IPGRI

Descriptors for *Lathyrus* spp.

JAPAN
Official Development Assistance

List of Descriptors

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

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Descriptors for

Lathyrus

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 plant genetic resources for the benefit of present and future generations. IPGRI's headquarters is based in Rome, Italy, with offices in another 15 countries worldwide. It operates through three programmes: (1) the Plant Genetic Resources Programme, (2) the CGIAR Genetic Resources Support Programme, and (3) the International Network for the Improvement of Banana and Plantain (INIBAP). The international status of IPGRI is conferred under an Establishment Agreement which, by January 1998, 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, Pakistan, Panama, Peru, Poland, Portugal, Romania, Russia, Senegal, Slovakia, Sudan, Switzerland, Syria, Tunisia, Turkey, Uganda and Ukraine.

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CONTENTS

PREFACE

Descriptors for *Lathyrus* spp. was developed by Dr R.L. Pandey, Dr P.N. Mathur, Dr Stefano Padulosi and Dr R.N. Sharma with inputs from Dr K.W. Riley, Dr V. Ramanatha Rao, Dr Larry Robertson and Dr Bhag Mal. The development of this descriptor list has been coordinated by Dr P.N. Mathur. A draft version 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'.

IPGRI encourages the collection 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 the importance of the crop's description. Descriptors listed under *Evaluation* allow for a more extensive description of 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 to the IPGRI format, will produce a rapid, reliable and efficient means for information storage, retrieval and communication, and will assist with the utilization of germplasm. It is recommended, therefore, that information should be produced by closely following the descriptor list with regard to ordering and numbering descriptors, using the descriptors specified, and using the descriptor states recommended.

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

Multi-crop passport descriptors (see Annex I) were developed jointly by IPGRI and FAO, to provide consistent coding schemes for common passport descriptors across crops. They are marked in the text as [MCPD]. Please note that owing to the generic nature of the multi-crop passport descriptors, not all descriptor states for a particular descriptor will be relevant to a specific crop. In Annex II, the reader will find a Collecting form for *Lathyrus* that will facilitate data collecting.

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

AN INTRODUCTION TO *LATHYRUS*

The genus *Lathyrus* is large, with 187 species and subspecies (Allkin *et al*. 1983) that are found in both the Old World and the New World. However, only one species (*Lathyrus sativus*) is widely cultivated as a food crop, while other species are cultivated to a lesser extent for both food and forage. These species include *L. cicera*, *L. clymenum* and *L. ochrus* for grain but mainly for forage production; *L. tingitanus*, *L. latifolius* and *L. sylvestris* as forage species; *L. odoratus* for ornamental purposes. A newly described species, *Lathyrus amphicarpus*, is presently found in the Middle East and has the potential of becoming important as a self-seeding forage species (Campbell 1997).

Several botanical varieties of *L. sativus* and *L. cicera* have been noted in North Africa and the Near and Middle east. These include: var. *albus* (white flowers), var. *roseus* (pink or red flowers) and var. *cyaneus* (blue flowers) for *L. sativus*; var. *genuinus* Rouy, var. *angustifolius* Rouy, var. *longistipulatus* Sennen and var. *ciliatus* Lipsky for *L. cicera*. In addition to these botanical varieties, several native ecotypes have been reported for the genus *Lathyrus*.

Vavilov (1951) described two separate centres of origin for *Lathyrus*. One was the Central Asiatic Centre, which includes northwest India, Afghanistan, the Republics of Tajikistan and Uzbekistan, and western Tian-Shan. The second was the Abyssinian Centre. In addition, Vavilov noted trends in diversity similar to those found in other pulses, such as lentils and broad beans, in that smaller-seeded forms were found in southern and southwest Asia, whereas around the Mediterranean region, almost all were highly cultivated forms with large white seeds and flowers (Jackson and Yunus 1984). According to Zeven and de Wet (1982) there are centres of diversity for Old World species in Asia Minor and the Mediterranean region. Saraswat (1980) reported that *Lathyrus* is an ancient crop and its existence is recorded as long ago as 2000–1500 BC in India. However, the combination of archaeobotanical and phytogeographical evidence gathered now lead to the conclusion that the origin of *L. sativus* cultivation is in the Balkan peninsula, in the early Neolithic period, dated to the beginning of the 6th millenium BC (Kislev 1989).

The descriptors for *Lathyrus* are mainly based on diversity observed for the three most important useful and widely cultivated species of genus *Lathyrus: L. sativus*, *L. cicera* and *L. ochrus*, all cool-season species propagating themselves by seed. However, these descriptors also can be used for other *Lathyrus* species.

Lathyrus sativus is an erect or ascending, much-branched, bushy or slender legume reaching a height of 30-90 cm with a deep, much-branched taproot with numerous, normally bluish-purple flowers carried on a stiff axillary stalk, and with glabrous pods each containing 2-5 seeds. Grasspea ecotypes are classified on the basis of flower colour, markings on pods, and size and colour of seeds. The geographical distribution is: the blue-flowered lines are concentrated in Southwest Asia and Ethiopia, whereas the white and mixed-colour lines are found in Europe, the Canary Islands and countries of the former USSR. *Lathyrus sativus* was cultivated and extensively naturalized in Central, South and East Europe (from Germany south to Portugal and Spain and east to the Balkans and South Russia), Crete, Rhodes, Cyprus, Syria, Lebanon, Palestine, Egypt, Caucasus, Iraq, Iran, Afghanistan, North and Central India, Central Asia (Balkhash to Palmir-Alai), Macronesia (Madeira, Canaries, Azores), and was also

cultivated in North Africa (Morocco, Algeria), tropical Africa (Sudan, Ethiopia and S. Africa) and experimentally in Australia. Today significant areas of cultivation are to be found in the North and Central India, pakistan, Bangladesh and Ethiopia. Smaller areas are cultivated in Spain, China, Chile and possibly some other countries.

Lathyrus cicera is a robust legume reaching a height of 20-100 cm with copper-coloured flowers and canicular pods not winged at the corners, with angular brown or grey seeds with black markings; seeds and flowers are smaller than those of *L. sativus*. It is distributed in South and Mediterranean Europe (from Portugal to Italy to the Balkans and the Crimea), Crete, Aegean Isles, Cyprus, Syria, Lebanon, Palestine, Jordan, Egypt, Turkey, Caucasus, Iraq, Iran, Central Asia (Turkmenia to Palmir-Alai), Macronesia (Madeira, Canaries), North Africa (Morocco, Algeria, Tunisia, Libya) and introduced into South Africa. This species has shown very good adaptation to dryland conditions in southern Australia where two cultivars were recently released.

Lathyrus ochrus is a spreading legume with winged stems reaching a height of 20-70 cm with solitary or pairs of yellow flowers and glabrous pods, fawn coloured at maturity with longitudinal laminae adpressed to the wings on the back, each pod containing 4-8 round black (or green, brown, cream), often pea-sized, seeds lightly covered with a bloom (wax), in some accessions. It is distributed in Mediterranean Europe (Portugal, Spain, South France, Corsica, Sardinia, Italy, Sicily, Malta, Yugoslavia, Greece), Crimea, Aegean Isles, Cyprus, Syria, Lebanon, Palestine, Turkey and North Africa (Morocco, Algeria, Tunisia, Libya). In Greece and Cyprus it is locally known as 'fava' and has been used for human consumption.

Chromosomal and cytogenetic studies have shown the genus *Lathyrus* to be predominantly diploid with $2n=14$ chromosomes. The chromosome numbers of more than 60 species have been reported with only three species having been shown to have more than 14 somatic chromosomes (Campbell 1997). Two species (*L. pratensis* and *L. venosus*) are tetraploid with $2n=28$ chromosomes and one species (*L. palustris*) is hexaploid with $2n=42$ chromosomes. These species have been studied cytologically and have been shown to be autopolyploids. Interspecific hybridization between species in the genus *Lathyrus* has been attempted by many researchers since the report of the successful crossing of *L. hirsutus* x *L. odoratus* by Baker (1916). However, only 16 cases have been reported as successful (Campbell 1997). Khawaja (1988) reported that *L. sativus* crosses readily with *L. amphicarpus* when the latter is used as the female parent. Cytological studies of the F_1 hybrids between *L. amphicarpus* x *L. sativus*, *L. amphicarpus* x *L. cicera* and *L. odoratus* x *L. chloranthus* were carried out by Khawaja (1988) which showed 50-70% chromosome homology and pollen fertility in conformity with the meiotic pairing.

Plant regeneration techniques developed have been successful in regenerating plants from explants derived from stem, leaf and root tissue. The resulting plants showed a high amount of somoclonal variation in plant habit (Mehta *et al*. 1996). This technique may be successfully exploited in the production of agronomically desirable types for low β-N-Oxalyl-L-α, β-Diaminopropionic acid (ODAP) lines and thus provides an alternative means of improvement than that allowed by conventional crossing and backcrossing methods.

DEFINITIONS AND USE OF THE DESCRIPTORS

IPGRI uses the following definitions in genetic resources documentation:

Passport descriptors: These provide the basic information used for the general management of the accession (including the registration at the genebank and other identification information) and describe parameters that should be observed when the accession is originally collected.

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

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

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

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

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

Highly discriminating descriptors are marked as highlighted text.

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

(a) the Système International d'Unités (SI) is used;

(b) the units to be applied are given in square brackets following the descriptor name;

(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* are 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, and (ii) a descriptor is inapplicable. In the following example, '0' will be recorded if an accession does not have a central leaf lobe:

Shape of central leaf lobe

1 Toothed
2 Elliptic
3 Linear

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

Terminal leaflet

0 Absent
1 Present

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

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

(j) dates should be expressed numerically in the format YYYYMMDD, where
YYYY - 4 digits to represent the year
MM - 2 digits to represent the month
DD - 2 digits to represent the day.

PASSPORT

1. Accession descriptors

1.1 Accession number [MCPD]

This number serves as a unique identifier for accessions and is assigned when an accession is entered into the collection. Once assigned this number should never be reassigned to another accession in the collection. Even if an accession is lost, its assigned number should never be re-used. Letters should be used before the number to identify the genebank or national system (e.g. IDG indicates an accession that comes from the genebank at Bari, Italy; CGN indicates an accession from the genebank at Wageningen, The Netherlands; PI indicates an accession within the USA system)

1.2 Donor name

Name of institution or individual responsible for donating the germplasm

1.3 Donor number [MCPD]

Number assigned to 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 2.2**). Other numbers can be added as 1.4.3, etc.

1.4.1 Other number 1

1.4.2 Other number 2

1.5 Scientific name

1.5.1 Genus [MCPD]

1.5.2 Species [MCPD]

1.5.3 Subspecies [MCPD]

1.5.4 Botanical variety

1.6 Pedigree

Parentage or nomenclature and designations assigned to breeders' material

1.7 Accession

1.7.1 Accession name [MCPD]

Either a registered or other formal designation assigned to the accession

1.7.2 Synonyms

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

1.8 Acquisition date [YYYYMMDD]

Date on which the accession entered the collection

1.9 Accession size

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

1.10 Type of material received

1 Seed
2 Plant (including seedlings)
3 Pollen
4 *In vitro* culture
99 Other (specify in descriptor **1.11 Notes**)

1.11 Notes

Any additional information may be specified here

2. Collecting descriptors

2.1 Collecting institute(s)

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

2.2 Collecting number [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 and should be unique and always accompany subsamples wherever they are sent

2.3 Collecting date of original sample [YYYYMMDD] [MCPD]

2.4 Country of collecting [MCPD]

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

2.5 Province/State

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

2.6 Department/County

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

2.7 Location of collecting site [MCPD]

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

2.8 Latitude of collecting site [MCPD]

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

2.9 Longitude of collecting site [MCPD]

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

2.10 Elevation of collecting site [m asl] [MCPD]

2.11 Collecting source [MCPD]

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

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

2 Farm
- 2.1 Field
- 2.2 Orchard
- 2.3 Garden
- 2.4 Fallow
- 2.5 Pasture
- 2.6 Store

3 Market
- 3.1 Town
- 3.2 Village
- 3.3 Urban area (around city)
- 3.4 Other exchange system

4 Institute/Research organization

99 Other (specify in descriptor **2.21 Collector's notes**)

2.12 Collecting source environment

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

2.13 Status of sample [MCPD]

0 Unknown
1 Wild
2 Weedy
3 Traditional cultivar/Landrace
4 Breeders' line
5 Advanced cultivar
99 Other (specify in descriptor **2.21 Collector's notes**)

2.14 Type of sample

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

1 Seed
2 Vegetative
3 Pollen
4 Tissue culture
99 Other (specify in descriptor **2.21 Collector's notes**)

2.15 Number of plants sampled

2.16 Occurrence of *Lathyrus* species in sampling area

1 Rare
2 Occasional
3 Frequent
4 Abundant
99 Other (specify in descriptor **2.21 Collector's notes**)

2.17 Associated mycorrhizal fungi and/or rhizobium

Were root samples collected? If so, specify which fungi and/or rhizobium were identified in the laboratory in descriptor **2.21 Collector's notes**

0 No
1 Yes

2.18 Ethnobotanical data

2.18.1 Ethnic group

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

2.18.2 Local/vernacular name

2.18.3 Translation

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

2.18.4 Cultural data

Is there associated folklore with the collected *Lathyrus* type? If so, describe it briefly in descriptor **2.21 Collector's notes**

0 No
1 Yes

2.18.5 Plant uses

1 Food
2 Animal feed
3 Forage
4 Ornamental
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.6 Parts of the plant used

1 Whole plant
2 Seed
3 Foliage
4 Inflorescence
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.7 Frequency of seed use

1 Daily
2 Weekly
3 Occasional
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.8 Frequency of forage use

1 Daily
2 Weekly
3 Occasional
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.9 Seed palatability

1 Poor taste
2 Acceptable taste
3 Good taste
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.10 Forage palatability

1 Poor taste
2 Acceptable taste
3 Good taste
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.11 Main cooking methods (seed only)

1 Boiling
2 Baking
3 Roasting
4 Snacks
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.12 Number of recipes

Record the number of recipes for each descriptor state of **2.18.11**, as available

2.18.13 History of plant used (seed only)

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

2.18.14 Growing conditions

1 Wet land (flooded)
2 Wet land (raised beds)
3 Upland
4 Slopes
5 Natural swamp
6 Atoll (pits)
7 Relay crop (*utera* under rice field)
99 Other (specify in descriptor **2.21 Collector's notes**)

2.18.15 Cultural practices

2.18.15.1 Planting date [YYYYMMDD]

2.18.15.2 Harvest date [YYYYMMDD]

2.18.16 Cropping system

1 Monoculture
2 Intercropped (specify crop in descriptor **2.21 Collector's notes**)

2.18.17 Landrace popularity

Is the landrace/variety popular and widely grown? If yes, describe briefly why in descriptor **2.21 Collector's notes**

0 No
1 Yes

2.18.18 Market information

Specify if any premium price was assigned to this particular landrace/variety

0 No
1 Yes

2.18.18.1 Type of market

1 Local
2 National
3 International

2.18.19 Prevailing stresses

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

2.18.20 Observation of lathyrism – human being

Is any information available relating to the cause of lathyrism associated with this collection? If so, provide details in descriptor **2.21 Collector's notes**

0 No
1 Yes

2.18.21 Observation of lathyrism – animals

Is there any record of lathyrism symptoms in animal feeds, either fodder or grain? If so, provide information for specific animal species in descriptor **2.21 Collector's notes**

0 No
1 Yes

2.18.22 Associated flora

Other dominant crop/plant species found in and around the collecting site

2.19 Herbarium specimen

Was a herbarium specimen collected? If so, provide an identification number in the descriptor **2.21 Collector's notes**

0 No
1 Yes

2.20 Photograph

Were photograph(s) taken of the accession or habitat at the time of collecting? If so, provide an identification number(s) in the descriptor **2.21 Collector's notes**

0 No
1 Yes

2.21 Collector' s notes

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

MANAGEMENT

3. Management descriptors

3.1 Accession number (Passport 1.1)

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

3.3 Seed storage location identifier
(Building, room, shelf number/location in medium- and /or long-term storage)

3.4 Storage date [YYYYMMDD]

3.5 Seed germination at storage (initial) [%]

3.6 Date of last seed germination test [YYYYMMDD]

3.7 Seed germination at the last test [%]

3.8 Date of next seed germination test [YYYYMMDD]
Estimated date when the accession should next be tested

3.9 Seed moisture content at harvest [%]

3.10 Seed moisture content at storage (initial) [%]

3.11 Type of stored plant material

1 Seed
2 Vegetative
3 Tissue
4 Pollen
99 Other (specify in descriptor **4.12 Notes**)

3.12 Amount of seed in storage [g or number] (Passport 1.9)

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

3.14 *In vitro* conservation

3.14.1 Type of explant

1 Apical or axillary meristem
2 Nodal cutting
3 Zygotic embryo
4 Seed
99 Other (specify in descriptor **4.12 Notes**)

3.14.2 Date of introduction *in vitro* [YYYYMMDD]

3.14.3 Type of subculture material

1 Axillary shoot
2 Callus
3 Cell suspension
4 Other (specify in descriptor **4.12 Notes**)

3.14.4 Regeneration process

1 Organogenesis
2 Somatic embryogenesis
3 Other (specify in descriptor **4.12 Notes**)

3.14.5 Number of genotypes introduced *in vitro*

3.14.6 Number of replicates per genotype

3.14.7 Last subculture date [YYYYMMDD]

3.14.8 Medium used at the last subculture

3.14.9 Number of plants at the last subculture

3.14.10 Location after the last subculture

3.14.11 Next subculture date [YYYYMMDD]

3.15 Cryopreservation

3.15.1 Type of material for cryopreservation

1 Seed
2 Zygotic embryo
3 Apex or axillary bud
4 Somatic embryo
5 Callus
6 Cell suspension
99 Other (specify in descriptor **4.12 Notes**)

3.15.2 Introduction date in liquid nitrogen [YYYYMMDD]

3.15.3 Number of samples introduced into liquid nitrogen

3.15.4 End of storage period [YYYYMMDD]

3.15.5 Number of samples taken from liquid nitrogen

3.15.6 Type of subcultured material for recovery

(After liquid nitrogen)

1 Seed
2 Zygotic embryo
3 Apex or axillary bud
4 Somatic embryo
5 Callus
6 Cell suspension
99 Other (specify in descriptor **4.12 Notes**)

3.15.7 Regeneration process

1 Organogenesis
2 Somatic embryogenesis
99 Other (specify in descriptor **4.12 Notes**)

3.15.8 Number of recovered samples

3.15.9 Location after the last subculture

4. Multiplication/regeneration descriptors

4.1 Accession number (Passport 1.1)

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

4.3 Field plot number

4.4 Multiplication/regeneration site location

4.5 Collaborator

4.6 Planting date [YYYYMMDD]

4.7 Cultural practices

4.7.1 Distance between plants [cm]
4.7.2 Distance between rows [cm]

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

4.8 Plant/seedling vigour
Assessed at 45 days after emergence
3 Low
5 Medium
7 High

4.9 Number of plants established

4.10 Previous multiplication and/or regeneration

4.10.1 Location
4.10.2 Sowing/planting date [YYYYMMDD]
4.10.3 Plot number

4.11 Number of times accession regenerated
Since the date of acquisition

4.12 Notes
Any additional information, including the information relating to method of isolation, selfing, sibbing, etc. may be specified here

ENVIRONMENT AND SITE

5. Characterization and/or evaluation site descriptors

5.1 Country of characterization and/or evaluation

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

5.2 Site (research institute)

5.2.1 Latitude

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

5.2.2 Longitude

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

5.2.3 Elevation [m asl]

5.2.4 Name and address of farm or institute

5.3 Evaluator's name and address

5.4 Sowing date [YYYYMMDD]

5.5 Harvest date [YYYYMMDD]

5.6 Evaluation environment

Environment in which characterization/evaluation was carried out

1 Field
2 Screen house
3 Glasshouse
4 Laboratory
99 Other (specify in descriptor **5.15 Notes**)

5.7 Type of planting material

1 Seed
2 Tissue culture plantlet (specify)
3 Vegetative part
99 Other (specify in descriptor **5.15 Notes**)

5.8 Planting site in the field
Give block, strip and/or row/plot numbers as applicable, plants/plot, replication

5.9 Field spacing

5.9.1 Distance between plants in a row [cm]

5.9.2 Distance between rows [cm]

5.10 Seed germination [%]
Percentage of plants germinated

5.10.1 Days to germination [d]
Specify number of days over which germination is measured

5.11 Field establishment [%]
Percent of plants established

5.11.1 Days to establishment [d]
Specify number of days from planting after which establishment is measured

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

5.13 Fertilizer
Specify types used, doses, frequency of each and method of application

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

5.15 Notes
Any other site-specific information

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

6.1 Site environment

6.1.1 Topography

This refers to the profile in elevation of the land surface on a broad scale. The reference is FAO (1990)

1	Flat	0-0.5%
2	Almost flat	0.6- 2.9%
3	Gently undulating	3-5.9%
4	Undulating	6-10.9%
5	Rolling	11-15.9%
6	Hilly	16-30%
7	Steeply dissected	>30%, moderate elevation range
8	Mountainous	>30%, great elevation range (>300 m)
99	Other	(specify in the 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 collecting site is located (adapted from FAO 1990)

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

6.1.3 Land element and position

Description of the geomorphology of the immediate surroundings of the collecting site (adapted from FAO 1990). (See Fig. 1)

1	Plain level	17	Interdunal depression
2	Escarpment	18	Mangrove
3	Interfluve	19	Upper slope
4	Valley	20	Midslope
5	Valley floor	21	Lower slope
6	Channel	22	Ridge
7	Levee	23	Beach
8	Terrace	24	Beach ridge

9 Floodplain
10 Lagoon
11 Pan
12 Caldera
13 Open depression
14 Closed depression
15 Dune
16 Longitudinal dune
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 Notes)

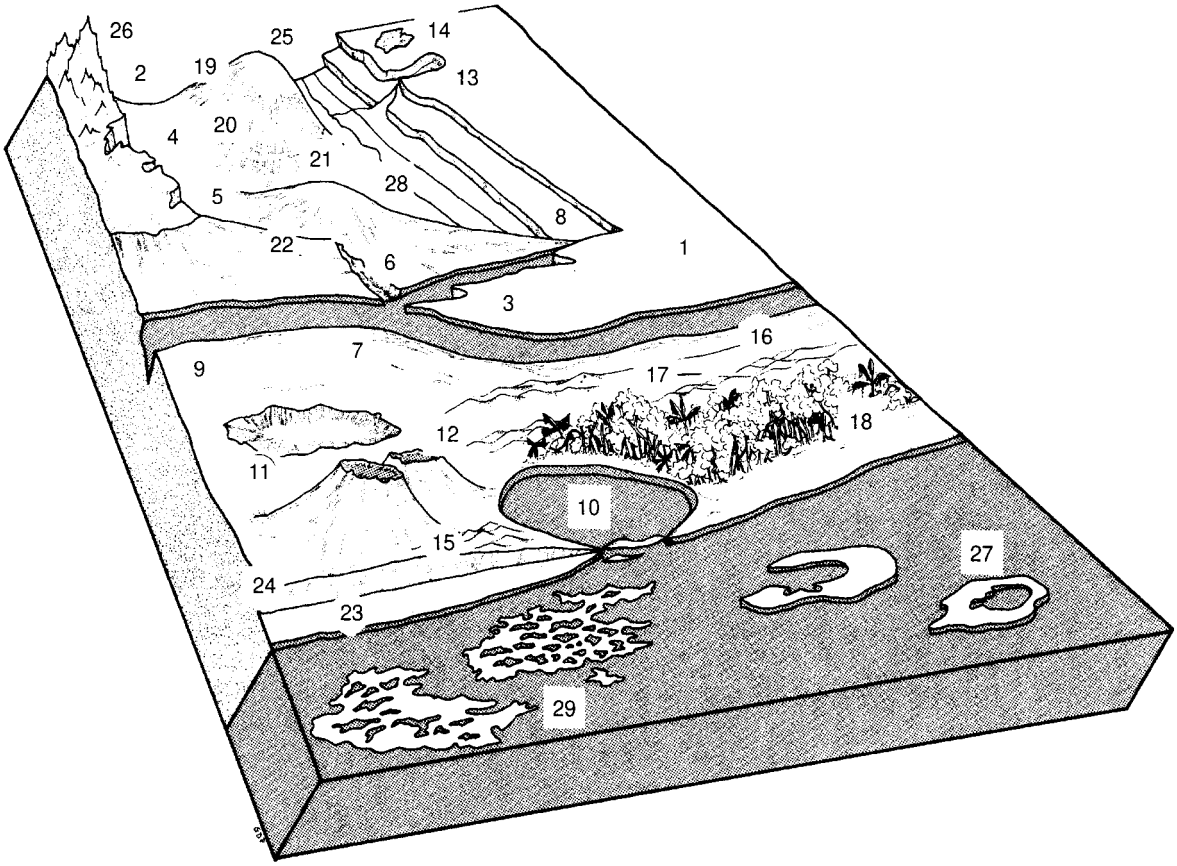

Fig. 1. Land element and position

6.1.4 Slope [°]

Estimated slope of the collecting 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 south west has an aspect of SW)

6.1.6 Crop agriculture

(From FAO 1990)

1 Annual field cropping
2 Perennial field cropping

6.1.7 Overall vegetation surrounding and at the collecting site

(Adapted from FAO 1990)

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

6.1.8 Soil parent material

(Adapted from FAO 1990)

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

6.1.8.1 Unconsolidated material

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

6.1.8.2 Rock type

(Adapted from FAO 1990)

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

6.1.9 Stoniness/rockiness/hardpan/cementation

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

6.1.10 Soil drainage

(Adapted from FAO 1990)

3 Poorly drained
5 Moderately drained
7 Well drained

6.1.11 Soil 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

6.1.12 Soil salinity

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

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 Color 1975). If there is no dominant soil matrix colour, the horizon is described as mottled and two or more colours are given and should be registered under uniform conditions. Early morning and late evening readings are not accurate. Provide depth of measurement [cm]. If colour chart is not available, the following states may be used:

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

6.1.14 Soil pH

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

6.1.14.1 pH at 0-10 cm

6.1.14.2 pH at 11-15 cm

6.1.14.3 pH at 16-30 cm

6.1.14.4 pH at 31-60 cm

6.1.14.5 pH at 61-90 cm

6.1.15 Soil erosion

3 Low
5 Intermediate
7 High

6.1.16 Rock fragments

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

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

6.1.17 Soil texture classes

(Adapted from FAO 1990)

For convenience in determining the texture classes of the following list, particle size classes are also given for each of the fine earth fraction listed 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

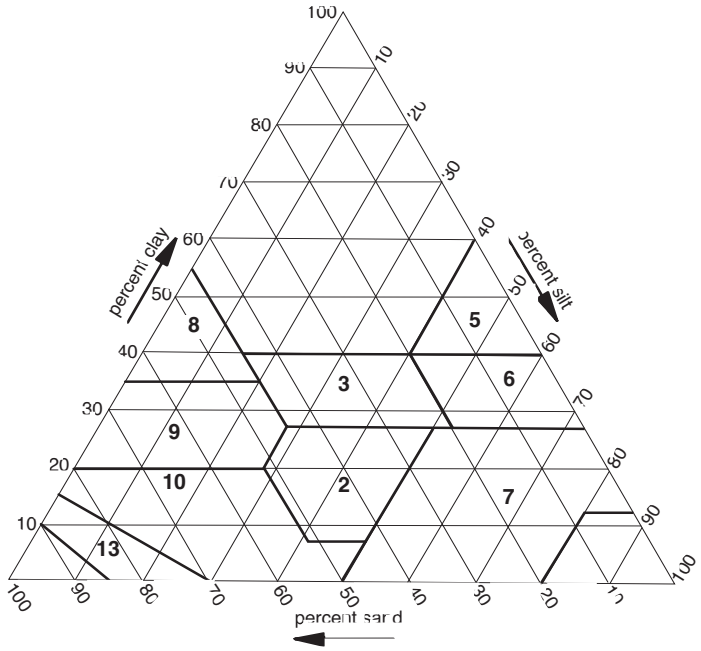

Fig. 2. Soil texture classes

6.1.17.1 Soil particle size classes

(Adapted from FAO 1990)

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

6.1.18 Soil organic matter content

1 Nil (as in arid zones)
2 Low (as in long-term cultivation in tropical setting)
3 Medium (as in recently cultivated but not yet much depleted)
4 High (as in never cultivated, and in recently cleared from forest)
5 Peaty

6.1.19 Soil taxonomic classification

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

6.1.20 Water availability

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

6.1.21 Soil fertility

General assessment of the soil fertility based on existing vegetation

3 Low
5 Moderate
7 High

6.1.22 Climate of the site

Should be assessed as close to the site as possible (State number of recorded years)

6.1.22.1 Temperature [°C]

Provide either the monthly or the annual mean

6.1.22.2 Dry season length [d]

6.1.22.3 Rainfall [mm]

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

6.1.22.4 Wind [m/s]

Annual average (state number of years recorded)

6.1.22.4.1 Frequency of typhoons or hurricane force winds

3 Low
5 Intermediate
7 High

6.1.22.4.2 Date of most recent typhoons or hurricane force winds [YYYYMMDD]

6.1.22.4.3 Annual maximum wind velocity [m/s]

6.1.22.5 Frost

6.1.22.5.1 Date of most recent frost [YYYYMMDD]

6.1.22.5.2 Lowest temperature [°C]

Specify seasonal average and minimum survival temperature

6.1.22.5.3 Duration of temperature below 0°C [d]

6.1.22.6 Relative humidity

6.1.22.6.1 Relative humidity diurnal range [%]

6.1.22.6.2 Relative humidity seasonal range [%]

6.1.22.7 Light

3 Shady
7 Sunny

6.1.22.8 Daylength [h]

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

CHARACTERIZATION

7. Plant descriptors

For all quantitative descriptors (metric traits), record the average of at least five measurements per individual accession. Most of the observations should be made at maximum vegetative growth stage (at 50% flowering), unless otherwise specified.

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

7.1 Vegetative characters

7.1.1 Epicotyl colour

Recorded 10 days after emergence

1 Light green
2 Green
3 Green-purple
4 Purple
99 Other (specify in descriptor **7.10 Notes**)

7.1.2 Hypocotyl colour

Recorded 10 days after emergence

1 Light green
2 Green
3 Green-purple
4 Purple
99 Other (specify in descriptor **7.10 Notes**)

7.1.3 Seedling vigour

Recorded 20 days after emergence

3 Poor
5 Intermediate
7 Vigorous

7.1.4 Plant growth rate – stage I

Recorded during emergence to flowering initiation

3 Low
5 Medium
7 High

7.1.5 Plant growth rate – stage II

Recorded after flowering initiation

3 Low
5 Medium
7 High

7.1.6 Plant growth habit

Recorded at the beginning of flowering period. (See Fig. 3)

1 Prostrate
2 Spreading
3 Semi-erect
4 Erect

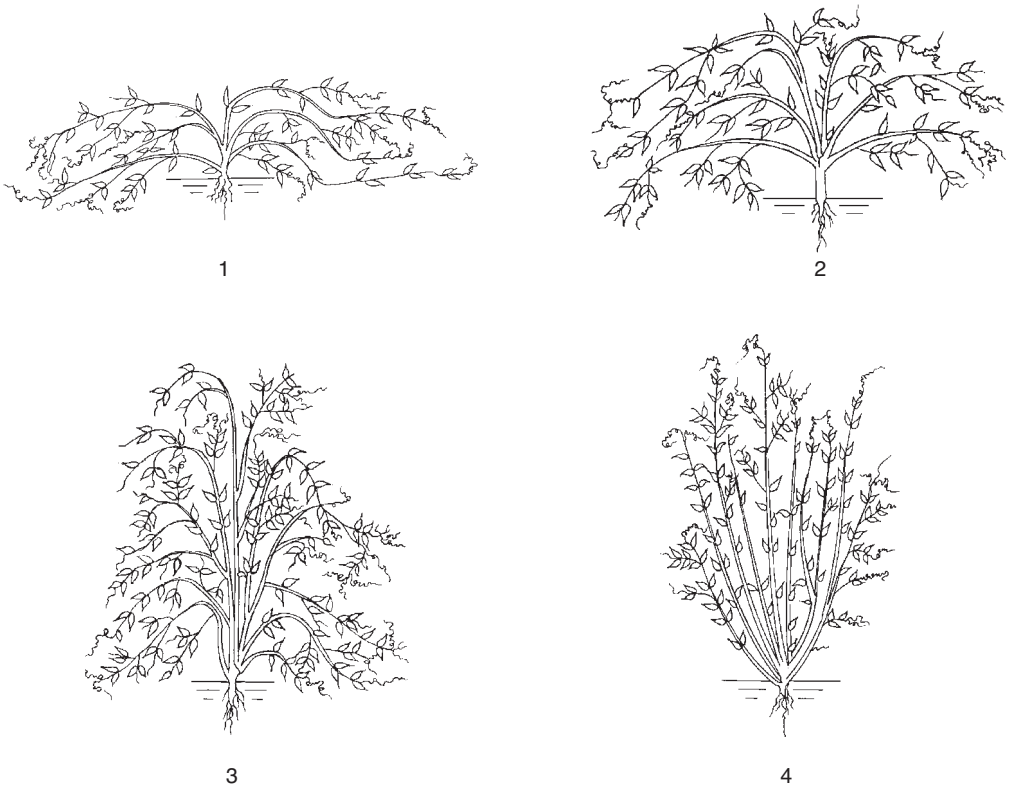

Fig. 3. Plant growth habit

7.1.7 Plant type

1 Indeterminate
2 Determinate

7.2 Stem characters

7.2.1 Plant height [cm]

Height of plant at physiological maturity measured from ground to the tip of the longest branch

7.2.2 Nodes per plant

Recorded on the main branch

3 Few
5 Medium
7 Many

7.2.3 Internode length

Recorded on the main branch

3 Small
5 Medium
7 Large

7.2.4 Nodes to the first bearing pod

Count the total number of nodes to the first pod-bearing position on the main branch

7.2.5 Stem colour

Recorded at 50% flowering

1 Light green
2 Green
3 Purple-green
4 Purple
99 Other (specify in descriptor **7.10 Notes**)

7.2.6 Stem thickness [mm]

Measured at the middle of the main branch at 50% flowering

7.2.7 Stem wing width

Assessed at the middle of the main branch at 50% flowering

0 Wingless
3 Narrow
5 Medium
7 Wide

7.2.8 Stem waxy coating

0 No coating
3 Small
5 Medium
7 Large

7.2.9 Stem section shape

1 Round
2 Square
3 Deeply fasciated
99 Other (specify in descriptor **7.10 Notes**)

7.3 Branch characters

7.3.1 Branch arrangements

1 Evenly distributed throughout the whole plant
2 Mainly on lower part of the plant
3 Mainly in middle part of the plant

7.3.2 Number of primary branches

Counted at first pod maturity (only pod-bearing branches)

7.3.3 Length of primary branch [cm]

Measure the longest branch

7.3.4 Number of secondary branches

Counted at first pod maturity (only pod-bearing branches)

7.4 Root characters

7.4.1 Root length [cm]

7.4.2 Root nodulation at full blooming stage

0 No nodules
3 Low
5 Intermediate
7 High

7.4.3 Nodulation activity

0 Absent (non-active)
1 Present (active nodules)

7.5 Leaf characters

7.5.1 Anthocyanin pigmentation on leaf

Recorded at 50% flowering

0 Absent
1 Present

7.5.2 Leaf type

1 Tendril
2 Phyllody
3 Simple (lamina not bifurcated into leaflets)
4 Bipinnate
5 Multipinnate
99 Other (specify in descriptor **7.10 Notes**)

7.5.3 Number of leaflets per leaf

1 One pair
2 Two pairs
3 More than two pairs

7.5.4 Leaf colour

1 Light green
2 Green
3 Dark green
99 Other (specify in descriptor **7.10 Notes**)

7.5.5 Prominence of leaf vein

0 No
1 Yes

7.5.6 Pigmentation of leaf vein

0 No
1 Yes

7.5.7 Leaf size

Recorded at 50% flowering from the middle area of the main branch

3 Small
5 Medium
7 Large

7.5.8 Leaflet length [cm]

Maximum length of leaf lamina recorded from the middle area of the main branch

7.5.9 Leaflet width [cm]

Maximum width of leaf lamina recorded from the middle area of the main branch

7.5.10 Leaflet shape

(See Fig. 4)

1 Linear
2 Lanceolate
3 Ovate-lanceolate
4 Ovate
99 Other (specify in descriptor **7.10 Notes**)

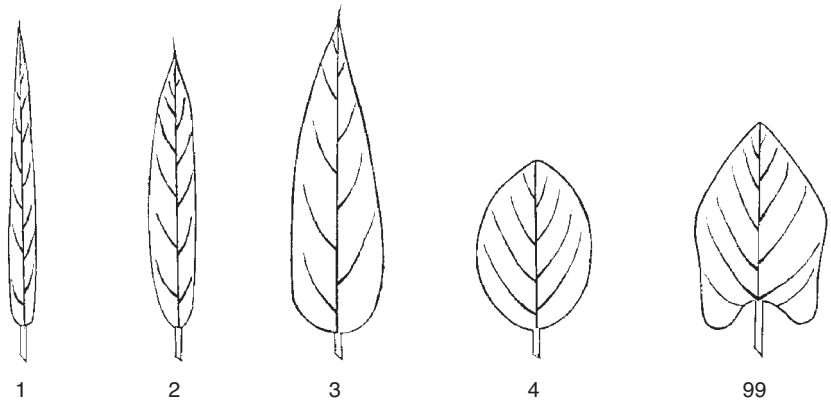

Fig. 4. Leaflet shape

7.5.11 Leaf petiole length [cm]

Measured from the base to the point where leaf intersects petiole

7.5.12 Leaf petiole colour

1 Green
2 Purple-green
99 Other (specify in descriptor **7.10 Notes**)

7.5.13 Leaf tendrils

0 Absent
1 Short
2 Medium
3 Long
99 Other (specify in descriptor **7.10 Notes**)

7.5.14 Top leaves – petiole end

1 Tendril subulate
2 Tendril simple
3 Tendril compound
99 Other (specify in descriptor **7.10 Notes**)

7.5.15 Lower leaves – petiole end

1 Tendril subulate
2 Tendril simple
3 Tendril compound
99 Other (specify in descriptor **7.10 Notes**)

7.5.16 Leaf persistence

Recorded when 80% of pods have reached maturity

3 Low
5 Moderate
7 High

7.5.17 Leaf senescence

Recorded when 80% of pods have reached maturity

0 No visual senescence
3 Slight visual senescence
5 Moderate senescence
7 Conspicuous concurrent senescence

7.5.18 Leaf pubescence

0 Absent
1 Present

7.5.19 Presence of pubescence

1 Upper surface of leaf
2 Lower surface of leaf
3 Both upper and lower surfaces of leaf
4 Only on leaf margin
99 Other (specify in descriptor **7.10 Notes**)

7.5.20 Leaf scale type

1 Subulate
2 Linear
3 Half shaft-shaped
4 Shaft-shaped
5 Heart-shaped
99 Other (specify in descriptor **7.10 Notes**)

7.5.21 Leaf scale size

3 Small
5 Medium
7 Large

7.6 Inflorescence characters

7.6.1 Days to first flowering [d]

Number of days from sowing to when the first flower opens

7.6.2 Days to 50% flowering [d]

Number of days from sowing to stage when 50% of plants have begun to flower in a row

7.6.3 Days to first mature pod [d]

Number of days from sowing to first mature pod separating from plant

7.6.4 Days to maturity [d]

From sowing to when 80% of plants have mature pods

7.6.5 Maturation period [d]

Number of days from first flowering to first mature pod

7.6.6 Peduncle length [cm]

Measured as the mean length of randomly chosen peduncles at maturity

7.6.7 Flower bud shape

(Just before opening)

1 Globular
2 Intermediate
3 Long
99 Other (specify in descriptor **7.10 Notes**)

7.6.8 Flower bud size

(Just before opening)

3 Small
5 Medium
7 Large

7.6.9 Flower size

3 Small
5 Medium
7 Large

7.6.10 Mean length of standard petal [cm]

Measured on randomly selected, fully expanded flowers

7.6.11 Mean width of standard petal [cm]

Measured on randomly selected, fully expanded flowers

7.6.12 Flower colour

Score on fresh, open flowers for score standard, wing and keel colours separately

1 White
2 White blue
3 Blue
4 Grey
5 Light yellow
6 Yellow
7 Pink
8 Orange
9 Red
10 Violet-blue
11 Violet
99 Other (specify in descriptor **7.10 Notes**)

7.6.13 Flower vein colour

1 Blue
2 Grey
3 Violet
4 Yellow
99 Other (specify in descriptor **7.10 Notes**)

7.6.14 Calyx colour

1 Light green
2 Green
3 Green-purple
99 Other (specify in descriptor **7.10 Notes**)

7.6.15 Calyx teeth length

1 Shorter than tube
2 Equal to tube
3 Longer than tube

7.6.16 Calyx teeth width

3 Narrow
5 Medium
7 Broad

7.6.17 Calyx teeth shape

1 Sharp
2 Blunt
99 Other (specify in descriptor **7.10 Notes**)

7.6.18 Rate of flower droop [%]

Recorded up to 50% pod maturity

7.6.19 Pod-bearing position [cm]

Recorded as height to the lowest pod (see descriptor **7.2.4**)

7.6.20 Pod-bearing length [cm]

Recorded as length of stem between the lowest pod-bearing position to the topmost pod-bearing position

7.7 Pod characters

7.7.1 Number of pods per peduncle

1 One
2 Two
3 Three
99 Other (specify in descriptor **7.10 Notes**)

7.7.2 Number of pods per plant

Mean number of pods. Recorded from randomly selected plants at physiological maturity

7.7.3 Number of effective pods

Mean number of pods having seed(s). Recorded from randomly selected plants at physiological maturity

7.7.4 Pod shape

(See Fig. 5)

1 Oblong-elliptical
2 Medium oblong-elliptical
3 Curved
4 Beaded
5 Broad-linear
6 Broad-elliptical
99 Other (specify in descriptor **7.10 Notes**)

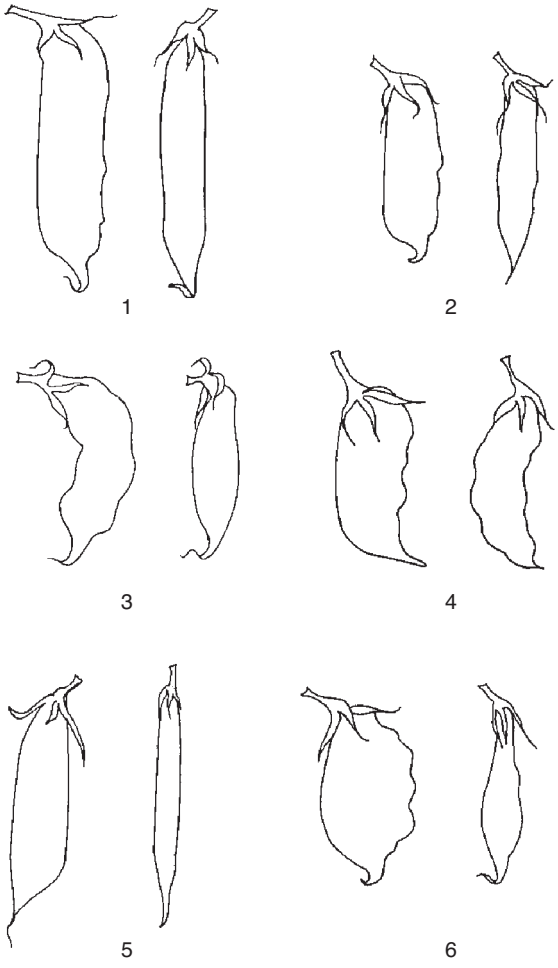

Fig. 5. Pod shape

7.7.5 Pod curvature

Recorded on mature pods. (See Fig. 6)

1 Straight
2 Slightly curved
3 Curved

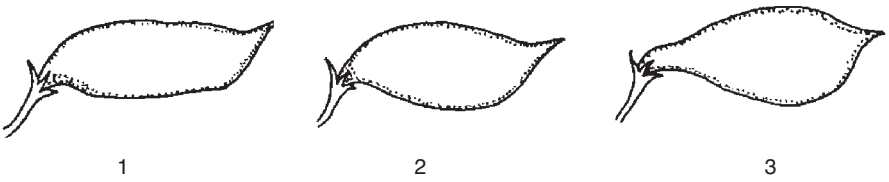

Fig. 6. Pod curvature

7.7.6 Pod beak shape

(See Fig. 7)

1 Pointed
2 Blunt
99 Other (specify in descriptor **7.10 Notes**)

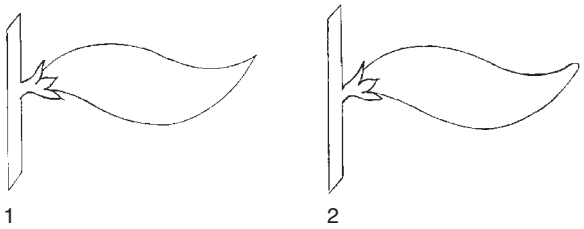

Fig. 7. Pod beak shape

7.7.7 Pod beak length

Recorded on a fully expanded immature pod from end of last loculus up to the pod tip

0 Absent
3 Short
5 Medium
7 Long

7.7.8 Immature pod colour

1 Yellow-cream
2 Light green
3 Green
4 Dark green
5 Green-purple
6 Light purple
7 Purple
99 Other (specify in descriptor **7.10 Notes**)

7.7.9 Mature pod colour

1 Yellow-green
2 Violet mottled
3 Grey
99 Other (specify in descriptor **7.10 Notes**)

7.7.10 Pattern of pod veins

1 Longitudinal
2 Netted
99 Other (specify in descriptor **7.10 Notes**)

7.7.11 Pod length [cm]

Maximum mean length of randomly selected mature pods. Recorded at physiological maturity

7.7.12 Pod width [cm]

Maximum mean width of randomly selected mature pods. Recorded at physiological maturity

7.7.13 Pod wings

0 Absent
3 Narrow
5 Medium
7 Wide

7.7.14 Pod pubescence

0 Absent
3 Low
5 Medium
7 High

7.7.15 Constriction of pods between the seeds

(See Fig. 8)

0 Absent
3 Slight
5 Medium
7 Pronounced

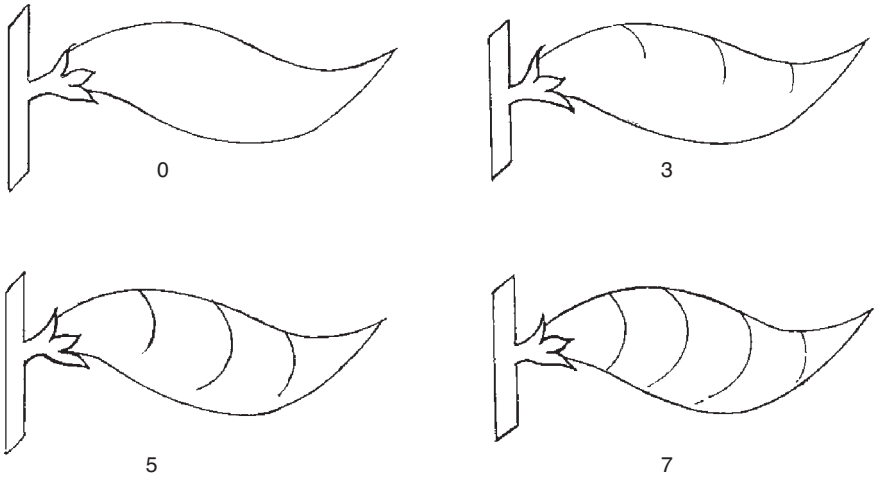

Fig. 8. Constriction of pods between the seeds

7.7.16 Number of seeds per pod

Mean number of seeds counted on randomly selected pods. Recorded at physiological maturity

7.7.17 Pod dehiscence

Scored one week after maturity

0 No shattering
3 Low shattering
5 Medium shattering
7 High shattering

7.8 Seed characters

7.8.1 Seed shape

(See Fig. 9)

1 Oblate or flattened
2 Triangular
3 Rhomboid
4 Square
5 Obtriangular
6 Spherical
99 Other (specify in descriptor **7.10 Notes**)

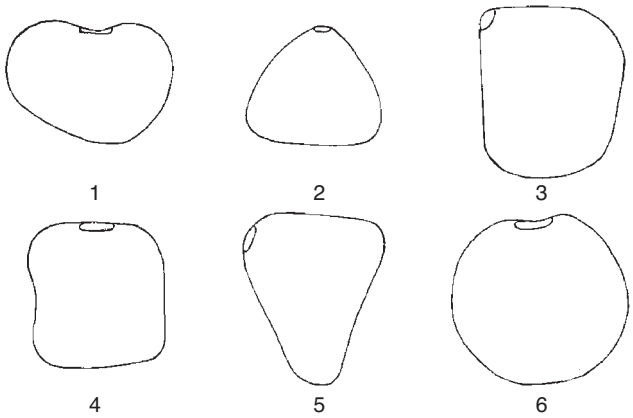

Fig. 9. Seed shape

7.8.2 Seed size

3 Small
5 Medium
7 Large

7.8.3 Seed coat colour

1 Greyed-white
2 Yellow-white
3 Grey
4 Brown
5 Yellow-green
6 Pink
7 Red-purple
8 Black
9 Grey mottled
10 Green mottled
99 Other (specify in descriptor **7.10 Notes**)

7.8.4 Seed coat surface

1 Smooth
2 Tubercular

7.8.5 Seed coat pattern

0 Absent
1 Marbled
2 Dotted
3 Streaked
4 Mixture (any combination of 1, 2 and 3)

7.8.6 Seed coat pattern colour

1 Cream
2 Green
3 Brown
4 Red-purple
5 Black
99 Other (specify in descriptor **7.10 Notes**)

7.8.7 Cotyledon colour

Recorded after removing the seed coat

1 Yellow
2 Orange
99 Other (specify in descriptor **7.10 Notes**)

7.8.8 Seed eye width

3 Narrow
5 Medium
7 Wide

7.8.9 Seed ornamentation

0 Absent
1 Present

7.8.10 100-seed weight [g]

Weight of 100 randomly selected mature seeds at 8-10% (air-dry) seed moisture content

7.8.11 Seed volume [cm^3]

Recorded on the basis of 94% ethanol displaced by 100 seeds

7.8.12 Seed yield per plant [g]

Recorded as mean weight of seeds on five randomly selected plants

7.9 Forage characters

7.9.1 Early vigour

Recorded at 8-10 leaf stage

3 Poor
5 Medium
7 Good

7.9.2 Herbage yield – Fall season

3 Poor
5 Medium
7 Good

7.9.3 Herbage yield – Spring season

3 Poor
5 Medium
7 Good

7.9.4 Regeneration

0 Absent
1 Present

7.9.5 Vigour of regrowth after cutting

3 Poor
5 Medium
7 Good

7.9.6 Leaf : stem ratio

Recorded at 50% flowering

3 Poor (main stem easily visible)
5 Medium
7 Good (very leafy)

7.9.7 Relative biological yield

Recorded in comparison with other forage legumes (specify the name of crop used for comparison)

7.10 Notes

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

EVALUATION

8. Plant descriptors

8.1 Agronomic characters

8.1.1 Physiological seed maturity

1 Very early
2 Early
3 Intermediate
4 Late
5 Very late
6 Undetermined growth

8.1.2 Overall appearance (desirability)

Rating based on overall appearance of the accession compared with other accessions and checks. Data for perennials to be recorded during the second year

3 Poor
5 Medium
7 Good

8.1.3 Lodging susceptibility

Scored at seed maturity

0 None (all plants standing)
3 Low
5 Medium
7 High

8.1.4 Biological yield per plant – Fall season [g]

Yield of dried, mature plants after pulling

8.1.5 Biological yield per plant – Spring season [g]

Yield of dried, mature plants after pulling

8.1.6 Harvest index [%]

Ratio of total grain to total biological yield taken from randomly selected plants in a row

8.1.7 Shelling [%]

Calculated from seed to pod ratio of randomly selected plants in a row

8.1.8 Milling [%]

Yield of de-husked cotyledons (*Dhal*)

8.2 Quality characters

8.2.1 Seed crude protein content [g/100 g DW]

8.2.2 Fodder crude protein content [g/100 g DW]

8.2.3 Amino acid composition [μg/g DW]

Estimate essential amino acids in seed sample [FAO 1991]

8.2.4 β-N-Oxalyl-L-α, β-Diaminopropionic Acid (ODAP) content [%]

Estimate ODAP content in dry seeds and any other plant part (specify such as dry cotyledons, dry embryo, etc.)

8.2.5 Fodder crude fiber content [g/100 g DW]

8.2.6 Fodder digestible fiber content [g/100 g DW]

8.2.7 Cooking time [min]

Minutes taken to cook to mashing stage

8.2.7.1 Cooking time of *Dhal* [min]

8.2.7.2 Cooking time of dry seeds [min]

8.3 Chemical analysis

8.3.1 Dry matter content [g/100 g DM]

8.3.2 Micronutrients content

Indicate if Manganese, Zinc, Copper, etc. in descriptor **8.4 Notes**

8.3.3 Analysis of anti-nutritional factors

Indicate if Tannin, Trypsin inhibitors, Chymotrypsin inhibitor, Lactins, Amylase inhibitors, Soponins, Phytic acid, etc. in descriptor **8.4 Notes**

8.4 Notes

Specify here any other additional information

9. Abiotic stress susceptibility

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

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

9.1 Reaction to higher temperature

Scored under natural conditions during daytime for at least four weeks

9.2 Reaction to drought

Scored under natural conditions during daytime for at least four weeks

9.3 Reaction to high soil moisture

Scored under paddy conditions

9.4 Reaction to soil salinity

9.5 Reaction to high soil acidity

(pH <4.5)

9.6 Reaction to alkalinity

9.7 Reaction to shade

9.8 Reaction to constant winds

9.9 Notes

Specify any additional information here

10. Biotic stress susceptibility

In each case, it is important to state the origin of the infestation or infection, i.e. natural, field inoculation, and laboratory. Also specify the causal organism and the corresponding symptoms. Record such information in descriptor **10.6 Notes**. These are coded on a susceptibility scale from 1 to 9, viz.:

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

10.1 Insects

	Causal organism	Common name
10.1.1	*Aphis craccivora*	Bean aphid
10.1.2	*Etiella zinckenella*	Pod borer
10.1.3	*Caliothrips indicus*	Black thrips
10.1.4	*Bruchus affinis*, *Callosobruchus* spp.	Bruchids

10.2 Nematodes

10.2.1	*Heterodera* spp.	Cyst nematode
10.2.2	*Meloidogyne* spp.	Root knot nematode

10.3 Fungi

10.3.1	*Erysiphe polygoni* f. sp. *pisi*	Powdery mildew
10.3.2	*Peronospora lathyri - palustris*	Downy mildew
10.3.3	*Uromyces viciae-fabae*	Rust
10.3.4	*Fusarium oxysporum* f. sp. *ciceris*	Wilt
10.3.5	*Botrytis* spp.	Grey mold/blight
10.3.6	*Erysiphe pisi*	Powdery mildew
10.3.7	*Fusarium orthoceras* var. *lathyri*	Wilt
10.3.8	*Glomerella cingulata*	Anthracnose
10.3.9	*Leveillula taurica*	Oidium
10.3.10	*Macrophomina phaseolina*	Root rot/ashy stem
10.3.11	*Sclerotinia sclerotiorum*	White mold

10.4 Bacteria

10.4.1	*Pseudomonas syringae* pv. *cannabina*	Bacteriosis

10.5 Viruses

10.5.1	Tomato spotted wilt	Chlorosis, wilt
10.5.2	Faba bean necrotic yellows	Variegation

10.6 Notes

Specify here any additional information

11. Biochemical markers

Specify methods used and cite reference(s)

11.1 Isozymes

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

11.2 Other biochemical markers

(e.g. Polyphenol profile)

12. Molecular markers

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

12.1 Restriction fragment length polymorphism (RFLP)

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

12.2 Amplified fragment length polymorphism (AFLP)

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

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

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

12.4 Sequence-tagged microsatellites (STMS)

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

12.5 PCR-sequencing

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

12.6 Other molecular markers

13. Cytological characters

13.1 Chromosome number

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

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

13.4 Other cytological characters

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

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ANNEX I. Multicrop Passport Descriptors

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

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

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

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

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

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

11. Longitude of collecting site (LONGITUDE)

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

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

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

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

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

14. Status of sample (SAMPSTAT)

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

15. Collecting source (COLLSRC)

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

1	Wild habitat	2	Farm	3	Market	4	Institute/Research organization
1.1	Forest/ woodland	2.1	Field	3.1	Town		
		2.2	Orchard	3.2	Village		
1.2	Shrubland	2.3	Garden	3.3	Urban	0	Unknown
1.3	Grassland	2.4	Fallow	3.4	Other exchange system		
1.4	Desert/ tundra	2.5	Pasture			99	Other (Elaborate in REMARKS field)
		2.6	Store				

16. Donor institute code (DONORCODE)

Code for the donor institute. The codes consist of the 3-letter ISO 3166 country code of the country where the institute is located plus number or an acronym as specified in the Institute database that will be made available by FAO. Preliminary codes (i.e. codes not yet incorporated in the FAO Institute database) start with an asterisk followed by a 3-letter ISO 3166 country code and an acronym.

17. Donor number (DONORNUMB)

Number assigned to an accession by the donor. Letters should be used before the number to identify the genebank or national system (e.g. IDG indicates an accession that comes from the genebank at Bari, Italy; CGN indicates an accession from the genebank at Wageningen, The Netherlands; PI indicates an accession within the USA system)

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

Any other identification number known to exist in other collections for this accession. Letters should be used before the number to identify the genebank or national system (e.g. IDG indicates an accession that comes from the genebank at Bari, Italy; CGN indicates an accession from the genebank at Wageningen, The Netherlands; PI indicates an accession within the USA system). Multiple numbers can be added and should be separated with a semicolon

19. Remarks (REMARKS)

The remarks field is used to add notes or to elaborate on descriptors with value "99" (=Other). Prefix remarks with the field name they refer to and a colon (e.g. COLLSRC: roadside). Separate remarks referring to different fields are separated by semicolons.

FAO WIEWS DESCRIPTORS

1. Location of safety duplicates (DUPLSITE)

Code of the institute where a safety duplicate of the accession is maintained. The codes consist of 3-letter ISO 3166 country code of the country where the institute is located plus number or an acronym as specified in the Institute database that will be made available by FAO. Preliminary codes (i.e. codes not yet incorporated in the FAO Institute database) start with an asterisk followed by a 3-letter ISO 3166 country code and an acronym. Multiple numbers can be added and should be separated with a semicolon.

2. Availability of passport data (PASSAVAIL)

(i.e. in addition to what has been provided)

0 Not available
1 Available

3. Availability of characterization data (CHARAVAIL)

0 Not available
1 Available

4. Availability of evaluation data (EVALAVAIL)

0 Not available
1 Available

5. Acquisition type of the accession (ACQTYPE)

1 Collected/bred originally by the institute
2 Collected/bred originally by joint mission/institution
3 Received as a secondary repository

6. Type of storage (STORTYPE)

Maintenance type of germplasm. If germplasm is maintained under different types of storage, multiple choices are allowed, separated by a semicolon (e.g. 2;3). (Refer to FAO/IPGRI Genebank Standards 1994 for details on storage type)

1 Short-term
2 Medium-term
3 Long-term
4 *In vitro* collection
5 Field genebank collection
6 Cryopreserved
99 Other (elaborate in REMARKS field)

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