  Lowest temperature  [°C]
  Specify seasonal average and minimum survived
- 6.1.21.4.3  Duration of temperature below freezing  [d]

6.1.21.5  **Relative humidity**
- 6.1.21.5.1  Relative humidity diurnal range  [%]
- 6.1.21.5.2  Relative humidity seasonal range  [%]

6.1.21.6  **Light**
- 3  Shady
- 7  Sunny

6.1.22  **Other**
Any additional information may be specified here
CHARACTERIZATION

7. Plant descriptors

7.1 Vegetative

7.1.1 Seedling
Records should be taken when the seedling primary leaves are fully opened and the terminal bud is around 5 mm in size

7.1.1.1 Hypocotyl colour
1 Green
2 1/4 purple from the base
3 1/2 purple from the base
4 Purple

7.1.1.2 Hypocotyl colour intensity
3 Low
5 Intermediate
7 High

7.1.1.3 Hypocotyl pubescence
0 Absent
1 Present

7.1.1.4 Primary leaf length [mm]
Average of 10 cotyledonous leaves

7.1.1.5 Primary leaf width [mm]
Average of 10 cotyledonous leaves

7.1.2 Plant characteristics
Records should be taken when the fruits of the 2nd and 3rd truss are ripened

7.1.2.1 Plant growth type
Observed on the whole plot, after admixtures have been removed
1 Dwarf
2 Determinate
3 Semi-determinate
4 Indeterminate
### 7.1.2.2 Plant size
Visual estimation of the whole plot

<table>
<thead>
<tr>
<th>Reference variety</th>
<th>3 Small</th>
<th>5 Intermediate</th>
<th>7 Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC82B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>many improved varieties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>many improved local varieties</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7.1.2.3 Vine length [cm]
Measured on 10 randomly selected plants from the soil level to the tip of the longest stem of a plant

### 7.1.2.4 Stem pubescence density

| 3 Sparse |
| 5 Intermediate |
| 7 Dense |

### 7.1.2.5 Stem internode length

| 3 Short |
| 5 Intermediate |
| 7 Long |

### 7.1.2.6 Foliage density

| 3 Sparse |
| 5 Intermediate |
| 7 Dense |

### 7.1.2.7 Number of leaves under 1st inflorescence

| 3 Few |
| 7 Many |

### 7.1.2.8 Leaf attitude

| 3 Semi-erect |
| 5 Horizontal |
| 7 Drooping |

### 7.1.2.9 Leaf type

(See Fig. 3)

| 1 Dwarf |
| 2 Potato leaf type |
| 3 Standard |
| 4 Peruvianum |
| 5 Pimpinellifolium |
| 6 Hirsutum |
| 7 Other (specify in descriptor 7.4 Notes) |
Fig. 3 Leaf type
7.1.2.10 Degree of leaf dissection
3 Low
5 Intermediate
7 High

7.1.2.11 Anthocyanin colouration of leaf veins
Indicate the environmental conditions of the trial (e.g. temperature and luminous intensity)
1 Obscure vein
2 Normal (clear)

7.2 Inflorescence and fruit
Unless otherwise indicated, all observations on the fruit should be taken, when possible, on the 3rd fruit of the 2nd and/or 3rd truss at the full maturity stage, provided normal fertilization has occurred.

7.2.1 Inflorescence descriptors

7.2.1.1 Inflorescence type
Observe the 2nd and 3rd truss of at least 10 plants
1 Generally uniparous
2 Both (partly uniparous, partly multiparous)
3 Generally multiparous

7.2.1.2 Corolla colour
1 White
2 Yellow
3 Orange
4 Other (specify in descriptor 7.4 Notes)

7.2.1.3 Corolla blossom type
1 Closed
2 Open

7.2.1.4 Flower sterility type
1 Stemless
2 Functional
3 Pollen

7.2.1.5 Petal length [mm]
Average of 10 petals from different flowers of different plants

7.2.1.6 Sepal length [mm]
Average of 10 sepals from different flowers of different plants
7.2.1.7 Style position
The relative position of the style compared with the stamens. Average of 10 styles from different flowers of different plants.
1 Inserted
2 Same level as stamen
3 Slightly exserted
4 Highly exserted

7.2.1.8 Style shape
1 Simple
2 Fasciated
3 Divided

7.2.1.9 Style hairiness
0 Absent
1 Present

7.2.1.10 Stamen length [mm]
Average of 10 stamens from different flowers of different plants

7.2.1.11 Dehiscence
Reference variety
1 Poricidal L. pennellii
2 Longitudinal Rest of species

7.2.2 Fruit descriptors
Unless otherwise indicated, all observations on the fruit should be taken, when possible, on the 3rd fruit of the 2nd and/or 3rd truss at the full maturity stage, provided normal fertilization has occurred. Record the average of 10 fruits from different plants.

★ 7.2.2.1 Exterior colour of immature fruit (5.3)
Recorded before maturity
1 Greenish-white
3 Light green
5 Green
7 Dark green
9 Very dark green

★ 7.2.2.2 Presence of green (shoulder) trips on the fruit
0 Absent (uniform ripening)
1 Present (fruit shoulders - upper part of the fruit, around calyx - are green while pistilar area of the fruit is red)
7.2.2.3 **Intensity of greenback (green shoulder)**

3  Slight
5  Intermediate
7  Strong

7.2.2.4 **Fruit pubescence**

<table>
<thead>
<tr>
<th>Reference variety</th>
<th>3  Sparse</th>
<th>5  Intermediate</th>
<th>7  Dense</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td><em>L. esculentum</em></td>
<td><em>L. pennellii</em></td>
<td><em>L. hirsutum</em></td>
</tr>
</tbody>
</table>

7.2.2.5 **Predominant fruit shape**

Recorded after the fruits turn colour. (See Fig. 4)

1  Flattened (oblate)
2  Slightly flattened
3  Rounded
4  High rounded
5  Heart-shaped
6  Cylindrical (long oblong)
7  Pyriform
8  Ellipsoid (plum-shaped)
9  Other (specify in descriptor 7.4 Notes)

---

**Fig. 4** Predominant fruit shape
### 7.2.2.6 Fruit size
At maturity

<table>
<thead>
<tr>
<th>Reference variety</th>
<th>Fruit size (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerise</td>
<td>Very small (&lt;3 cm)</td>
</tr>
<tr>
<td>Freude</td>
<td>Small (3 - 5 cm)</td>
</tr>
<tr>
<td>Vollendung</td>
<td>Intermediate (5.1 - 8 cm)</td>
</tr>
<tr>
<td>Bonset</td>
<td>Large (8.1 - 10 cm)</td>
</tr>
<tr>
<td>Grosse rote</td>
<td>Very large (&gt;10 cm)</td>
</tr>
</tbody>
</table>

### 7.2.2.7 Fruit size homogeneity
(Within a plant)

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
</tr>
<tr>
<td>Intermediate</td>
</tr>
<tr>
<td>High</td>
</tr>
</tbody>
</table>

### 7.2.2.8 Fruit weight [g]

### 7.2.2.9 Fruit length [mm]
Recorded from stem end to blossom end, to one decimal place, at maturity

### 7.2.2.10 Fruit width [mm]
Recorded at the largest diameter of cross-sectioned fruits to one decimal place, at maturity

### 7.2.2.11 Exterior colour of mature fruit
Recorded at maturity

<table>
<thead>
<tr>
<th>Exterior colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
</tr>
<tr>
<td>Yellow</td>
</tr>
<tr>
<td>Orange</td>
</tr>
<tr>
<td>Pink</td>
</tr>
<tr>
<td>Red</td>
</tr>
<tr>
<td>Other (specify in descriptor 7.4 Notes)</td>
</tr>
</tbody>
</table>

### 7.2.2.12 Intensity of exterior colour

<table>
<thead>
<tr>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
</tr>
<tr>
<td>Intermediate</td>
</tr>
<tr>
<td>Dark</td>
</tr>
</tbody>
</table>
7.2.2.13 Secondary fruit shape
(8.3)
Recorded on fruits of the second and third truss, after the fruits turn colour
1  Flattened (oblate)
2  Slightly flattened
3  Rounded
4  High rounded
5  Heart-shaped
6  Cylindrical (long oblong)
7  Pyriform
8  Ellipsoid (plum-shaped)
9  Other (specify in descriptor 7.4 Notes)

7.2.2.14 Ribbing at calyx end
(5.9)
Reference variety
1  Very weak  Cerise
3  Weak  Allround
5  Intermediate  Saint-Pierre
7  Strong  Supermarmande

7.2.2.15 Easiness of fruit to detach from the pedicel
Recorded during harvesting
3  Easy
5  Intermediate
7  Difficult

7.2.2.16 Fruit shoulder shape
(See Fig. 5)
Reference variety
1  Flat  Rossol
3  Slightly depressed
5  Moderately depressed  Saint-Pierre
7  Strongly depressed

Fig. 5 Fruit shoulder shape
32  Descriptors for Tomato

7.2.2.17  **Pedicel length** [cm]
Measured from peduncle to calyx

7.2.2.18  **Pedicel length from abscission layer** [cm]  (8.10)
Recorded from abscission layer to calyx. Average of 10 pedicels from different plants. (See Fig. 6)

Fig. 6 Pedicel length from abscission layer

7.2.2.19  **Presence/absence of jointless pedicel**  (5.8)
0  Absent
1  Present

7.2.2.20  **Width of pedicel scar** [mm]
Recorded at the widest part on 10 randomly selected fruits from different plants
3  Narrow (covered by the calyx)
5  Medium (slightly apparent around the calyx)
7  Wide (very apparent around the calyx)

7.2.2.21  **Size of corky area around pedicel scar** [mm]
Recorded at the widest part on 10 randomly selected fruits
3  Small
5  Intermediate
7  Large

7.2.2.22  **Easiness of fruit wall (skin) to be peeled**
3  Easy
5  Intermediate
7  Difficult

7.2.2.23  **Skin colour of ripe fruit**  (5.4)
Observe the peeled fruit skin
1  Colourless
2  Yellow
7.2.2.24  **Thickness of fruit wall (skin)** [mm]
Measured with a dial caliper

7.2.2.25  **Thickness of pericarp** [mm]  (8.8)
Measured from an equatorial section of the fruits

7.2.2.26  **Flesh colour of pericarp (interior)**  (5.5)
1. Green
2. Yellow
3. Orange
4. Pink
5. Red
6. Other (specify in descriptor 7.4 Notes)

7.2.2.27  **Flesh colour intensity**  (5.6)
3. Light
5. Intermediate
7. Dark

7.2.2.28  **Colour (intensity) of core**
1. Green
2. White
3. Light
5. Intermediate
7. Dark

7.2.2.29  **Fruit cross-sectional shape**  (5.7)
(See Fig. 7)
1. Round
2. Angular
3. Irregular

*Fig. 7 Fruit cross-sectional shape*
7.2.2.30  **Size of core** [cm]  (8.9)
Measured on 10 cross-sectional randomly selected fruits at the widest part of the core

7.2.2.31  **Number of locules**  (8.7)
Counted on at least 10 fruits

7.2.2.32  **Shape of pistil scar**
(See Fig. 8)
1  Dot
2  Stellate
3  Linear
4  Irregular

Fig. 8 Shape of pistil scar

7.2.2.33  **Fruit blossom end shape**  (8.15)
(See Fig. 9)
1  Indented
2  Flat
3  Pointed

Fig. 9 Blossom end shape
7.2.2.34  Blossom end scar condition  
1 Open  
2 Closed  
3 Both  

7.2.2.35  Fruit firmness (after storage)  
Recorded by pressing together in the palm on the side of a fruit at its widest girth, i.e. sideways, 10 days after harvesting in full ripeness  
3 Soft  
5 Intermediate  
7 Firm  

7.3  Seed  

7.3.1  Seed shape  
1 Globular  
2 Ovate  
3 Triangular with pointed base  

7.3.2  1000-seed weight [g]  

7.3.3  Seed colour  
1 Light yellow  
2 Dark yellow  
3 Grey  
4 Brown  
5 Dark brown  

7.4  Notes  
Any additional information, especially in the category of ‘other’ under various descriptors above, may be specified here
8. Plant descriptors

8.1 Agronomic characteristics

8.1.1 Number of days to flowering [d]
From sowing until 50% of plants have at least one open flower in a uniform growing environment

8.1.2 Number of days to maturity [d]
From sowing until 50% of plants have at least one fruit ripened

8.1.3 Ripening uniformity of the whole plot
3 Poor
5 Intermediate
7 Good

8.1.4 Number of inflorescences
(On the main stem). Average of 10 plants

8.1.5 Number of flowers per inflorescence
(Second inflorescence). Average of 10 plants

8.1.6 Number of fruit set per inflorescence
Recorded in the 2nd truss

8.2 Fruit characteristics
(Environment dependent). All quality characteristics should be evaluated in physiologically mature fruits

8.2.1 Blotchy ripening
Internal white tissue
3 Slight
5 Intermediate
7 Severe

8.2.2 Sun scald
3 Slight
5 Intermediate
7 Severe
8.2.3  **Radial cracking**  
1  Corky lines  
3  Slight  
5  Intermediate  
7  Severe  

8.2.4  **Concentric cracking**  
1  Corky lines  
3  Slight  
5  Intermediate  
7  Severe  

8.2.5  **Fruit fasciation**  
3  Slight  
5  Intermediate  
7  Severe  

8.2.6  **Vascular bundle content**  
3  Slight  
5  Intermediate  
7  Severe  

8.2.7  **Cat-face appearance**  
3  Slight  
5  Intermediate  
7  Severe  

8.2.8  **Blossom-end rot**  
3  Few  
5  Moderate  
7  Many  

8.2.9  **Puffiness appearance**  
Presence of cavity  
3  Slight  
5  Intermediate  
7  Severe  

8.3  **Chemical composition**  

8.3.1  **Soluble solids**  
Measured in Brix unit (percent solids) from two composite raw juice samples of at least five fruits per juice sample
8.3.2 Fruit pH
Measured from two composite raw juice samples of at least five fruits per juice sample

8.4 Notes
Specify any additional information here

9. Abiotic stress susceptibility
Scored under artificial and/or natural conditions, which should be clearly specified. These
are coded on a susceptibility scale from 1 to 9:
1 Very low or no visible sign of susceptibility
3 Low
5 Intermediate
7 High
9 Very high

★ 9.1 Low temperature

9.2 High temperature

9.3 Salinity
Specify conductivity dS/m and main salt involved (NaCl, Na₂CO₃, CaCl₂, etc.)

9.4 Drought

9.5 High soil moisture

9.6 High humidity

9.7 Aluminium sensitivity

9.8 Calcium deficiency

9.9 Notes
Specify here any additional information
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 10.9 Notes. These are coded on a susceptibility scale from 1 to 9, viz:

1. Very low or no visible sign of susceptibility  
2. Low  
3. Intermediate  
4. High  
5. Very high

Asterisks (*) in sections 10.1 to 10.3 indicate the organisms considered most important by breeders or pathologists.

### 10.1 **Fungi**

<table>
<thead>
<tr>
<th>Causal organism</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.1.1</strong> <em>Alternaria alternata</em> f.sp. <em>lycopersici</em></td>
<td>Alternaria stem canker (Black mould)</td>
</tr>
<tr>
<td><strong>10.1.2</strong> <em>Alternaria solani</em></td>
<td>Early blight</td>
</tr>
<tr>
<td><strong>10.1.3</strong> <em>Alternaria</em> <em>tomato</em></td>
<td>Tomato nail head spot</td>
</tr>
<tr>
<td><strong>10.1.4</strong> <em>Ascochyta</em> <em>lycopersici</em></td>
<td>Tomato gray spot</td>
</tr>
<tr>
<td><strong>10.1.5</strong> <em>Botrytis cinerea</em></td>
<td>Grey mould</td>
</tr>
<tr>
<td><strong>10.1.6</strong> <em>Cercospora</em> <em>fujigena</em></td>
<td>Tomato Cercospora mould</td>
</tr>
<tr>
<td><strong>10.1.7</strong> <em>Colletotrichum</em> <em>spp.</em></td>
<td>Anthracnose (10.2.5)</td>
</tr>
<tr>
<td><strong>10.1.8</strong> <em>Corynespora</em> <em>cassicola</em></td>
<td>Target spot</td>
</tr>
<tr>
<td><strong>10.1.9</strong> <em>Didymella</em> <em>lycopersici</em></td>
<td>Didymella stem rot</td>
</tr>
<tr>
<td><strong>10.1.10</strong> <em>Fulvia</em> <em>fulva</em> (syn. <em>Cladosporium</em> <em>fulvum</em>)</td>
<td>Leaf mould (races A, B1 and B2)</td>
</tr>
<tr>
<td><strong>10.1.11</strong> <em>Fusarium</em> <em>oxysporum</em> f.sp. <em>radicis-lycopersici</em></td>
<td>Fusarium crown and root rot</td>
</tr>
<tr>
<td><strong>10.1.12</strong> <em>Fusarium</em> <em>oxysporum</em> f.sp. <em>lycopersici</em></td>
<td>Fusarium wilt (10.2.6-8)</td>
</tr>
<tr>
<td>(races 0, 1 and 2)</td>
<td></td>
</tr>
<tr>
<td><strong>10.1.13</strong> <em>Helminthosporium</em> <em>carpocapsum</em></td>
<td>Tomato Helminthosporium fruit rot</td>
</tr>
<tr>
<td><strong>10.1.14</strong> <em>Leveillula</em> <em>taurica</em></td>
<td>Powdery mildew</td>
</tr>
<tr>
<td><strong>10.1.15</strong> <em>Oidium</em> <em>lycopersicum</em></td>
<td></td>
</tr>
<tr>
<td><strong>10.1.16</strong> <em>Phytophthora</em> <em>spp.</em></td>
<td>Buckeye rot of fruit, Phytophthora root rot,</td>
</tr>
<tr>
<td></td>
<td>Late blight (10.2.9)</td>
</tr>
<tr>
<td><strong>10.1.17</strong> <em>Pseudocercospora</em> <em>fuligena</em></td>
<td>Cercospora leaf mould</td>
</tr>
<tr>
<td><strong>10.1.18</strong> <em>Pythium</em> <em>spp.</em></td>
<td>Corky root rot, Brown root rot</td>
</tr>
<tr>
<td><strong>10.1.19</strong> <em>Rhizoctonia</em> <em>solani</em></td>
<td>Pythium (10.2.14)</td>
</tr>
<tr>
<td><strong>10.1.20</strong> <em>Septoria</em> <em>lycopersici</em></td>
<td>Rhizoctonia</td>
</tr>
<tr>
<td></td>
<td>Septoria leaf spot (10.2.10)</td>
</tr>
</tbody>
</table>

**Evaluation**
10.1.21  *Stemphylium spp.*  
Grey leaf spot

10.1.22  *Verticillium dahliae*  
Verticillium wilt

10.2  *Verticillium albo-atrum* (races 1 and 2)  
(10.2.11-12)

10.2  Bacteria

<table>
<thead>
<tr>
<th>Causal organism</th>
<th>Common name</th>
</tr>
</thead>
</table>
| 10.2.1  *Clavibacter michiganensis subsp. michiganensis*  
syn. *Corynebacterium michiganense*  | Bacterial canker  
(10.3.1) |
| 10.2.2  *Erwinia carotovora subsp. carotovora*  | Bacterial stem rot |
| 10.2.3  *Pseudomonas corrugata*  | Tomato pith necrosis |
| 10.2.4  *Pseudomonas solanacearum*  | Bacterial wilt (10.3.2) |
| 10.2.5  *Pseudomonas syringae pv. tomato*  | Bacterial speck |
| 10.2.6  *Xanthomonas campestris pv. vesicatoria*  | Bacterial spot (10.3.3) |

10.3  Virus and mycoplasma

<table>
<thead>
<tr>
<th>Major distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.3.1  Alfalfa mosaic virus (AMV)</td>
</tr>
<tr>
<td>10.3.2  Cucumber mosaic virus (CMV)</td>
</tr>
<tr>
<td>10.3.3  <em>Curly-top virus</em></td>
</tr>
<tr>
<td>10.3.4  Potato virus Y (PVY)</td>
</tr>
<tr>
<td>10.3.5  Tobacco etch virus (TEV)</td>
</tr>
<tr>
<td>10.3.6  Tomato bushy stunt virus (TBSV)</td>
</tr>
<tr>
<td>10.3.7  <em>Tomato mosaic virus (ToMV)</em></td>
</tr>
<tr>
<td>10.3.8  Tomato spotted wilt virus (TSWV)</td>
</tr>
<tr>
<td>10.3.9  Tomato yellow leaf curl (syn. tomato leaf curl) (TYLCV)</td>
</tr>
<tr>
<td>10.3.10  Tomato yellow top</td>
</tr>
</tbody>
</table>

10.4  Viroids

| 10.4.1  Tomato apical stunt viroid (TASVd)  | |
| 10.4.2  Tomato bunchy top viroid (TBTVd)  | |
| 10.4.3  Tomato planta macho viroide (TPMVd)  | |

10.5  Mycoplasma-like organisms

| 10.5.1  Aster yellow disease  | |
| 10.5.2  Tomato big bud  | |

10.6  Post-harvest diseases

| 10.6.1  *Erwinia spp.*  
*Bacterial soft rot*  
*Pseudomonas spp.*  
*Bacillus spp.*  | |
| 10.6.2  *Alternaria alternata* (syn. *A. tennis*  
*Stemphylium botryosum* (teleomorph *Pleospora herbarum*)  
*Stemphylium consortiale*  | *Black mould rot* |
10.6.3 Pleospora lycopersici (syn. P. herbarum)  
10.6.4 Rhizopus stolonifer (syn. R. nigricans)  
10.6.5 Geotrichum candidum (syns. Oidium lactis and Oospora lactis and G. penicillatum) (watery rot and Oospora rot)

10.7 Pests

<table>
<thead>
<tr>
<th>Causal organism</th>
<th>Pest or common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.7.1 Acrosternum hilare</td>
<td>Green stink bug</td>
</tr>
<tr>
<td>10.7.2 Aculops lycopersici</td>
<td>Tomato russet mite</td>
</tr>
<tr>
<td>10.7.3 Agrostis ipsilon</td>
<td>Cutworm</td>
</tr>
<tr>
<td>10.7.4 Bemisia tabaci</td>
<td>Sweet potato whitefly</td>
</tr>
<tr>
<td>10.7.5 Drosophila spp.</td>
<td>Fruit fly</td>
</tr>
<tr>
<td>10.7.6 Euschistus servus</td>
<td>Brown stink bug</td>
</tr>
<tr>
<td>10.7.7 Euschistus conspersus</td>
<td>Conspersse stink bug</td>
</tr>
<tr>
<td>10.7.8 Frankliniella spp.</td>
<td>Thrips</td>
</tr>
<tr>
<td>Heliothrips haemorrhoidalis</td>
<td></td>
</tr>
<tr>
<td>Thrips spp.</td>
<td></td>
</tr>
<tr>
<td>10.7.9 Helicoverpa armigera</td>
<td>Tomato fruitworm</td>
</tr>
<tr>
<td>10.7.10 Nezara viridula</td>
<td>Southern green stink bug</td>
</tr>
<tr>
<td>10.7.11 Tetranychus spp.</td>
<td>Spider mites</td>
</tr>
<tr>
<td>10.7.12 Thyanta accerra</td>
<td>Red shouldered stink bug</td>
</tr>
<tr>
<td>10.7.13 Trialeurodes vaporariorum</td>
<td>Greenhouse whitefly</td>
</tr>
<tr>
<td>10.7.14 Macrosiphum euphorbiae</td>
<td>Potato aphid</td>
</tr>
<tr>
<td>10.7.15 Myzus persicae</td>
<td>Green peach aphid</td>
</tr>
<tr>
<td>10.7.16 Liriomyza spp.</td>
<td></td>
</tr>
<tr>
<td>10.7.17 Polyphagotarsonemus latus</td>
<td>Yellow tea mite</td>
</tr>
</tbody>
</table>

10.8 Nematodes

<table>
<thead>
<tr>
<th>Causal organism</th>
<th>Pest or common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.8.1 Belonolaimus gracilis</td>
<td>Sting nematode</td>
</tr>
<tr>
<td>10.8.2 Meloidogyne spp.</td>
<td>Root-knot nematode</td>
</tr>
<tr>
<td>10.8.3 Paratrichodorus spp.</td>
<td>Stubby-root nematode</td>
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<tr>
<td>Trichodorus spp.</td>
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</tbody>
</table>

10.9 Notes
Specify any additional information here
11. Biochemical markers
For biochemical and molecular markers refer to Plant Genome database (SolGenes for Tomato)

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.

11.2 Other biochemical markers
(e.g. Flavonoid and polyphenol profiles)

12. Molecular markers
Describe any specific discriminating or useful trait for this accession. Report probe-enzyme combination analyzed.

12.1 Restriction Fragment Length Polymorphism (RFLP)
12.2 Random Amplified Polymorphic DNA (RAPD)
12.3 Specific Amplicon Polymorphism (SAP)
12.4 Microsatellites
12.5 Other molecular markers

13. Cytological characters

13.1 Haploid chromosome number

13.2 Ploidy level
(4n, 6n)

13.3 Trisomics

13.4 Monosomics

13.5 B chromosomes

14. Identified genes
Refers to any gene identified for any of the morphological and biochemical characters. List all identified genes.
REFERENCES


Plant Genome Databases. SolGenes (for tomato) was developed by Cornell University with funding from the Plant Genome Project of the USDA. The URL for access to this and other plant databases via the World Wide Web is http://probe.nalusda.gov:8300.


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Ms Adriana Alercia supervised the drafting and re-drafting of the text up to the pre-publication stage. Ms Linda Sears edited the text, and Ms Patrizia Tazza drew the cover and the illustrations and prepared the layout. Mr Paul Stapleton managed the production of the publication.

The following IPGRI Staff provided substantial technical advice: Drs M. Diekmann, G. Ayad and Stefano Padulosi.
# List of Descriptors

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<th>Descriptor</th>
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