

# DESCRIPTORS FOR CHICKPEA (*Cicer arietinum* L.)



IBPGR

ICRISAT

ICARDA

# DESCRIPTORS FOR CHICKPEA

(*Cicer arietinum* L.)

IBPGR/ICRISAT/CARDA  
ROME 1993



Citation

IBPGR, ICRISAT and ICARDA. 1993. Descriptors for chickpea (*Cicer arietinum* L.). International Board for Plant Genetic Resources, Rome, Italy; International Crops Research Institute for the Semi-Arid Tropics, Patancheru, India and International Center for Agricultural Research in the Dry Areas, Aleppo, Syria

ISBN 92-9043-137-7

IBPGR  
Via delle Sette Chiese 142  
00145 Rome  
Italy

ICRISAT  
Patancheru  
Andhra Pradesh 502 324  
India

ICARDA  
P.O. Box 5466  
Aleppo  
Syria

Printed by ICRISAT, Patancheru, India

Copyright. International Board for Plant Genetic Resources, 1993

The International Board for Plant Genetic Resources (IBPGR) is an autonomous international scientific organization operating under the aegis of the Consultative Group on International Agricultural Research (CGIAR). IBPGR was established by the CGIAR in 1974 and is administered by the Food and Agriculture Organization of the United Nations.

IBPGR's mandate is to advance the conservation and use of plant genetic resources for the benefit of present and future generations.

Financial support for the core programme of IBPGR was provided in 1992 by the Governments of Australia, Austria, Belgium, Canada, the People's Republic of China, Denmark, France, Germany, India, Italy, Japan, the Republic of Korea, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK, the USA and the World Bank

About ICRISAT: The semi-arid tropics (SAT) encompasses parts of 48 developing countries including most of India, parts of southeast Asia, a swathe across sub-Saharan Africa, much of southern and eastern Africa, and parts of Latin America. Many of these countries are among the poorest in the world. Approximately one sixth of the world's population lives in the SAT, which is typified by unpredictable weather, limited and erratic rainfall, and nutrient-poor soils.

ICRISAT's mandate crops are sorghum, pearl millet, finger millet, chickpea, pigeonpea, and groundnut; these six crops are vital to life for the ever-increasing populations of the semi-arid tropics. ICRISAT's mission is to conduct research which can lead to enhanced sustainable production of these crops and to improved management of the limited natural resources of the SAT. ICRISAT communicates information on technologies as they are developed through workshops, networks, training, library services, and publishing.

ICRISAT was established in 1972. It is one of 18 nonprofit, research and training centers funded through the Consultative Group on International Agricultural Research (CGIAR). The CGIAR is an informal association of approximately 50 public and private sector donors; it is co-sponsored by the Food and Agriculture Organization of the United Nations (FAO), the World Bank, and the United Nations Development Programme (UNDP)

The principle objective of ICARDA is to meet the challenge posed by a harsh, stressful and variable environment in which the productivity of winter rainfed agricultural systems must be increased to higher sustainable levels; in which soil degradation must be arrested and, possibly reversed; and in which the quality of the environment is assured. ICARDA meets this challenge through research, training and dissemination of information in a mature partnership with the national agricultural research and development systems.

The Center has a world responsibility for the improvement of barley, lentil, and faba bean, and a regional responsibility in West Asia and North Africa for the improvement of wheat, chickpea, and pasture and forage crops and the associated farming systems

# CONTENTS

PREFACE	vii
DEFINITIONS AND USE OF THE DESCRIPTORS	1
PASSPORT	3
1. Accession data	3
2. Collection data	4
CHARACTERIZATION AND PRELIMINARY EVALUATION	11
3. Site data	11
4. Plant data	13
4.1 Vegetative	13
4.2 Inflorescence and fruit	14
4.3 Seed	15
FURTHER CHARACTERIZATION AND EVALUATION	18
5. Site data	18
6. Plant data	20
7. Abiotic stress susceptibility	23
8. Biotic stress susceptibility	24
9. Allozyme composition	26
10. Cytological characters and identified genes	26
MANAGEMENT	27
M1. Seed management data	27
M2. Multiplication/regeneration data	28
CONTRIBUTORS	30
ACKNOWLEDGEMENTS	31

## DEFINITIONS AND USE OF THE DESCRIPTORS

IBPGR now uses the following definitions in genetic resources documentation:

- (i) passport (accession identifiers and information recorded by collectors);
- (ii) characterization (consists of recording those characters which are highly heritable, can be seen by the eye and are expressed in all environments);
- (iii) preliminary evaluation (consists of recording a limited number of additional traits thought desirable by a consensus of users of the particular crop);
- (iv) further evaluation (consists of recording a number of additional descriptors thought to be useful in crop improvement);
- (v) management (information indispensable for management of accessions in medium- and long-term storage as well as for multiplication/regeneration).

Characterization and preliminary evaluation will be the responsibility of genebank curators, while further characterization and evaluation will typically be carried out elsewhere (by a multidisciplinary team of scientists). The data from further evaluation 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 as indicated below:

- (a) the SI system of measurements is used. The units to be applied are given in square brackets following the descriptor;
- (b) many quantitative characters which are continuously variable are recorded on a 1-9 scale, where:

- 1 Very low
- 2 Very low to low
- 3 Low
- 4 Low to intermediate
- 5 Intermediate
- 6 Intermediate to high
- 7 High
- 8 High to very high
- 9 Very high

## 2 DESCRIPTORS FOR CHICKPEA

is the expression of a character. If the character is not expressed, '0' should be recorded (see also (e)). 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 8 (Biotic stress susceptibility) 1 = very low susceptibility and 8 = high to very high susceptibility;

- (c) 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, or where the descriptor is discontinuous up to three codes in the order of frequency can be recorded;
- (d) absence/presence of characters are scored as:

0 Absent  
+ Present

- (e) when the descriptor is inapplicable, '0' is used as the descriptor value, e.g. if an accession does not have a central leaf lobe, '0' would be scored for the following descriptor:

### Shape of central leaf lobe

3 Toothed  
5 Elliptic  
7 Linear

- (f) blanks are used for information not yet available;
- (g) standard colour charts, e.g. Royal Horticultural Society Colour Chart, Methuen Handbook of Colour, 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 the colour chart is used);
- (h) dates should be expressed numerically in the format DDMMYYYY, where

DD - 2 digits to represent the day  
MM - 2 digits to represent the month  
YYYY - 4 digits to represent the year



# PASSPORT

## 1. ACCESSION DATA

### 1.1 ACCESSION NUMBER (1.1)

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

### 1.2 DONOR NAME (1.2)

Name of institution or individual responsible for donating the germplasm

### 1.3 DONOR NUMBER (1.3)

Number assigned to accession by the donor

### 1.4 OTHER NUMBER(S) ASSOCIATED WITH THE ACCESSION (1.4)

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

#### 1.4.1 Other number 1 (1.4.1)

#### 1.4.2 Other number 2 (1.4.2)

### 1.5 SCIENTIFIC NAME (1.5)

#### 1.5.1 Genus (1.5.1)

#### 1.5.2 Species (1.5.2)

#### 1.5.3 Author(s)

#### 4 DESCRIPTORS FOR CHICKPEA

- 1.5.4 Subspecies (1.5.3)
- 1.5.5 Botanical variety (1.5.4)
- 1.6 PEDIGREE (1.6)  
Parentage or nomenclature and designations assigned to breeders' material
- 1.7 CULTIVAR NAME (1.6)  
Either a registered or other formal cultivar designation given to the accession
- 1.8 ACQUISITION DATE (1.7)  
Date on which the accession entered the collection (in the format DDMMYYYY)
- 1.9 DATE OF LAST REGENERATION OR MULTIPLICATION (1.8)  
(in the format DDMMYYYY)
- 1.10 ACCESSION SIZE (1.9)  
Approximate number or weight of seeds or pods of an accession in the genebank
- 1.11 NUMBER OF TIMES ACCESSION REGENERATED (1.10)  
Since the date of acquisition
- 1.12 NUMBER OF PLANTS USED IN EACH REGENERATION
- 1.13 TYPE OF MAINTENANCE
- 1 Vegetative
  - 2 Seed
  - 3 Both
  - 4 Tissue culture

## 2. COLLECTION DATA

### 2.1 COLLECTING INSTITUTE(S) (2.2)

Institute(s) and people collecting/sponsoring the sample collection

### 2.2 COLLECTOR'S NUMBER (2.1)

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 COLLECTION DATE OF ORIGINAL SAMPLE (2.3)

(in the format DDMMYYYY)

### 2.4 COUNTRY OF COLLECTION (2.4)

Name of the country in which the sample was collected or was bred. Use three letter abbreviations from the *International Standard (ISO), Codes for the representation of names of countries*, No. 3166, 1988. Copies of these are available from Beuth Verlag GmbH, Burggrafenstrasse 6, D-10772 Berlin 30, Germany; Tel. 30-2601-2320; Fax 30-2601-1231, Tlx. 1-83-622-bvb-d

### 2.5 PROVINCE/STATE (2.5)

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

### 2.6 DEPARTMENT/COUNTY

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

### 2.7 COLLECTION SITE (2.6)

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)

## 6 DESCRIPTORS FOR CHICKPEA

- 2.8 LATITUDE OF COLLECTION SITE (2.7)  
Degrees and minutes followed by N (North) or S (South) (e.g. 01030S)
- 2.9 LONGITUDE OF COLLECTION SITE (2.8)  
Degrees and minutes followed by E (East) or W (West) (e.g. 07625W)
- 2.10 ELEVATION OF COLLECTION SITE [m] (2.9)  
Altitud above sea level
- 2.11 COLLECTION SOURCE (2.10)
- 1 Wild habitat
  - 2 Farmer's field
  - 3 Farm store
  - 4 Backyard
  - 5 Market
  - 6 Institute
  - 7 Threshing yard
  - 8 Others (specify in the descriptor COLLECTOR'S NOTES, 2.31)
- 2.12 STATUS OF SAMPLE (2.11)
- 1 Wild
  - 2 Weedy
  - 3 Breeding/research material
  - 4 Landrace
  - 5 Advanced cultivar
  - 6 Interspecific derivative
  - 7 Other (specify in the descriptor COLLECTOR'S NOTES, 2.31)
- 2.13 NUMBER OF PLANTS SAMPLED (2.13)
- 2.14 NUMBER OF PODS COLLECTED
- 2.15 WEIGHT OF SEED COLLECTED [g]

## 2.16 TYPE OF SAMPLE

- 1 Vegetative
- 2 Seed
- 3 Vegetative and seed
- 4 Tissue culture
- 5 Pure line
- 6 Balanced population
- 7 Mixture of different types
- 8 Segregating population
- 9 Other (specify in the descriptor COLLECTOR'S NOTES, 2.31)

## 2.17 HERBARIUM SPECIMEN (2.23)

Was a herbarium specimen collected? If so, provide an identification number in the descriptor COLLECTOR'S NOTES, 2.31

- 0 No
- + Yes

## 2.18 FREQUENCY OF ACCESSION AT COLLECTION SITE (2.19)

- 1 Rare
- 3 Occasional
- 5 Frequent
- 7 Abundant
- 9 Very abundant

## 2.19 CULTURAL PRACTICES (2.18)

- 1 Rainfed
- 2 Irrigated
- 3 Flooded
- 4 River banks
- 5 Transplanted
- 6 Other (specify in the descriptor COLLECTOR'S NOTES, 2.31)

## 2.20 CROPPING SYSTEM (2.20)

- 1 Monoculture
- 2 Mixed with cereals (specify crop)
- 3 Mixed with legumes (specify crop)
- 4 Mixed with other (specify crop)

## 8 DESCRIPTORS FOR CHICKPEA

### 2.21 PLANT POPULATION DENSITY (2.21)

- 3 Low
- 5 Medium
- 7 High

### 2.22 LOCAL/VERNACULAR NAME (2.12)

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

### 2.23 ETHNIC GROUP

Name of the tribe of the farmer donating the sample or of the people living in the area of collection

### 2.24 USES OF THE ACCESSION

- 1 Grain
- 2 Flour
- 3 Forage
- 4 Other (specify in the descriptor COLLECTOR'S NOTES, 2.31)

### 2.25 PHOTOGRAPH (2.14)

Was a photograph taken of the accession or habitat at the time of collection? If so, provide an identification number in the descriptor COLLECTOR'S NOTES, 2.31

- 0 No
- + Yes

### 2.26 COLLECTION SOURCE ENVIRONMENT

2.26.1 Growing period (state months)

2.26.2 Maturity

2.26.3 Vigour

2.26.4 Uniformity/homogeneity of population sampled

- 1 Highly uniform
- 9 Highly variable

2.26.5 Topography (2.15)

- 1 Swamp
- 2 Flood plain
- 3 Plain level
- 4 Undulating
- 5 Hilly
- 6 Mountainous
- 7 Other (specify in the descriptor COLLECTOR'S NOTES, 2.31)

2.26.6 Soil fertility

- 3 Poor
- 7 Good

2.26.7 Soil pH

Actual value of the soil in the root zone around the accession

2.26.8 Soil moisture

- 3 Low
- 7 High

2.26.9 Soil texture (2.17)

- 1 Highly organic
- 2 Clay
- 3 Clay silt
- 4 Silt
- 5 Silt sand
- 6 Sandy
- 7 Sandy loam
- 8 Loam
- 9 Gravelly

2.26.10 Soil drainage (2.18)

- 3 Poor
- 7 Good

## 10 DESCRIPTORS FOR CHICKPEA

### 2.27 CLIMATE OF COLLECTION SITE

2.27.1 Temperature range [°C]

2.27.2 Rainfall range [mm]

2.27.3 Wind [km s<sup>-1</sup>]

2.27.4 Frost

Number of frost-free days during growing season

2.27.5 Light (2.16)

3 Shady

7 Sunny

### 2.28 NODULES COLLECTION

Were nodules collected?

0 No

+ Yes

### 2.29 ASSOCIATED CROPS

Other dominant crop species, found at and around the collection site

### 2.30 PREVAILING STRESSES

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

### 2.31 COLLECTOR'S NOTES (2.24)

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



## CHARACTERIZATION AND PRELIMINARY EVALUATION

### 3. SITE DATA

3.1 COUNTRY (3.1)

(See instructions in COUNTRY OF COLLECTION, 2.4)

3.2 SITE (RESEARCH INSTITUTE) (3.2)

3.2.1 Latitude

(See format under 2.8)

3.2.2 Longitude

(See format under 2.9)

3.2.3 Elevation [m]

3.2.4 Name of farm or institute

3.3 EVALUATOR'S NAME AND ADDRESS (3.3)

3.4 SOWING DATE (3.4)

(in the format DDMMYYYY)

3.5 HARVEST DATE (3.5)

(in the format DDMMYYYY)

3.6 EVALUATION ENVIRONMENT

Environment in which characterization/preliminary evaluation was carried out

1 Field (specify in the descriptor NOTES, 3.19)

2 Screenhouse

3 Glasshouse

4 Laboratory

5 Other (specify in the descriptor NOTES, 3.19)

3.7 PERCENTAGE SEED GERMINATION [%]

## 12 DESCRIPTORS FOR CHICKPEA

### 3.8 PERCENTAGE FIELD ESTABLISHMENT [%]

### 3.9 NUMBER OF DAYS TO 50% FIELD EMERGENCE

### 3.10 SOWING SITE IN FIELD

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

### 3.11 FIELD SPACING

3.11.1 Distance between plants in a row [cm]

3.11.2 Distance between rows [cm]

### 3.12 SOIL TEXTURE

- 1 Highly organic
- 2 Clay
- 3 Clay silt
- 4 Silt
- 5 Silt sand
- 6 Sandy
- 7 Sandy loam
- 8 Loam
- 9 Gravelly

### 3.13 SOIL pH

Actual value of the soil in the root zone around the accession

### 3.14 SOIL TAXONOMIC CLASSIFICATION

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

### 3.15 WATERING

- 1 Irrigated
- 2 Rainfed
- 3 Both/alternate

## 3.16 FERTILIZER

(Specify name and dose)

## 3.17 PLANT PROTECTION

(Specify pesticides used and dose of each)

## 3.18 CLIMATE (during growing season)

3.18.1 Temperature range [°C]3.18.2 Heat unit during crop season3.18.3 Rainfall range [mm]3.18.4 Sunshine hours

## 3.19 NOTES

Any other site-specific information

**4. PLANT DATA**

## 4.1 VEGETATIVE

4.1.1 Plant pigmentation (4.1.2)

- 1 No anthocyanin, stems and leaves pale green
- 3 No anthocyanin, stems and leaves green
- 5 Low anthocyanin, stems and leaves partly light purple
- 7 High anthocyanin, stems and leaves predominantly purple
- 9 Highly purple

4.1.2 Plant hairiness (4.1.3)

Hairs (including glandular ones) on stems, leaves and pods

- 3 Lightly pubescent
- 5 Pubescent
- 7 Densely pubescent

4.1.3 Leaf type

- 1 Normal (uni-imparipinnate)
- 2 Simple (leaf lamina not differentiated into leaflet and rachis)
- 3 Multipinnate (leaf lamina differentiated more than once)

4.1.4 Number of leaflets per leaf (4.1.4)

- 1 5-7
- 2 7-9
- 3 9-11
- 4 11-13
- 5 >13

4.2 INFLORESCENCE AND FRUIT

4.2.1 Days to 50% flowering (4.2.1)

From sowing (or first rain sufficient for germination under rainfed conditions) to the stage when 50% of plants have begun to flower

4.2.2 Days to maturity (4.2.4)

From sowing (or first rain sufficient for germination under rainfed conditions) to the stage when over 90% of pods have matured and turned yellow

4.2.3 Number of seeds per pod (4.2.8)

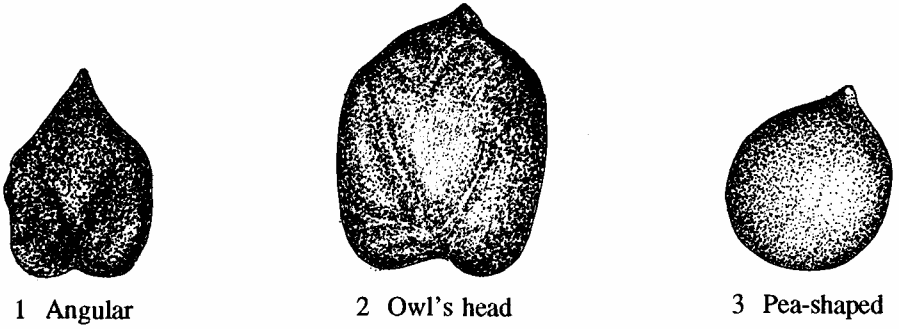
Mean of 10 pods each from 5 representative plants. At maturity

4.2.4 Flower colour (4.2.2)

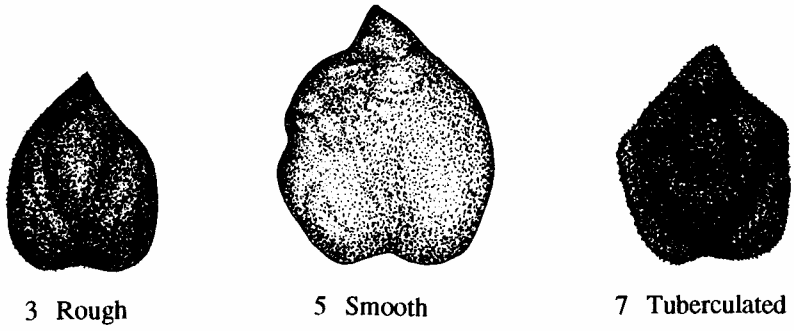
In most cases pink and blue flowers have veins of a darker shade in the flag, while the tip of the keel is also darker. The classes are ranges rather than only the shades of the reference colours. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

- 1 Blue (violet-blue group 97B)
- 2 Light blue (violet-blue group 97C)
- 3 Dark pink (red-purple group 64D)
- 4 Pink (red-purple group 63D)
- 5 Light pink (red-purple group 69C)
- 6 White (white group 155D)
- 7 White-pink striped (white group 155D, red-purple group 63D)

- 4.2.5 Number of flowers and pods per peduncle (4.2.5)
- 1 Single pod per peduncle
  - 2 Twin pods - at least 10% of the peduncles bear two pods
- 4.2.6 Pod length [mm] (4.2.6)
- 3 Short (<15 mm)
  - 5 Medium (15-20 mm)
  - 7 Long (>20 mm)
- 4.2.7 Pod dehiscence (4.2.9)
- At maturity
- 1 <10% dehiscence
  - 2 >10% dehiscence
- 4.2.8 Number of pods per plant (4.2.7)
- Mean of 5 representative plants
- 4.3 SEED
- 4.3.1 Seed shape (4.3.3)
- See Fig. 1
- 1 Angular, ram's head (most desi cultivars)
  - 2 Irregular rounded, owl's head (most kabuli cultivars)
  - 3 Pea-shaped, smooth round
- 4.3.2 Testa texture (4.3.4)
- See Fig. 2
- 3 Rough
  - 5 Smooth
  - 7 Tuberculated



**Fig. 1. Seed shape**



**Fig. 2. Testa texture**

4.3.3 Seed colour (4.3.1)

Observed from mature seeds stored not longer than 5 months. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

- 1 Black (black group 202A, 202B; brown group 200A)
- 2 Brown (greyed-orange group 177B)
- 3 Light brown (greyed-orange group 177C)
- 4 Dark brown (greyed-orange group 177A)
- 5 Reddish brown (greyed-orange group 166C)
- 6 Greyish brown (brown group 200D)
- 7 Salmon brown (greyed-orange group 165C)
- 8 Grey (greyed-green group 196A)
- 9 Brown beige (greyed-orange group 173D)
- 10 Beige (greyed-orange group 165D)
- 11 Yellow (greyed-orange group 164B)
- 12 Light yellow (greyed-orange group 164C)
- 13 Yellow brown (greyed-orange group 165C)
- 14 Orange yellow (greyed-orange group 168D)
- 15 Orange (greyed-orange group 168C)
- 16 Yellow beige (orange-white group 159C)
- 17 Ivory white (orange-white group 159C)
- 18 Green (greyed-green group 191A; grey group 201A; greyed-orange group 166B)
- 19 Light green (greyed-green group 193B)
- 20 Variegated
- 21 Black brown mosaic (black group 202A; greyed-orange group 177E)

4.3.4 Absence/presence of minute black dots (4.3.2)

- 0 Absent
- + Present

4.3.5 100-seed weight [g] (4.3.5)

Measured at 10% (air-dry) moisture content

## FURTHER CHARACTERIZATION AND EVALUATION

### 5. SITE DATA

5.1 COUNTRY (5.1)

(See instructions in COUNTRY OF COLLECTION, 2.4)

5.2 SITE (RESEARCH INSTITUTE) (5.2)

5.2.1 Latitude

(See format under 2.8)

5.2.2 Longitude

(See format under 2.9)

5.2.3 Elevation [m]

5.2.4 Name of farm or institute

5.3 EVALUATOR'S NAME AND ADDRESS (5.3)

5.4 SOWING DATE (5.4)

(in the format DDMMYYYY)

5.5 HARVEST DATE (5.5)

(in the format DDMMYYYY)

5.6 EVALUATION ENVIRONMENT

Environment in which further characterization and evaluation was carried out

- 1 Field (specify in the descriptor NOTES, 5.19)
- 2 Screenhouse
- 3 Glasshouse
- 4 Laboratory
- 5 Other (specify in the descriptor NOTES, 5.19)



5.7 PERCENTAGE SEED GERMINATION [%]

5.8 PERCENTAGE FIELD ESTABLISHMENT [%]

5.9 NUMBER OF DAYS TO 50% GERMINATION

5.10 SOWING SITE IN FIELD

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

5.11 FIELD SPACING

5.11.1 Distance between plants in a row [cm]

5.11.2 Distance between rows [cm]

5.12 SOIL TEXTURE

- 1 Highly organic
- 2 Clay
- 3 Clay silt
- 4 Silt
- 5 Silt sand
- 6 Sandy
- 7 Sandy loam
- 8 Loam
- 9 Gravelly

5.13 SOIL pH

Actual value of the soil in the root zone around the accession

5.14 SOIL TAXONOMIC CLASSIFICATION

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

5.15 WATERING

- 1 Irrigated
- 2 Rainfed
- 3 Both/alternate

## 20 DESCRIPTORS FOR CHICKPEA

### 5.16 FERTILIZER

(Specify name and dose)

### 5.17 PLANT PROTECTION

(Specify pesticides used and dose of each)

### 5.18 CLIMATE

5.18.1 Temperature range [°C]

5.18.2 Heat unit during crop season

5.18.3 Rainfall range [mm]

5.18.4 Sunshine hours

### 5.19 NOTES

Any other site-specific information

## 6. PLANT DATA

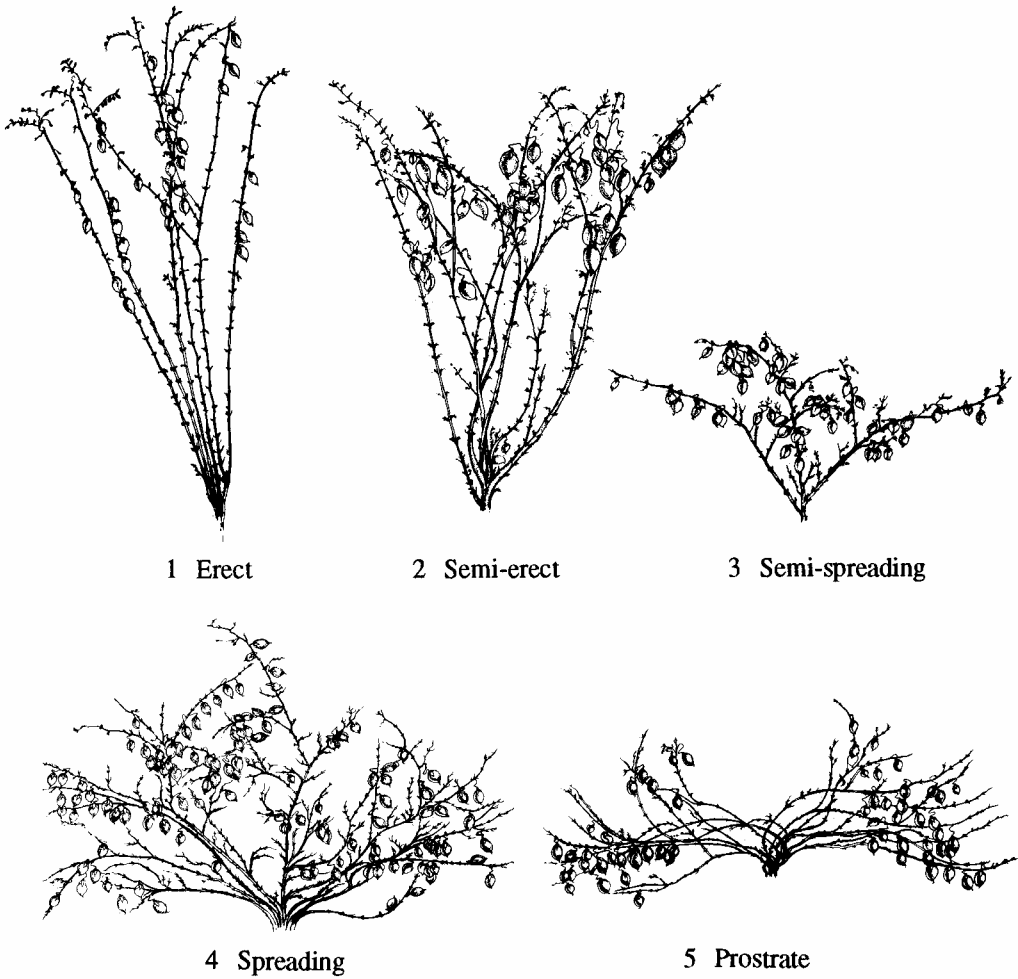
Unless otherwise noted, descriptors should be evaluated at plant flowering/maturity

### 6.1 VEGETATIVE

6.1.1 Growth habit (4.1.1)

Angle of primary branches, recorded at mid-pod filling stage. See Fig. 3

- 1 Erect (0-15° from vertical)
- 2 Semi-erect (16-25° from vertical)
- 3 Semi-spreading (26-60° from vertical)
- 4 Spreading (61-80° from vertical)
- 5 Prostrate (branches flat on the ground)



**Fig. 3. Growth habit**

6.1.2 Leaflet size [mm]

(4.1.5)

Size of basal pair of leaflets. Average of 10 fully grown representative leaves at the fifth leaf from the top

- 1 Small (<10 mm long, <4 mm wide)
- 2 Medium (10-15 mm long, 4-12 mm wide)
- 3 Large (>15 mm long, >12 mm wide)

6.1.3 Leaf area [cm<sup>2</sup>] (4.1.6)

Average leaf area of 5 representative leaves (1 from each of the 5 plants)

- 1 Small (<13 cm<sup>2</sup>)
- 2 Medium (13-16 cm<sup>2</sup>)
- 3 Large (>16 cm<sup>2</sup>)

6.1.4 Number of branches (4.1.7)

6.1.4.1 Basal primary (4.1.7.1)

6.1.4.2 Basal secondary (4.1.7.2)

6.1.4.3 Apical primary (4.1.7.3)

6.1.4.4 Apical secondary (4.1.7.4)

6.1.4.5 Tertiary (4.1.7.5)

6.1.5 Plant canopy height [cm] (4.1.8)

Mean canopy height of 5 representative plants. At the end of flowering.

6.1.6 Plant canopy width [cm] (4.1.9)

Average spread of 5 representative plants. At the end of flowering measured from the soil surface

6.2 INFLORESCENCE AND FRUIT

6.2.1 Flower duration (4.2.3)

Days between 50% flowering and the end of flowering in 50% of the plants

6.2.2 Yield

6.2.2.1 Biological yield [kg ha<sup>-1</sup>] (4.2.10)

Total weight of hand-pulled plants at harvest (maturity)

6.2.2.2 Grain yield [kg ha<sup>-1</sup>] (4.2.11)

## 6.3 SEED

6.3.1 Quality characteristics6.3.1.1 Protein content [% DW]

Whole seed crude protein using the dyebinding method or automatic protein analyser

6.3.1.2 Dhal milling [%] (8.2)

After milling (dehusked split peas)

6.3.1.3 Cookability of dhal (8.3)

Increase in volume (v/v) after soaking for 24 h and boiling for 25 min

6.3.1.4 Cookability of dry seeds (8.4)

Increase in volume (v/v) after soaking for 24 h and boiling for 25 min or if possible, run a regular test and determine the actual cooking time for dry seed without soaking

## 7. 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

## 7.1 REACTION TO LOW TEMPERATURE (7.4)

7.1.1 Seedling emergence7.1.2 Susceptibility to cold (whole plant) (7.4.1)7.1.3. Frost damage (7.4.2)

- 7.2 REACTION TO HIGH TEMPERATURE (HEAT) (7.3.1)
- 7.3 REACTION TO ALUMINIUM TOXICITY
- 7.4 REACTION TO LOW IRON (7.5)
- 7.5 REACTION TO DROUGHT (7.1)
- 7.6 REACTION TO LOW SEEDBED MOISTURE CONDITIONS (7.2)
- 7.7 REACTION TO ALKALINE SOILS (7.6)
- 7.8 NOTES

Specify here any additional information

## 8. BIOTIC STRESS SUSCEPTIBILITY

In each case, it is important to state the origin of the infestation or infection, i.e. natural, field inoculation, laboratory. Record such information in the NOTES descriptor, 8.9. 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

### 8.1 FOLIAR DISEASES

	<b>Causal organism</b>	<b>Disease or common name</b>
8.1.1	<u><i>Alternaria alternata</i> (Fr.) Kiessler</u>	Alternaria blight (6.2.1)
8.1.2	<u><i>Ascochyta rabiei</i> (Pass.) Labr.</u>	Ascochyta blight (6.2.2)
8.1.3	<u><i>Botrytis cinerea</i> Pers. ex Fr.</u>	Grey mould (6.2.3)
8.1.4	<u><i>Fusarium oxysporum</i> Schlecht. emend. Snyder &amp; Hans. f. sp. <i>ciceri</i> (Padwick) Snyder &amp; Hans.</u>	Fusarium wilt (6.2.4)

	Causal organism	Disease or common name
8.1.5	<u><i>Phytophthora megasperma</i> Drechs.</u>	Phytophthora blight (6.2.7)
8.1.6	<u><i>Uromyces ciceris-arietini</i> (Grogn.) Jacz &amp; Beyer</u>	Rust (6.2.13)
8.2	SEED AND SEEDLING DISEASES	
8.2.1	<u><i>Pythium ultimum</i> Trow.</u>	Damping off (6.2.8)
8.2.2	<u><i>Stemphylium sarciniforme</i> (Cav.) Wilts.</u>	Stemphylium blight (6.2.12)
8.2.3	<u><i>Xanthomonas cassiae</i> Kulkarni et al.</u>	Seedling rot (6.3.1)
8.3	ROOT AND STEM ROT	
8.3.1	<u><i>Fusarium solani</i> (Mart.) Sacc.</u>	Root rot (6.2.5)
8.3.2	<u><i>Operculella padwickii</i> Kheswalla</u>	Foot rot (6.2.6)
8.3.3	<u><i>Rhizoctonia bataticola</i> (Taub.) Butler</u>	Dry root rot (6.2.9)
8.3.4	<u><i>Sclerotinia sclerotiorum</i> (Lib.) de Bary</u>	Stem rot (6.2.10)
8.3.5	<u><i>Sclerotium rolfsii</i> Sacc.</u>	Collar rot (6.2.11)
8.4	VIRAL AND MYCOPLASMA DISEASES	
8.4.1	<u>Bean (pea) leafroll virus (Luteovirus)</u>	Chickpea stunt (6.4.1)
8.5	ROOT, FOLIAGE AND STEM FEEDING INSECTS	
8.5.1	<u><i>Metopina ciceri</i> Disney</u>	Nodule damaging flies
8.5.2	<u><i>Agrotis ipsilon</i> Hufnagel, etc.</u>	Cutworm (6.1.2)
8.5.3	<u><i>Liriomyza cicerina</i> (Rondani)</u>	Leaf miner (6.1.3)
8.5.4	<u><i>Aphis craccivora</i> (Koch)</u>	Aphids

8.6 STEM, FLOWER AND POD FEEDING INSECTS

<b>Causal organism</b>	<b>Disease or common name</b>
8.6.1 <u><i>Helicoverpa armigera</i> (Hübner)</u>	Pod borer (6.1.1)

8.7 STORAGE INSECTS

8.7.1 <u><i>Callosobruchus chinensis</i> (L.)</u> <u><i>C. maculatus</i> (F.), etc.</u>	Storage bruchid beetles (6.1.4)
--	---------------------------------

8.8 NEMATODES

8.8.1 <u><i>Meloidogyne incognita</i></u> <u>Kofoid and White) Chitw.</u> <u><i>Meloidogyne javanica</i> (Treub) Chitw.</u> <u><i>Meloidogyne aritiellia</i> Franklin</u>	Rootknot nematode
8.8.2 <u><i>Pratylenchus thornei</i> Sher and Allen</u> <u><i>Pratylenchus zaeae</i> Graham</u>	Root lesion nematode
8.8.3 <u><i>Heterodera ciceri</i> Vovlas, Greco and Di Vito</u>	Cyst nematode

8.9 NOTES

Specify here any additional information

**9. BIOCHEMICAL COMPOSITION**

9.1 PROTEIN CHARACTERIZATION

9.2 ALLOZYME COMPOSITION

9.3 DNA FINGERPRINTING (RFLP/RAPD)

**10. CYTOLOGICAL CHARACTERS AND IDENTIFIED GENES**



## MANAGEMENT

### M1. SEED MANAGEMENT DATA

M1.1 ACCESSION NUMBER (Passport 1.1)

M1.2 POPULATION IDENTIFICATION (Passport 2.2)

Collector's number, pedigree, cultivar name, etc. depending on the population type

M1.3 STORAGE ADDRESS

(building, room, shelf numbers/location in medium and/or long-term storage)

M1.4 STORAGE DATE

(in the format DDMMYYYY)

M1.4.1 Year of harvest

M1.5 GERMINATION AT STORAGE (INITIAL) [%]

M1.6 DATE OF LAST GERMINATION TEST

(in the format DDMMYYYY)

M1.7 GERMINATION AT THE LAST TEST [%]

M1.8 DATE OF NEXT TEST

Date (estimate) when the accession should next be tested (in the format DDMMYYYY)

M1.9 MOISTURE CONTENT AT HARVEST [%]

M1.10 MOISTURE CONTENT AT STORAGE (INITIAL) [%]

M1.11 AMOUNT OF SEED IN STORAGE(S) [g or number]

M1.12 DUPLICATION AT OTHER LOCATION(S)

## M2. MULTIPLICATION/REGENERATION DATA

M2.1 ACCESSION NUMBER (Passport 1.1)

M2.2 POPULATION IDENTIFICATION (Passport 2.2)

Collector's number, pedigree, cultivar name, etc. depending on the population type

M2.3 FIELD PLOT NUMBER

M2.4 LOCATION

M2.5 COLLABORATOR

M2.6 SOWING DATE

(in the format DDMMYYYY)

M2.7 SOWING DENSITY

M2.8 FERTILIZER APPLICATION

M2.9 GERMINATION IN THE FIELD [%]

M2.10 SEEDLING VIGOUR

Assessed 18 days after emergence

M2.11 NUMBER OF PLANTS HARVESTED

M2.12 AGRONOMIC EVALUATION

M2.13 PREVIOUS MULTIPLICATION AND/OR REGENERATION

M2.13.1 Location

M2.13.2 Sowing date

M2.13.3 Plot number

M2.14 OTHERS

A minimum set of characterization descriptors must be evaluated whenever an accession is planted to assist in recognizing/avoiding errors in maintenance of germoplasm

## CONTRIBUTORS

**Prof. L.J.G. van der Maesen**  
Wageningen Agricultural  
University  
P.O. Box 8010  
6700 ED  
The Netherlands

**Dr. R.P.S. Pundir**  
Senior Scientist  
(Germplasm)  
Genetic Resources Program  
ICRISAT  
Patancheru  
Andhra Pradesh 502 324  
India

**Dr. K.B. Singh**  
Principal Scientist  
(Breeding)  
ICRISAT/ICARDA  
Chickpea Project  
P.O. Box 5466  
Aleppo  
Syria

### *Reviewers*

**Dr. Lazlo Holly**  
Legume Germplasm Curator  
ICARDA  
P.O. Box 5466  
Syria

**Dr. M.P. Haware**  
Senior Scientist (Pathology)  
Legumes Program  
ICRISAT  
Patancheru  
Andhra Pradesh 502 324  
India

**Dr. M.H. Mengesha**  
Program Leader  
Genetic Resources Program  
ICRISAT  
Patancheru  
Andhra Pradesh 502 324  
India

**Dr. M. Pimbert**  
Formerly Principal Entomologist  
Legumes Program  
ICRISAT  
Patancheru  
Andhra Pradesh 502 324  
India

**Dr. R.P.S. Pundir**  
Senior Scientist  
(Germplasm)  
Genetic Resources Program  
ICRISAT  
Patancheru  
Andhra Pradesh 502 324  
India

**Dr. V.R. Rao**  
Genetic Diversity Research  
c/o IDRC Regional Office  
7th Floor, RELC Building  
30 Orange Grove Road  
Singapore 1025

**Dr. Mohan C. Saxena**  
Leader  
Legume Program  
ICARDA  
P.O. Box 5466  
Aleppo  
Syria

## ACKNOWLEDGEMENTS

IBPGR, ICRISAT and ICARDA wish to place on record their sincere thanks to the many scientists around the world and particularly to the scientists at ICARDA and ICRISAT who work on chickpeas and who have contributed to the development of the *Descriptors for chickpea* directly or indirectly.

The assistance of ICRISAT Information Management and Exchange Program (IMEP) is gratefully acknowledged.

Ms Adriana Alercia prepared the text for publication, under the coordination of Mr Paul Stapleton. Scientific direction was provided by Dr Mark Perry.

