IPGRI

Descriptors for

Allium

Allium spp.

European Cooperative Programme for Crop Genetic Resources Network

ECP/GR

ASIAN VEGETABLE RESEARCH & DEVELOPMENT CENTER 1971

List of Descriptors

Almond (revised) * (E)	1985
Apple (E)	1982
Apricot * (E)	1984
Avocado (E,S)	1995
Bambara groundnut (E,F)	2000
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)	1999
Cashew (E)	1986
Cherry * (E)	1985
Chickpea (E)	1993
Citrus (E,F,S)	1999
Coconut (E)	1992
Coffee (E,S,F)	1996
Cotton (Revised) (E)	1985
Cowpea (E)	1983
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
Jackfruit (E)	2000
Kodo millet * (E)	1983
Lathyrus spp. (E)	2000
Lentil * (E)	1985
Lima bean * (E,P)	1982
Lupin * (E,S)	1981
Maize (E,S,F, P)	1991
Mango (E)	1989
Medicago (Annual) * (E,F)	1991
Mung bean * (E)	1980
Oat * (E)	1985
Oca * (S)	2001
Oil palm (E)	1989
Panicum miliaceum and *P. sumatrense* (E)	1985
Papaya (E)	1988
Peach * (E)	1985
Pear * (E)	1983
Pearl millet (E,F)	1993
Phaseolus acutifolius (E)	1985
Phaseolus coccineus * (E)	1983
Phaseolus vulgaris * (E,P)	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 (E)	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,F,S)	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

IPGRI publications are available free of charge to the libraries of genebanks, university departments, research institutions, etc. On request to Head, Editorial and Publications Unit, titles may also be made available to individuals who can show that they have a need for a personal copy of a publication. E, F, S, C and P indicate English, French, Spanish, Chinese, and Portuguese respectively. Titles marked with * are available only as photocopies. Various descriptor lists are available for downloading in portable document format from IPGRI's web site (URL: <http://www.ipgri.cgiar.org/>).

Descriptors for

Allium

Allium spp.

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 19 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). The international status of IPGRI is conferred under an Establishment Agreement which, by January 2000, had been signed and ratified by the Governments of Algeria, Australia, Belgium, Benin, Bolivia, Brazil, Burkina Faso, Cameroon, Chile, China, Congo, Costa Rica, Côte d'Ivoire, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, Greece, Guinea, Hungary, India, Indonesia, Iran, Israel, Italy, Jordan, Kenya, Malaysia, Mauritania, Morocco, Norway, Pakistan, Panama, Peru, Poland, Portugal, Romania, Russia, Senegal, Slovakia, Sudan, Switzerland, Syria, Tunisia, Turkey, Uganda and Ukraine.

Financial support for the Research Agenda of IPGRI is provided by the Governments of Australia, Austria, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Cyprus, Czech Republic, Denmark, Estonia, F.R. Yugoslavia (Serbia and Montenegro), Finland, France, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Republic of Korea, Latvia, Lithuania, Luxembourg, Macedonia (F.Y.R.), Malta, Mexico, the Netherlands, Norway, Peru, the Philippines, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, the UK, the USA and by the Asian Development Bank, Common Fund for Commodities, Technical Centre for Agricultural and Rural Cooperation (CTA), European Environment Agency (EEA), European Union, Food and Agriculture Organization of the United Nations (FAO), International Development Research Centre (IDRC), International Fund for Agricultural Development (IFAD), Interamerican Development Bank, Natural Resources Institute (NRI), Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), Nordic Genebank, Rockefeller Foundation, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), Taiwan Banana Research Institute (TBRI) and the World Bank.

The ECP/GR *Allium* Working Group is made of members, nominated by the National Coordinators, who are responsible for representing the activities and interests of their country with regard to *Allium* genetic resources. A Chair, elected by the members, coordinates the group. The Working Group members ensure effective links between ECP/GR and the respective stakeholders at the national level. Working Group members and other scientists from participating countries carry out an agreed workplan with their own resources as inputs in kind to the Programme. A central element in the Working Groups' activities is the ECP/GR *Allium* Database (http://www.hri.ac.uk/site2/research/PGB/ecpgr/ecpgr.htm), which is managed by Genetic Resources Unit, Horticulture Research International, Wellesbourne, United Kingdom. This database has the dual role of providing users with information on the germplasm maintained in Europe and providing the Group with a tool allowing it to take informed decisions and give recommendations regarding the management of national collections such as priority-setting, rationalization and safety-duplication. Other activities of the Working Group include the planning of joint research or collecting projects, the promotion of the utilization of genetic resources (e.g. through the establishment and evaluation of European core collections) and the regional coordination of *in situ* and *ex situ* conservation activities.

The Asian Vegetable Research and Development Center (AVRDC) was established in 1971 to help improve the nutrition, health and incomes of people in developing countries through improved vegetable varieties and methods of vegetable production, marketing and distribution, which take into account the need to preserve the quality of the environment.

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CONTENTS

PREFACE

Descriptors for Allium is a revision of a list of descriptors that appeared in Genetic Resources of *Allium* (AGPG/IBPGR/81/77, IBPGR 1982). This revised descriptor list is based on the work of a team of ECP/GR *Allium* descriptors crop subgroup members and experts from AVRDC. A draft version of the revision prepared in the internationally accepted IPGRI format for descriptor lists was subsequently sent to a number of international experts for their comments and amendments. A full list of the names and addresses of those involved is given in 'Contributors'. The 1982 descriptor numbers are given in parentheses beside the present descriptors for cross-referencing purposes.

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, however, does not 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 management and maintenance of the collection and/or to the users of the plant genetic resources.

Multicrop passport descriptors 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], along with a few additional specific descriptors used in the ECP/GR *Allium* database and indicated as [EA]. Please note that owing to the generic nature of the multicrop passport descriptors, not all descriptor states for a particular descriptor will be relevant to a specific crop. A key for the most important species of *Allium* is given in Annex I, which will help in their identification. In Annex II, the reader will find a Collecting form for *Allium* that will facilitate data collecting.

Any suggestions for improvement on the Descriptors for *Allium* will be highly appreciated by IPGRI, ECP/GR and AVRDC.

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.

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 Linear
2 Elliptic
3 Lanceolate

(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

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

1. Accession descriptors

1.1 Institute code [MCPD]

Code of the institute where the accession is maintained. The codes consist of the 3-letter ISO 3166 country code of the country where the institute is located plus a number. The current set of Institute Codes is available from FAO website (http://apps3.fao.org/wiews/). If new Institute Codes are required, they can be generated online by national WIEWS administrators.

1.2 Accession number (1.1) [MCPD]

This number serves as a unique identifier for accessions within a genebank collection, and is assigned when a sample is entered into the genebank collection. Once assigned this number should never be reassigned to another accession in the collection. Even if an accession is lost, its assigned number should never be 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).

1.3 Donor institute code (1.2) [MCPD]

Code for the donor institute. (See instructions under Institute Code, **1.1**)

1.4 Donor accession number (1.3) [MCPD]

Number assigned to an accession by the donor. (See instructions under Accession Number, **1.2**)

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

Any other identification (numbers) known to exist in other collections for this accession. Use the following system: INSTCODE:ACCENUMB;INSTCODE: ACCENUMB;… INSTCODE and ACCENUMB follow the standard described above and are separated by a colon. Pairs of INSTCODE and ACCENUMB are separated by a semicolon without space. When the institute is not known, the number should be preceded by a colon.

1.6 Genus (1.5.1) [MCPD]

Genus name for taxon. Initial uppercase letter required.

1.7 Species (1.5.2) [MCPD]

Specific epithet portion of the scientific name in lowercase letters. The abbreviation 'sp.' is allowed.

1.7.1 Species authority [MCPD]

Provide the authority for the species name

1.8 Subtaxa [MCPD]

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

1.8.1 Subtaxa authority [MCPD]

Provide the authority at the most detailed taxonomic level

1.9 Ancestral data (1.6) [MCPD]

Provide any information about either pedigree or other ancestral information

1.10 Accession name [MCPD]

Either a registered or other formal designation given to the accession. First letter uppercase. Multiple names separated with semicolon without space.

1.10.1 Synonyms

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

1.11 Common name (1.12) [MCPD]

1 Dry bulb onion
2 Shallot
3 Japanese bunching onion/Welsh onion
4 Garlic
5 Leek
6 Kurrat
7 Great-headed garlic/elephant garlic
8 Chive
9 Rakkyo
10 Chinese chive/Oriental garlic/Nira
99 Other (specify in descriptor **1.12 Remarks**)

1.12 Remarks

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

2. Collecting descriptors

2.1 Collecting institute(s) (2.2) [EA]
Name and address of the institute(s) and individual(s) 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.

2.3 Collecting date of sample [YYYYMMDD] (2.3) [MCPD]
Collecting date of the sample where YYYY is the year, MM is the month and DD is the day. Missing data (MM or DD) should be indicated with hyphens. Leading zeros are required.

2.4 Country of origin (2.4) [MCPD]
Code of the country in which the sample was originally collected. Use the three-letter abbreviations from the *International Standard (ISO) Codes for the representation of names of countries*. The ISO 3166-1: Code List can be found at:
http://www.un.org/Depts/unsd/methods/m49alpha.htm.

2.5 Location of collecting site (2.5; 2.6) [MCPD]
Location information below the country level that describes where the accession was collected. This might include the distance in kilometers and direction from the nearest town, village or map grid reference point (e.g. 7 km south of Curitiba in the state of Parana).

2.6 Latitude of collecting site[1] (2.7)[MCPD]
Degree (2 digits), minutes (2 digits) and seconds (2 digits) followed by N (North) or S (South) (e.g. 103020S). Every missing digit (minutes or seconds) should be indicated with a hyphen. Leading zeros are required (e.g. 10----S; 011530N; 4531--S).

2.7 Longitude of collecting site[1] (2.8)[MCPD]
Degree (3 digits), minutes (2 digits) and seconds (2 digits) followed by E (East) or W (West) (e.g. 0762510W). Every missing digit (minutes or seconds) should be indicated with a hyphen. Leading zeros are required (e.g. 076----W).

2.8 Elevation of collecting site [m asl] (2.9) [MCPD]
Elevation of collecting site expressed in meters above sea level. Negative values are allowed.

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[1] To convert longitude and latitude in degrees (º), minutes ('), seconds (''), and a hemisphere (North or South and East or West) to decimal degrees, the following formula should be used:

dºm's''=h*(d+m/60+s/3600)

where h=1 for the Northern and Eastern hemispheres and h=–1 for the Southern and Western hemispheres, i.e. 30º30'0''S= –30.5 and 30º15'55''N=30.265.

2.9 Collecting/acquisition source (2.10) [MCPD]

Coding listed below follows strictly major descriptor states of the MCPD

10 Wild habitat
20 Farm or cultivated habitat
30 Market or shop
40 Institute/Experimental Station/Research organization/Genebank
50 Seed company
60 Weedy, disturbed or ruderal habitat
99 Other (specify in descriptor **2.17 Remarks**)

2.10 Collecting source environment

Use descriptors **6.1.1** to **6.1.5** in section **6**

2.11 Preliminary assessment of daylength requirement [EA]

This preliminary assessment has to be defined in accordance with the latitude from which the accession originated

	Example varieties
0 Unknown	
1 Short day (23°S–23°N)	Tropicana, Creole, Violet de Galmi and Bauku
2 Short to intermediate day (23°–32°N or S)	Grano and Granex
3 Intermediate day (32°–40°N or S)	Babosa and Ben Shemen
4 Long day (>40°N or S)	Pukekohe Longkeeper and Rijnsburger

2.12 Biological status of accession (2.11) [MCPD]

Coding listed below follows strictly major descriptor states of the MCPD

100 Wild
200 Weedy
300 Traditional cultivar/landrace
400 Breeding/research material
500 Advanced/improved cultivar
999 Other (specify in descriptor **2.17 Remarks**)

2.13 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 Vegetative
2 Seed
99 Other (specify which part of the plant in descriptor **2.17 Remarks**)

2.14 Number of plants sampled (2.13)

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

2.15 Ethnobotanical data

2.15.1 Ethnic group

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

2.15.2 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.

2.15.2.1 Translation

Provide translation of the local name into English, if possible

2.15.3 History of plant use

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

2.15.4 Parts of the plant used

1 Seed
2 Root/rhizome
3 Bulb/clove
4 Leaf sheath/pseudostem
5 Leaf blade
6 Scape
7 Flower/inflorescence
99 Other (specify in descriptor **2.17 Remarks**)

2.15.5 Plant uses (2.16)

1 Food
  1.1 Raw salad
  1.2 Fresh cooked
  1.3 Stored/cooked/bottled/canned
  1.4 Freezing
  1.5 Pickling
  1.6 Dehydrated
2 Medicinal
3 Ornamental
4 Forage
99 Other (specify in descriptor 2.17 **Remarks**)

2.15.6 Cultural characteristics

Is there any folklore associated with the collected Allium type (e.g. taboos, stories and/or superstitions)? If so, describe it briefly in descriptor **2.17 Remarks**.

0 No
1 Yes

2.15.7 Prevailing stresses

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

2.15.8 Cultural practices

2.15.8.1 Sowing date [YYYYMMDD]

2.15.8.2 First harvest date [YYYYMMDD]

2.15.8.3 Last harvest date [YYYYMMDD]

2.15.9 Cropping system

1 Monoculture
2 Intercropped (specify crop in descriptor **2.17 Remarks**)

2.15.10 Mode of reproduction (4.2.6) [EA]

1 Vegetative
2 Seed
3 Both

2.15.11 Associated flora

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

2.15.12 Seasonality

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

2.16 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 **2.17 Remarks**.

0 No
1 Yes

2.17 Remarks

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

MANAGEMENT

3. Management descriptors

3.1 Accession number (Passport 1.2)

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 germplasm storage (1.10) [MCPD]
10 Seed collection
20 Field collection
30 In vitro collection
40 Cryopreserved collection
99 Other (specify in descriptor **3.10 Remarks**)

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

3.6 Acquisition date [YYYYMMDD] (1.7) [MCPD]
Date on which the accession entered the collection. Missing data (MM or DD) should be indicated with hyphens. Leading zeros are required.

3.7 Location of safety duplicates [MCPD]
Code of the institute where a safety duplicate of the accession is maintained. See instructions under 1.1 Institute Code.

3.8 *In vitro* conservation

3.8.1 Type of source explant/ introduction method
1 Seed or zygotic embryo
2 Meristem
3 Shoot tip
4 Somatic embryo
5 Other organ via callus or suspension culture
99 Other (specify in descriptor **3.10 Remarks**)

3.8.2 Date of introduction *in vitro* [YYYYMMDD]

3.8.3 Type of subcultured material

1 Apical or axillary bud
2 Somatic embryo
99 Other (specify in descriptor **3.10 Remarks**)

3.8.4 Regeneration process

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

3.8.5 Number of individuals 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 Apical or axillary bud
3 Somatic embryo
99 Other (specify in descriptor **3.10 Remarks**)

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 Apical or axillary bud
3 Somatic embryo
99 Other (specify in descriptor **3.10 Remarks**)

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

3.9.8 Number of recovered samples

3.9.9 Location after the last subculture

3.10 Remarks
Any additional information may be specified here

4. Multiplication/regeneration descriptors

4.1 Accession number (Passport 1.2)

4.2 Population identification (Passport 2.2)
Collecting number, identifier number, pedigree, cultivar name, etc., depending on the population type

4.3 Multiplication/regeneration site location

4.4 Collaborator's name

4.5 Sowing/planting date [YYYYMMDD]

4.6 Cultural practices

4.6.1 Field spacing

4.6.1.1 Distance between plants [cm]

4.6.1.1.1 Number of plants per m^2

4.6.1.1.2 Number of plants per 1-m row

4.6.1.2 Distance between rows [cm]

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

4.6.1.4 Water availability
If irrigated, specify frequency in descriptor **4.11 Remarks**

1 Irrigated
2 Rain-fed

4.7 Plant/seedling vigour
Recorded in the nursery after 25 days of sowing at 4–5 leaf stage of development

3 Poor
5 Medium
7 Good

4.8 Number of plants established

4.9 Previous multiplication and/or regeneration (1.8)

4.9.1 Location

4.9.2 Sowing date [YYYYMMDD]

4.10 Number of times accession regenerated (1.10)
Since the date of acquisition

4.11 Remarks
Any additional information may be specified here

ENVIRONMENT AND SITE

5. Characterization and/or evaluation site descriptors

5.1 Country of characterization and/or evaluation (3.1)
(See instructions in descriptor **2.4** Country of origin)

5.2 Site (3.2)

5.2.1 Latitude

5.2.2 Longitude

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 Sowing date [YYYYMMDD]

5.5 Transplanting date [YYYYMMDD]

5.6 Harvest date [YYYYMMDD]

5.7 Evaluation environment
Environment in which characterization/evaluation was carried out

1 Field
2 Screenhouse
3 Greenhouse
4 Laboratory
99 Other (specify in descriptor **5.9 Remarks**)

5.8 Environmental characteristics of site
Use descriptors **6.1.1** to **6.1.5** in section **6**

5.9 Remarks
Any other site-specific information

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

This standard section has been reduced according to the relevance of descriptors for *Allium* documentation

6.1 Site environment

6.1.1 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

6.1.2 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 Sea coast
24 Beachridge
25 Rounded summit
26 Summit
27 Coral atoll
28 Drainage line (bottom position in flat or almost-flat terrain)
29 Coral reef
99 Other (specify in appropriate section's Remarks)

6.1.3 Slope [°]

Estimated slope of the site

6.1.4 Slope aspect

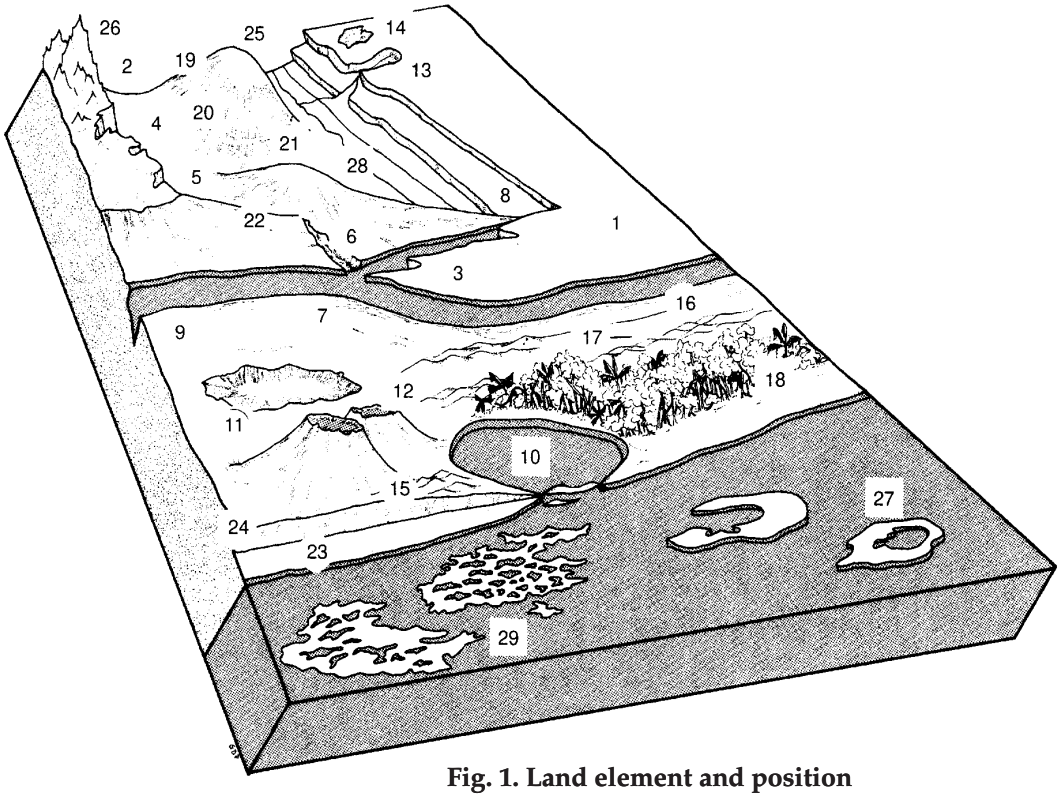

Fig. 1. Land element and position

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

6.1.5 Soil drainage

(Adapted from FAO 1990)

3 Poorly drained
5 Moderately drained
7 Well drained

6.2 Remarks

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

CHARACTERIZATION

7. Plant descriptors

7.1 Vegetative

Observations should be made on fully developed plants at the beginning of flowering, unless otherwise indicated

7.1.1 **Foliage colour** (onion, garlic, chive, leek) (4.1.1)

Recorded on fully developed plants, at flowering stage

1 Light green
2 Yellow green
3 Green
4 Grey-green
5 Dark green
6 Bluish green
7 Purplish-green
99 Other (specify in descriptor **7.4 Remarks**)

7.1.2 **Leaf length** [cm] (chive, leek, onion) (4.1.2)

Record the average length of longest leaf of 5–10 fully developed plants. Provide a description relative to the standard variety.

7.1.3 **Leaf width/diameter** [cm] (onion, leek, chive)

Record the maximum width of the longest leaf of 5–10 fully developed plants. For cylindrical leaf, flatten it to measure easily.

3 Narrow
5 Medium
7 Broad

7.1.4 **Density of leaves** (leek)

(See Fig. 2)

3 Low
5 Medium
7 High

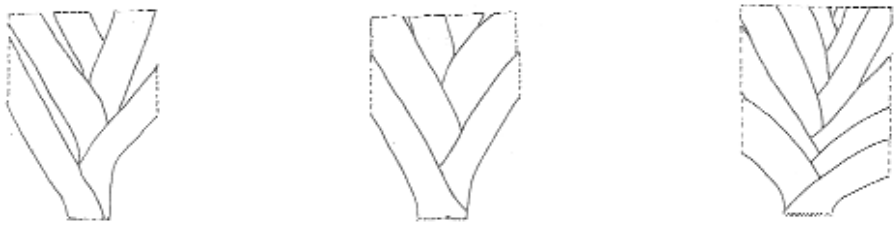

Fig. 2. Density of leaves (UPOV)

7.1.5 **Foliage attitude** (garlic, leek, onion, chive) (4.1.3)

3 Prostrate (or spreading)
5 Intermediate
7 Erect

7.1.6 **Foliage cracking** (leek, onion)

3 Weak
5 Medium
7 Strong

7.1.7 **Cross-section of leaf** (chive, leek) (4.1.4)

1 Circular
2 Semi-circular
3 Square
4 Pentagonal
5 V-shaped
6 Flat
7 Triangular
8 Concave
99 Other (i.e. 'mixed population' specify in descriptor **7.4 Remarks**)

7.1.8 **Degree of leaf waxiness** (chive, onion, leek) (4.1.6)

3 Weak
5 Medium
7 Strong

7.1.9 **Shaft length** (6.1.4)

Provide information on shaft length of the standard cultivar used as control for each evaluation trial

7.1.9.1 **Shaft length** (leek)

(Leaf sheath/pseudostem). Measured on 5–10 plants from base to first splitting leaf (cross)

3 Short
5 Intermediate
7 Long

7.1.9.2 **Shaft length** (garlic) (6.1.4)

(Pseudostem). Measured on mature plants in the ground, from soil level to the inner lamina notch

3 Short (<18 cm)
5 Intermediate
7 Long (>27 cm)

7.1.10 Shaft diameter (leek) (6.1.5)

(Leaf sheath/pseudostem). Measured on mature harvested plants at the median point after removal of dead and dying leaves.

3 Narrow
5 Intermediate
7 Broad

7.1.11 Shape of mature dry bulbs (all *Allium*) (4.1.10)

(See Fig. 3)

1 Flat
2 Flat globe
3 Rhomboid
4 Broad oval
5 Globe
6 Broad elliptic
7 Ovate (elongated oval)
8 Spindle
9 High top
99 Other (i.e. mixture, specify in descriptor **7.4 Remarks**)

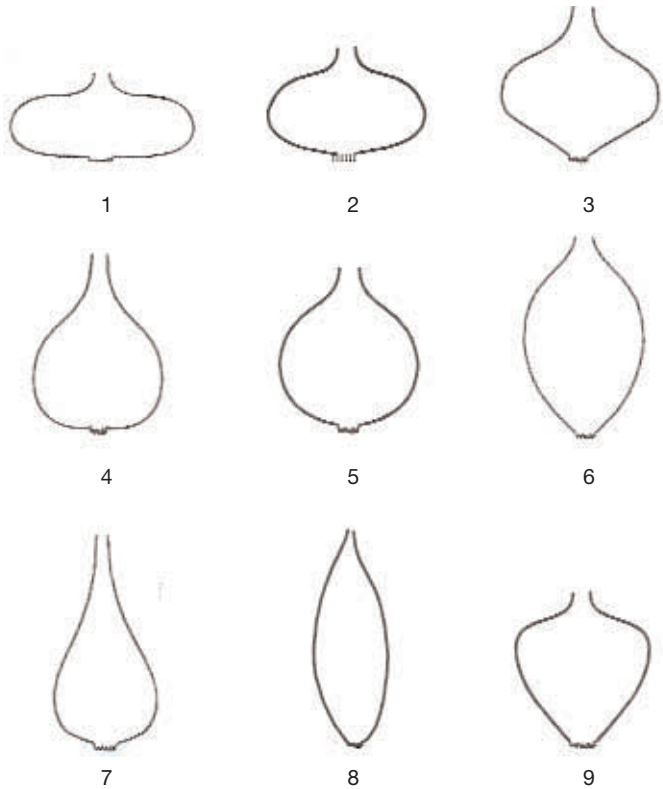

Fig. 3. Shape of mature dry bulbs

7.1.12 Shape of mature garlic bulb

(See Fig. 4.) Based on Burba's method of demonstrating the forms by means of longitudinal sections:

1 Circular, basal plate prominent
2 Heart-shaped, basal plate retracted
3 Broadly ovate, basal plate even

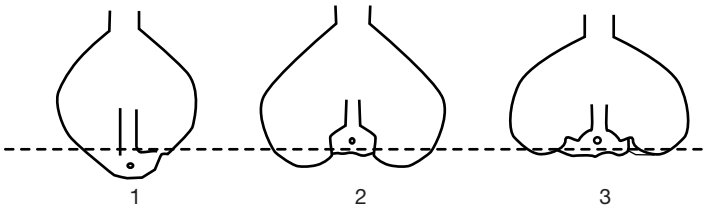

Fig. 4. Shape of mature bulbs (garlic)

7.1.13 Nature of storage organ[2] (wild taxa) (4.1.9)

0 None
1 Bulb, single large
2 Bulbs, aggregated
3 Rhizomes
4 Cloves
5 Foliage leaf bases
99 Other (specify in descriptor **7.4 Remarks**)

7.1.14 Population uniformity of bulb shape (onion) (4.1.11)

Recorded on harvested bulbs with dry skin

1 Uniform (homogeneous)
2 Variable
3 Highly variable

7.1.15 Bulb skin colour (onion) (4.1.12)

Recorded on harvested bulbs with dry skin

1 White
2 Yellow
3 Yellow and light brown
4 Light brown
5 Brown
6 Dark brown
7 Green (chartreuse)
8 Light violet
9 Dark violet
99 Other (i.e. 'mixed population' specify in descriptor **7.4 Remarks**)

[2] If bulb is present, record descriptors 7.1.14 through 7.1.17.

7.1.16 Bulb skin colour (garlic) (4.1.12)

7.1.16.1 Outer skin colour of compound bulb (garlic)

1 White
2 Cream
3 Beige
4 White stripes
5 Light violet
6 Violet
7 Dark violet
99 Other (specify in descriptor **7.4 Remarks**)

7.1.16.2 Skin colour of the clove[3] (garlic)

This character is highly subjective based on opinions about the colour ranges and because of the variation with environmental conditions and the age of the cloves. Use a colour chart to indicate intensity of colour.

1 White
2 Yellow and light brown
3 Brown
4 Red
5 Violet
99 Other (specify in descriptor **7.4 Remarks**)

7.1.17 Bulb skin thickness (onion) (6.1.1)

Recorded on harvested bulbs with dry skin

3 Thin
5 Medium
7 Thick

7.1.18 Bulb flesh colour (onion) (6.1.2)

1 White
2 Cream
3 Green/white
4 Violet/white
99 Other (specify in descriptor **7.4 Remarks**)

[3] a) No green types have been recorded in European collections. Possibly such forms are confined to Elephant Garlic (*A. ampeloprasum*).
b) Stripes of other colours can be scattered over the compound bulb and found only in several cloves of the bulb.
c) The older the cloves the paler the appearance.
d) The clearest distinction is between the white and yellow types.

7.1.19 Number of cloves per compound bulb (garlic)

Observed on three bulbs

1 1
2 2–4
3 5–10
4 11–15
5 16–20
6 >20
7 Around 50

7.1.20 Bulb structure type (garlic)

The following scores are based on 'fan-shaped' groups of cloves derived from the axil of one leaf base. Botanically a fan group is the 'collective' from a set of collateral buds. It is possible to distinguish the number of fan groups within a compound bulb (states 1 and 2). Where few buds develop per axil the individual cloves are larger. It is then difficult to distinguish the number of axillary 'groups', and is easier to score clove numbers (states 3 to 5)[4] . (See Fig. 5)

1 Regular multi-fan groups (or multi-shelled)
2 Regular two-fan groups
3 Regular multi-cloved radial
4 Regular quadruple
5 Regular two-cloved
6 Irregular

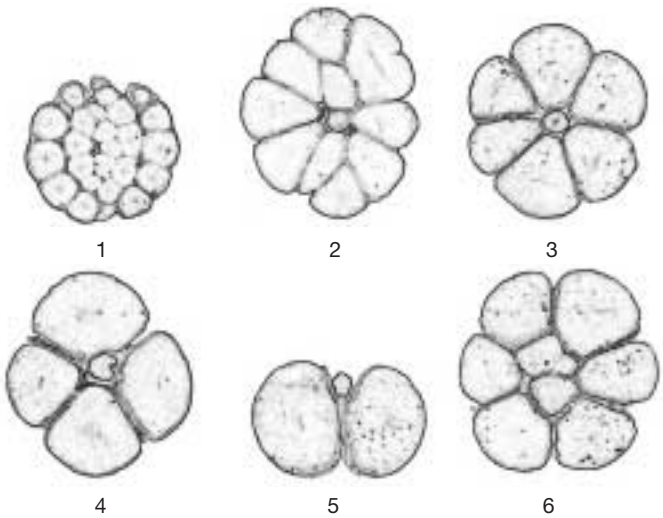

Fig. 5. Bulb structure type (garlic)

[4] When we look at the structure very thoroughly, we may see that the structures in states 3 and 4 are derived from two 'fan groups' based on the remnants of the leaf bases, but to distinguish these under field scoring conditions is not possible.

7.1.21 Shape of the compound bulb in horizontal section (garlic)

1 Circular
2 Elliptic
99 Other (i.e. 'mixture' specify in descriptor **7.4 Remarks)**

7.1.22 Weight of cloves (garlic)

Average weight of 10 cloves (of 5–10 plants) (outer whorl only)

1 <2 g
2 2–4 g
3 >4–6 g
4 >6–10 g
5 >10–15 g
6 >15 g

7.1.23 100-bulbil weight (garlic)

(Outer whorl only). Specify if side or top sets bulbils in descriptor **7.4 Remarks**.

1 Low (<10 g)
2 Medium (10–30 g)
3 High (>30 g)

7.1.24 Number of bulbils (topsets) (garlic and other *Allium* sp.) (4.1.7)

Average number of 5–10 inflorescences from different plants

0 Absent
1 Few (<30)
2 Many (>30)

7.1.25 Average number of bulbs per cluster (shallot)

Average taken from bulbs with dry skin around each bulblet from at least 10 clusters

0 Absent
1 Scarse
3 Few
5 Medium
7 Many

7.1.26 Average weight of whole cluster (shallot)

Average taken from at least 10 clusters

7.1.27 Bulb hearting (onion) (6.1.3)

1 Single heart
2 2–3 hearts
3 More than 3 hearts

7.1.28 Presence of bulblets (offsets) (4.1.13)

Observed on taxa producing bulblets at the mature bulb stage

0 Absent
1 Present

7.2 Inflorescence and fruit

7.2.1 Ability to flower (garlic, onion, shallot, chive) (4.2.1)

0 No
1 Yes

7.2.2 Ability to produce scape (garlic)

0 Scape absent
1 Semi-bolters (the ones that produce scapes but never develop heads)
2 Flowering plants (the ones that produce flower heads, with topset and/or flowers)

7.2.3 Scape length (6.2.1)

Average scape length of 5–10 plants with fully bloomed primary umbels, relative to a standard variety as listed in **2.11**

7.2.4 Internal structure of mature scape (6.2.2)

1 Hollow
2 Solid
3 Thick-walled with small canal

7.2.5 General fertility (chive, shallot, garlic) (4.2.2)

1 Sterile
2 Male sterile
3 Female sterile
4 Fertile
99 Other (i.e. 'mixture' specify in descriptor **7.4 Remarks**)

7.2.6 Flower number in umbel (for all flowering *Allium* sp.) (4.2.3)

Recorded in at least five fully bloomed primary umbels

0 Absent
1 Few (<30)
2 Many (>30)

7.2.7 **Flower colour** (chive) (4.2.4)

1 White
2 Cream
3 Yellow
3 Pink
4 Lilac
5 Blue
6 Purple
7 Green
8 Red
99 Other (i.e. 'mixed' specify in descriptor **7.4 Remarks**)

7.2.8 **Date of 50% flowering** [YYYYMMDD] (chive)

7.2.9 **Number of days to maturity**

Recorded when 50% have fallen tops

7.2.10 **Anther colour** (4.2.5)

1 Yellow
2 Orange
3 Beige
4 Grey
5 Green
6 Purple
99 Other (i.e. 'mixture' specify in descriptor **7.4 Remarks**)

7.3 Seed

7.3.1 **Seed coat colour** (chive) (6.3.1)

1 Brown
2 Black
99 Other (i.e. 'mixed population' specify in descriptor **7.4 Remarks**)

7.3.2 **100-Seed weight** [g]

(Average from 2 to 3 samples)

7.4 Remarks

Any additional information, especially in the category of 99= 'other' under various descriptors above, may be specified here

EVALUATION

8. Plant descriptors

8.1 Vegetative

8.1.1 Leaf dry matter content [% DW] (chive)

Weighed samples from a minimum of five plants per plot should be dried at 80ºC to constant weight, reweighed and the dry matter content for the accession presented as a percentage

3 Low (<10%)
5 Medium
7 High (>13%)

8.1.2 Dry matter content of storage organ [g/100 g, FW] (6.1.7)

Weighed samples from a minimum of five bulbs should be dried at 80ºC to constant weight, reweighed and the percentage dry matter content calculated for each sample. The mean dry matter content for the accession is recorded as a percentage. Alternatively use a refractometer after calibration.

8.1.3 Storage life of storage organs (onion) (6.1.8)

The length of storage life depends on storage temperature, which should be recorded during storage-life trials. When stored under ambient conditions, record monthly means of max and min taken from a local meteorological station. Use storage organs of uniform size and free from bruises, pests and diseases, of five replications each consisting of 50 units. Include a control variety in the test system. The storage life will be assessed as the number of weeks from 100% top fall to 50% breakdown of storage organs. Bulbs with storage roots are to be discounted and the sprouting expressed as a percentage of the original number minus the number of rotted bulbs. The storage life is recorded in number of weeks.

8.1.4 Lachrymatory potency of storage organ[5] (6.1.10)

0 Eye not irritated
3 Weak eye irritant
7 Strong eye irritant

[5] The pyruvic acid test provides a good indication for pungency and lachrymatory potency.

8.1.5 Biochemical composition

Indicate the plant part used in descriptor **8.3 Remarks**

8.1.5.1 Total soluble solids

(Refractometer)

8.1.5.2 Content of pyruvic acid

Provide reference

8.1.6 Flavour strength of storage organ (6.1.11)

(See Freeman and Mossadeghi 1970)

The determination of total pyruvate from the storage organ tissues will provide a good estimation of flavour strength. Absorbance at a wavelength of 525 nm to be measured on extracted juice as an equivalent of flavour strength using a spectrophotometer.

3 Low
5 Medium
7 High

8.1.7 Daylength requirement (1) (onion) (6.2.4)

The measurement of maturity time will give an indirect estimation of daylength requirement

The recommended procedure for determination of daylength requirement of a genotype is: a standard control cultivar should be grown with the test accession at a standard plant density and the response of the test genotype to daylength assessed when 50% of test plants have fallen tops; these data to be related temporally with a similar stage in the control variety. The data to be recorded as plus or minus the number of days to designate lateness or earliness in comparison with the standard, i.e.

+20 = the test accession exhibited 50% fallen tops 20 days after a similar stage in the control

–15 = the test accession exhibited 50% fallen tops 15 days before a similar stage in the control

8.1.8 Daylength requirement (2) (onion) (6.2.5)

Genetic material, which does not complete its ripening under experimental conditions, to be assessed as the percentage of plants reaching the maximal bulbing ratio of five. Bulb ratio is the ratio between maximal bulb diameter and minimal neck diameter.

0 No maturation (bulbing)
1 Maturation under the experimental field conditions

8.1.9 Cold requirement for bolting [%] (6.2.6)

Accessions should be tested relative to a control cultivar. The average degree of bolting of the control and the test accession to be recorded as a percentage. The relative amount of bolting will be calculated as a ratio of the amount of bolting in the control cultivar: (% test x 100)/(% control). This index will serve to identify the cold requirement for bolting in developmental and introduced material. It may be necessary in certain locations to have several staggered sowing dates to fully assess this character[6].

8.2 Inflorescence and fruit (6.2)

8.2.1 Time of (50%) flowering relative to a standard variety (6.2.3)

The standard variety and test accession should be planted at the same time. The commencement of flowering should be recorded for the test relative to the standard. The data to be presented as (–3), i.e. three weeks earlier or (+2), two weeks later than the standard.

8.2.1.1 Time of flowering

3 Early
5 Medium
7 Late

8.2.2 Inflorescence fragrance

3 Light
5 Medium
7 Strong

8.3 Remarks

Specify here any other additional information

9. Abiotic stress susceptibility

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

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

9.1 Reaction to low temperature (7.1)

6 This is valid providing the control cultivar bolts. If the tested accession had 27 or 97 bolters out of 100 but the control had 0, then the ratio of both counts is exactly the same (indefinite).

9.2 Reaction to high temperature (7.2)

9.3 Reaction to drought (7.3)

9.4 Reaction to high soil moisture (7.4)

9.5 Reaction to soil salinity (7.5)

9.6 Remarks

Specify any additional information here

10. Biotic stress susceptibility

In each case, it is important to state the life cycle tested, i.e. seedling, excised leaf, mature plant, seed-bearing plant, storage organ. Record such information in descriptor **10.7 Remarks.** 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 Arthropods

	Causal organism	Common name
10.1.1	*Aceria tulipae*	Onion mite
10.1.2	*Acrolepiopsis (Acrolepia) assectella*	Leek moth
10.1.3	*Agrotis* spp., *Faronta* spp.	Cutworm
10.1.4	*Delia (Hylemya) antiqua, Delia (Hylemya) alliaria*	Onion fly
10.1.5	*Limonius* spp.	Wireworm
10.1.6	*Liriomyza (Phytobia) cepae*	Leaf miner
10.1.7	*Rhizoglyphus echinopus*	Bulb mite
10.1.8	*Thrips tabaci*	Potato thrips

10.2 Nematodes

10.2.1	*Ditylenchus dipsaci*	Stem and bulb nematode
10.2.2	*Longidorus vineacola*	Needle nematode
10.2.3	*Paratrichodorus minor*	Stubby root nematode

10.3 Fungi

10.3.1	*Alternaria porri*	Purple blotch
10.3.2	*Aspergillus niger*	Black mould
10.3.3	*Botrytis allii (B. aclada)*	Black mould
10.3.4	*Botryotinia porri (Botrytis byssoidea)*	Damping-off, neck rot
10.3.5	*Botryotinia squamosa (Botrytis squamosa)*	Leaf blight
10.3.6	*Botryotinia fuckeliana (Botrytis cinerea)*	Gray mould

10.3.7	*Cercospora duddiae*	Leaf spot
10.3.8	*Mycosphaerella (Cladosporium) allii-cepa*	Leaf spot
10.3.9	*Colletotrichum circinans*	Onion smudge
10.3.10	*Colletotrichum lindemuthianum*	Anthracnose
10.3.11	*Fusarium oxysporum*	Basal rot
10.3.12	*Fusariun culmorum*	Rot
10.2.13	*Glomerella cingulata*	Anthracnose
10.3.14	*Mycosphaerella (Heterosporium) allii*	Leaf spot
10.3.15	*Leptotrochila porri*	White spot
10.3.16	*Leveillula (Oidiopsis) taurica*	Oidium
10.3.17	*Peronospora destructor*	Downy mildew
10.3.18	*Phyllosticta allii*	Leaf blight
10.3.19	*Phytophthora porri*	Downy mildew
10.3.20	*Puccinia (porri) allii*	Rust
10.3.21	*Pyrenochaeta terrestris*	Pink root
10.3.22	*Rhizoctonia solani*	Damping off
10.3.23	*Sclerotium cepivorum*	White rot
10.3.24	*Sclerotium rolfsii*	White rot
10.3.25	*Pleospora herbarum/tarda (Stemphylium botryosum)*	Leaf blight
10.3.26	*Urocystis cepulae = U. magica*	Onion smut

10.4 Bacteria

10.4.1	*Erwinia carotovora*	Bacterial soft rot
10.4.2	*Pseudomonas aeruginosa*	Bacteriosis
10.4.3	*Burkholderia gladioli (Pseudomonas)* pv. *alliicola*	Rot
10.4.4	*Pseudomonas syringae*	Halo blight
10.4.5	*Burkholderia (Pseudomonas) cepacia*	Sour skin
10.4.6	*Xanthomonas* spp.	Leaf spot, Canker

10.5 Viruses

10.5.1	*Onion yellow dwarf virus*	OYDV
10.5.2	*Leek yellow stripe virus*	LYSV
10.5.3	*Leek white stripe virus*	LWSV
10.5.4	*Shallot latent virus*	SLV
10.5.5	*Shallot virus X*	ShV-X
10.5.6	*Garlic latent virus*	GarLV
10.5.7	*Garlic common latent virus*	GarCLV
10.5.8	Allexiviruses	

10.6 Prokaryotes

10.6.1 Aster yellows phytoplasma

10.7 Remarks

Specify here any additional information

11. Biochemical markers

Evaluation characters listed in this section are useful in Chive descriptors for evaluating susceptibility to Yellow leaf tips, Rust (*Puccinia*) and Downy mildew (*Peronospora*)

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. according to the international nomenclature system for enzymes.

11.2 Other biochemical markers

(e.g. anthocyanins)

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. Evaluation characters listed in this section are useful in Chive descriptors for evaluating susceptibility to Yellow leaf tips, Rust (*Puccinia*) and Downy mildew (*Peronospora*).

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

13.2 Ploidy level
(2*x*, 3*x*, 4*x*, etc.)

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

13.4 Number of satellite chromosomes

13.5 Other cytological characters

14. Identified genes
Describe any known specific mutant present in the accession

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ANNEX I. Basic list of minimum discriminating descriptors for *Allium* species

Allium species	IPGRI Descriptor Number	Name
sativum (garlic)	**7.1.1**	Foliage colour
	7.1.5	Foliage attitude
	7.1.9.2	Shaft length
	7.1.12	Shape of mature garlic bulb
	7.1.16.1	Outer skin colour of compound bulb
	7.1.16.2	Skin colour of the clove
	7.1.19	Number of cloves per compound bulb
	7.1.20	Bulb structure type
	7.1.21	Shape of the compound bulb in horizontal section
	7.1.22	Weight of cloves
	7.1.23	100-bulbil weight
	7.1.24	Number of bulbils (topsets)
	7.2.2	Ability to produce scape
	7.2.5	General fertility
	7.2.6	Flower number in umbel
ampeloprasum (leek)	**7.1.1**	Foliage colour
	7.1.2	Leaf length
	7.1.3	Leaf width/diameter
	7.1.4	Density of leaves
	7.1.6	Foliage cracking
	7.1.7	Cross-section of leaf
	7.1.8	Degree of leaf waxiness
	7.1.9.1	Shaft length (leek)
	7.1.10	Shaft diameter
cepa (onion)	**7.1.1**	Foliage colour
	7.1.2	Leaf length
	7.1.3	Leaf width/diameter
	7.1.5	Foliage attitude
	7.1.8	Degree of leaf waxiness
	7.1.11	Shape of mature dry bulbs
	7.1.14	Population uniformity of bulb shape
	7.1.15	Bulb skin colour
	7.1.17	Bulb skin thickness
	7.1.18	Bulb flesh colour

Allium species	IPGRI Descriptor Number	Name
	7.1.27	Bulb hearting
	7.2.1	Ability to flower
	8.1.3	Storage life of storage organs
	8.1.7	Daylength requirement (1)
	8.1.8	Daylength requirement (2)
schoenoprasum (chives)	**7.1.1**	Foliage colour
	7.1.2	Leaf length
	7.1.5	Foliage attitude
	7.1.8	Degree of leaf waxiness
	7.2.1	Ability to flower
	7.2.5	General fertility
	7.2.6	Flower number in umbel
	7.2.7	Flower colour
	7.2.8	Date of 50% flowering
	7.3.1	Seed coat colour
	8.1.1	Leaf dry matter content

COLLECTING FORM for allium

SAMPLE IDENTIFICATION

COLLECTING INSTITUTE(S) (2.1):

COLLECTING No. (2.2): PHOTOGRAPH No. (2.16):

COLLECTING DATE OF SAMPLE [YYYYMMDD] (2.3):

SPECIES (1.7): SUBTAXA(1.8):

COMMON NAME (1.11)

1. Dry bulb onion	2. Shallot	3. Japanese bunching onion/Welsh onion
4. Garlic	5. Leek	6. Kurrat
7. Great-headed garlic/ elephant garlic	8. Chive	9. Rakkyo
10. Chinese chive/Oriental garlic/Nira	99. Other (specify)	

COLLECTING SITE LOCATION

COUNTRY OF ORIGIN (2.4):

LOCATION (2.5): km: direction: from:

LATITUDE (2.6): LONGITUDE (2.7): ELEVATION (2.8): m asl

Additional notes:

COLLECTING SITE ENVIRONMENT

COLLECTING/ACQUISITION SOURCE (2.9):

10. Wild habitat	20. Farm or cultivated habitat	30. Market or shop
40. Institute, Exp. Station, Research Org./Genebank	50. Seed company	
60. Weedy, disturbed or ruderal habitat	99. Other (specify):	

HIGHER LEVEL LANDFORM (6.1.1):

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

SLOPE [°] (6.1.2): SLOPE ASPECT (6.1.3): (code N,S,E,W)

SAMPLE

BIOLOGICAL STATUS OF ACCESSION: (2.12):

100. Wild	200. Weedy	300. Traditional cultivar/Landrace
400. Breeding/research material	500. Advanced/improved cultivar	999. Other (specify):

TYPE OF SAMPLE (2.13):

1. Vegetative	2. Seed	99. Other (specify)

NUMBER OF PLANTS SAMPLED (2.14):

PREVAILING STRESSES (2.15.7):
Mention the types of major stresses, i.e. abiotic (drought), biotic (pests, diseases, etc.)

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ETHNOBOTANICAL DATA

LOCAL/VERNACULAR NAME (2.15.2):

ETHNIC GROUP (2.15.1):

PLANT USES (2.15.5):
1. Food
   1.1 Raw salad 1.2 Fresh cooked 1.3 Stored/cooked/bottled/canned
   1.4 Freezing 1.5 Pickling 1.6 Dehydrated
2. Medicinal
3. Ornamental
4. Forage
99. Other (specify):

PARTS OF THE PLANT USED (2.15.4):
1. Seed 2. Root/rhizome 3. Bulb/clove 4. Leaf sheath/pseudostem 5. Leaf
6. Scape 7. Flower/inflorescence 99. Other (specify)

==========

CHARACTERIZATION

Plant descriptors

Foliage colour (7.1.1):
1. Light green 2. Yellow green 3. Green 4. Grey-green
5. Dark green 6. Bluish green 7. Purplish-green 99. Other (specify)

Leaf length [cm] (7.1.2):

Foliage attitude (7.1.5): 3. Prostrate 5. Intermediate 7. Erect

Cross-section of leaf (7.1.7):
1. Circular 2. Semi-circular 3. Square 4. Pentagonal 5. V-shaped
6. Flat 7. Triangular 8. Concave 99. Other (i.e. mixed population)

Degree of leaf waxiness (7.1.8): 3. Weak 5. Medium 7. Strong

Shape of mature dry bulbs (7.1.11):
1. Flat 2. Flat globe 3. Rhomboid 4. Broad oval 5 Globe
6. Broad elliptic 7. Ovate 8. Spindle 9. High top 99. Other

Bulb skin colour (7.1.15):
1. White 2. Yellow 3. Yellow and light brown 4. Light brown
5. Brown 6. Dark brown 7. Green (chartreuse) 8. Light violet
9. Dark violet 99. Other (i.e. mixed population)

Nature of storage organ (7.1.13)
0. None 1. Bulb, single large 2. Bulbs, aggregated 3. Rhizomes 4. Cloves
5. Foliage leaf bases 99. Other (specify)

Inflorescence/fruit

Ability to flower (7.2.1): 0. No 1. Yes
General fertility (7.2.5): 1. Sterile 2. Male sterile 3. Female sterile 4. Fertile 5. Mixture
Flower number in umbel (7.2.6): 0. Absent 1. Few (<30) 2. Many (>30)
Date of 50% flowering [YYYYMMDD] (7.2.8):

Collector's Notes:

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