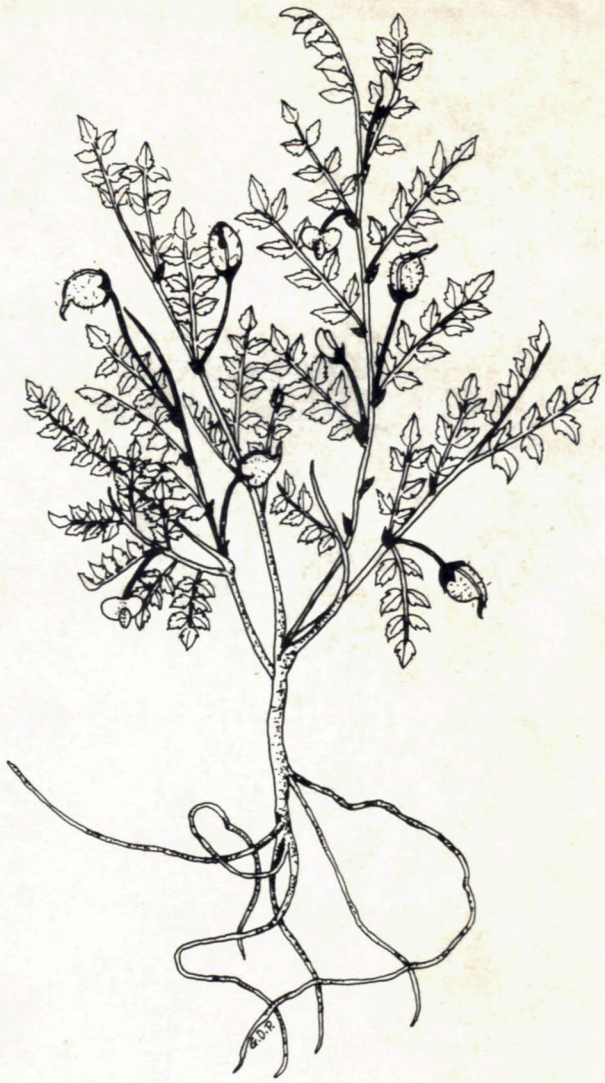

CHICKPEA DESCRIPTORS

INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES
(IBPGR)

INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH IN THE DRY AREAS
(ICARDA)

INTERNATIONAL CROP RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS
(ICRISAT)

CHICKPEA DESCRIPTORS

IBPGR Secretariat
Rome, 1985

The International Board for Plant Genetic Resources (IBPGR), the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Center for Agricultural Research in the Dry Areas (ICARDA) are autonomous international scientific organizations under the aegis of the Consultative Group on International Agricultural Research (CGIAR).

The basic function of the IBPGR is to promote and coordinate an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

The principal objectives of ICARDA are to conduct research into and develop improved cropping, livestock, and cropping-livestock systems; to serve as an international center for the improvement of barley, lentils, and faba beans; to serve as a regional center, in cooperation with other appropriate international agricultural research centers, for the improvement of other major crops in the region, such as wheat and chickpeas; to collaborate with and foster cooperation and communications among other national, regional, and international institutions in the development of adaptation, testing and demonstration of improved crops, farming, and livestock systems; and to provide and foster research and other activities to further its objectives.

ICRISAT serves as a world center for the improvement of grain yield and quality of sorghum, millet, chickpea, pigeonpea, and groundnut; acts as world repository for the genetic resources of these crops; and works to improve farming systems throughout the semi-arid tropics. The Institute's headquarters are at Patancheru, India, near Hyderabad. It is establishing a Sahelian Center at Niamey, Niger and has scientists posted in 9 African countries, Mexico and Syria.

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Plant Production and Protection Division
Food and Agriculture Organization of the United Nations
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March 1985

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CONTENTS

PREFACE

This descriptor list for chickpea (Cicer spp.) is an updating of ICRISAT's "Chickpea Genetic Resources, Introduction of the Descriptors and Data Evaluation", distributed as a pre-publication in 1979 on the occasion of the International Workshop on Chickpea Improvement held from 28 February to 2 March in Hyderabad, India.

The descriptors were prepared at ICRISAT and ICARDA on the basis of classifications widely used by breeders and then refined where needed. The descriptor list has been written by L.J.G. van der Maesen and R.P.S. Pundir (ICRISAT) and K.B. Singh (ICARDA) according to IBPGR standards, following advice on descriptors and descriptor states from many crop experts. ICRISAT, ICARDA and the IBPGR encourage the collection of data on the first four categories of this list: 1. Accession; 2. Collection; 3. and 4. Characterization and preliminary evaluation. The IBPGR endorses the information in categories 1-4 as the minimum that ideally should be available for any one accession. Other descriptors are given in categories 5 onwards that will enable the simple encoding of further characterization and evaluation data and which can serve as examples for the creation of additional descriptors in the IBPGR form by any user.

Although the suggested coding should not be regarded as the definitive scheme, this format has the full backing of the IBPGR and is promoted worldwide. The descriptor list given here provides an international format and thereby produces a universally understood 'language' for all plant genetic resources data. The adoption of this scheme for all data encoding, or at least the production of a transformation method to convert other schemes to the IBPGR format, will produce a rapid, reliable and efficient means for information storage, retrieval and communication. This will greatly assist the utilization of germplasm throughout the international plant genetic resources network. It is recommended, therefore, that information should be produced by closely following this descriptor list with regard to: ordering and numbering descriptors; using the descriptor specified; and using the descriptor states recommended.

Any suggestions for modifications will be welcomed by the IBPGR Secretariat, Rome.

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DESCRIPTOR LIST FOR CHICKPEA

The IBPGR now uses the following definitions in genetic resources documentation:

(i) passport (accession identifiers and information recorded by collectors);

(ii) characterization 1/ (consists of recording those characters which are highly heritable, can be easily 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).

Characterization and preliminary evaluation will be the responsibility of the curators, while further characterization and evaluation should be carried out by the plant breeder. The data from further evaluation should be fed back to the curator who will maintain a data file.

The following internationally accepted norms for the scoring or coding of descriptor states should be followed as indicated below:

(a) measurements are made according to the SI system. The units to be applied are given in square brackets following the descriptor;

(b) many descriptors which are continuously variable are recorded on a 1-9 scale. 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 (Pest and disease susceptibility) 1 = extremely low susceptibility and 8 = high to extremely high susceptibility;

(c) presence/absence of characters are scored as + (present) and 0 (absent);

1/ asterisked in Section 4

(d) for descriptors which are not generally uniform throughout the accession (e.g. mixed collection, genetic segregation) mean and standard deviation could be reported where the descriptor is continuous or mean and 'x' where the descriptor is discontinuous;

(e) when the descriptor is inapplicable, '0' is used as the descriptor value, e.g. if an accession does not form flowers, 0 would be scored for the following descriptor

Flower colour

1 White
2 Yellow
3 Red
4 Purple

(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 Charts for Plant Tissues are strongly recommended for all ungraded colour characters (the precise chart used should be specified in the NOTES descriptor, 11);

(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

This number serves as a unique identifier for accessions and is assigned by the curator when an accession is entered into his 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 occur before the number to identify the genebank or national system (e.g. ICC indicates an accession available at the ICRISAT genebank, ILC indicates an accession available at the ICARDA genebank)

1.2 DONOR NAME

Name of institution or individual responsible for donating the germplasm

1.3 DONOR IDENTIFICATION NUMBER

Number assigned to accession by the donor

1.4 OTHER NUMBERS ASSOCIATED WITH THE ACCESSION (other numbers can be added as 1.4.3 etc.)

Any other identification number known to exist in other collections for this accession, e.g. USDA Plant Inventory number (not collection number, see 2.1)

1.4.1 Other number 1

1.4.2 Other number 2

1.5 SCIENTIFIC NAME

1.5.1 Genus

1.5.2 Species

1.5.3 Subspecies

1.5.4 Botanical variety

1.6 PEDIGREE/CULTIVAR NAME

Nomenclature and designations assigned to breeders' material

1.7 ACQUISITION DATE

The date in which the accession entered the collection

1.8 DATE OF LAST REGENERATION OR MULTIPLICATION

1.9 ACCESSION SIZE

Approximate number of seeds of accession in collection

1.10 NUMBER OF TIMES ACCESSION REGENERATED

Number of regenerations or multiplications since original collection

2. COLLECTION DATA

2.1 COLLECTOR'S NUMBER

Original number assigned by collector 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 always accompany sub-samples wherever they are sent

2.2 COLLECTING INSTITUTE

Institute or person collecting/sponsoring the original sample

2.3 DATE OF COLLECTION OF ORIGINAL SAMPLE

2.4 COUNTRY OF COLLECTION OR COUNTRY WHERE CULTIVAR/VARIETY BRED

Use the 3 letter abbreviations supported by the Statistical Office of the United Nations. Copies of these abbreviations are available from the IBPGR Secretariat and have been published in the FAO/IBPGR Plant Genetic Resources Newsletter number 49

2.5 PROVINCE/STATE

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

2.6 LOCATION OF COLLECTION SITE

Number of kilometres and direction from nearest town, village or map grid reference (e.g. TIMBUKTU7S means 7 km south of Timbuktu)

2.7 LATITUDE OF COLLECTION SITE

Degrees and minutes followed by N (north) or S (south), e.g. 1030S

2.8 LONGITUDE OF COLLECTION SITE

Degrees and minutes followed by E (east) or W (east), e.g. 7625W

2.9 ALTITUDE OF COLLECTION SITE [m]

Elevation above sea level

2.10 COLLECTION SOURCE

1 Wild
2 Farm land
3 Farm store
4 Backyard
5 Village market
6 Commercial market
7 Institute
8 Other (specify in the NOTES descriptor, 9)

2.11 STATUS OF SAMPLE

1 Wild
2 Weedy
3 Breeder's line
4 Primitive cultivar/landrace
5 Advanced cultivar (bred)
6 Other (specify in the NOTES descriptor, 9)

2.12 LOCAL/VERNACULAR NAME

Name given by farmer to cultivar/landrace/weed

2.13 NUMBER OF PLANTS SAMPLED

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

2.14 PHOTOGRAPH

Was a photograph taken of the accession or environment at collection? If so, provide any identification in the NOTES descriptor, 9

0 No
\+ Yes

2.15 TOPOGRAPHY OF COLLECTION SITE

1 Swamp
2 Flood plain
3 Plain level
4 Undulating
5 Hilly
6 Mountainous
7 Other (specify in the NOTES descriptor, 9)

2.16 LIGHT AT COLLECTION SITE

3 Shady
7 Sunny

2.17 SOIL TEXTURE AT COLLECTION SITE

1 Organic
2 Clay
3 Loamy
4 Sandy
5 Rocky

2.18 SOIL DRAINAGE AT COLLECTION SITE

3 Poor
7 Good

2.19 FREQUENCY AT COLLECTION SITE

Frequency of occurrence of the collected species

1 Rare
3 Occasional
5 Frequent
7 Abundant
9 Very abundant

2.20 IF UNDER CULTIVATION: CROP

1 Monoculture
2 Mixed with cereals
3 Mixed with oilseeds
4 Other (specify in the NOTES descriptor, 9)

2.21 IF UNDER CULTIVATION: DENSITY, PLANT POPULATION

3 Low
7 High

2.22 PESTS AND DISEASES OF COLLECTION SAMPLE

Specify, using item numbers of pests and diseases (Section 6) and severity of infection on a 1-9 scale. '0' indicates that sample has no pests or diseases

2.23 HERBARIUM SPECIMEN

In regard to collection of wild Cicer sp., specify if a herbarium sample was collected

0 No
+ Yes

2.24 OTHER NOTES FROM COLLECTOR

Collectors will record ecological information. For cultivated crops, cultivation practices such as irrigation, season of sowing, etc. will be recorded

CHARACTERIZATION AND PRELIMINARY EVALUATION

3. SITE DATA

3.1 COUNTRY OF CHARACTERIZATION AND PRELIMINARY EVALUATION

3.2 SITE (RESEARCH INSTITUTE)

3.3 NAME OF PERSON IN CHARGE OF CHARACTERIZATION

3.4 SOWING DATE

3.5 HARVEST DATE

4. PLANT DATA

4.1 VEGETATIVE

4.1.1 Growth habit

Angle of primary branches, evaluated in the sixth week after sowing

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

4.1.2 Plant pigmentation (*)

1 No anthocyanin, stems and leaves pale green
2 No anthocyanin, stems and leaves green
3 Weak anthocyanin, stems and leaves partly light purple
4 Strong anthocyanin, stems and leaves predominantly purple

4.1.3 Plant hairness (*)

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

3 Hairs almost absent
5 Pubescent
7 Densely pubescent

4.1.4 Number of leaflets per leaf (*)

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

4.1.5 Leaflet size

Size of basal pair of leaflets. Average of 10 fully grown leaves randomly chosen

3	Small:	< 10 mm long,	< 4 mm wide
5	Medium:	10-15 mm long,	4-12 mm wide
7	Large:	> 15 mm long,	>12 mm wide

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* See footnote on page 1

4.1.6 Leaf area

Average leaf area of 3 compound leaves (1 from each of the 3 plants)

1 Small: < 13 cm^2
2 Medium: 13-16 cm^2
3 Large: > 16 cm^2

4.1.7 Branch number

4.1.7.1 Number of basal primary branches

4.1.7.2 Number of basal secondary branches

4.1.7.3 Number of apical primary branches

4.1.7.4 Number of apical secondary branches

4.1.7.5 Number of apical tertiary branches

4.1.8 Plant canopy height [cm]

At the end of flowering. Mean of 5 randomly selected plants

4.1.9 Plant canopy width [cm]

Average spread of 3-5 plants at maximum growth

4.2 INFLORESCENCE AND FRUIT

4.2.1 Days to 50% flowering

From sowing to the stage when 50% of plants have begun to flower

4.2.2 Flower colour (*)

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. Reference colours from the Royal Horticultural Society in brackets

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

4.2.3 Flowering duration

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

4.2.4 Days to maturity

From sowing to the stage when all plants have mature pods

4.2.5 Number of flowers and pods (*) per peduncle

Number of flowers and pods of majority of peduncles

4.2.6 Pod size (*)

3 Small: < 15 mm length
5 Medium: 15-20 mm length
7 Large: > 20 mm length

4.2.7 Number of pods per plant (*)

Mean from 5 plants randomly selected

4.2.8 Number of seeds per pod

Mean from 5 plants randomly selected.
Recorded at maturity

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* See footnote on page 1

4.2.9 Pod dehiscence

Recorded at the time of maturity

0 no dehiscence
1 < 10% dehiscence
2 10% dehiscence

4.2.10 Biological yield [kg/ha]

4.2.11 Grain yield [kg/ha]

4.3 SEED

4.3.1 Seed colour (*)

Observed from mature seeds stored not longer than 5 months. Reference colours from the Royal Horticultural Society in brackets

1 Black (Black 202 A, B, Brown 200 A)
2 Brown (Greyed orange 177 B)
3 Light brown (Greyed orange 177 C)
4 Dark brown (Greyed orange 177 A)
5 Reddish brown (Greyed orange 166 C)
6 Greyish brown (Brown 200 D)
7 Salmon brown (Greyed orange 165 C)
8 Grey (Greyed green 196 A)
9 Brown beige (Greyed orange 173 D)
10 Beige (Greyed orange 165 D)
11 Yellow (Greyed orange 164 B)
12 Light yellow (Greyed orange 164 C)
13 Yellow brown (Greyed orange 165 C)
14 Orange yellow (Greyed orange 168 D)
15 Orange (Greyed orange 168 C)
16 Yellow beige (Orange-white 159 B)
17 Ivory white (Orange-white 159 C)
18 Green (Greyed green 191 A, Grey 201 A) Greyed orange 166 B)
19 Light green (Greyed green 193 B, Greyed orange 174 D)
20 Variegated
21 Black brown mosaic (Black 202 A, Greyed orange 177 E)

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* See footnote on page 1

4.3.2 Presence of minute black dots (*)

0 Absent
+ Present

4.3.3 Seed shape (*)

1 Angular, ram's head (most desi cultivars)
2 Irregular rounded, brain shaped, (most kabuli cultivars)
3 Pea-shaped, smooth rounded

4.3.4 Testa texture (*)

1 Rough
2 Smooth
3 Tuberculated

4.3.5 100 seed weight [g]

Measured at moisture content ca 8% (air-dry)

FURTHER CHARACTERIZATION AND EVALUATION

5. SITE DATA

5.1 COUNTRY OF FURTHER CHARACTERIZATION AND EVALUATION

5.2 SITE (RESEARCH INSTITUTE)

5.3 NAME OF PERSON(S) IN CHARGE OF EVALUATION

5.4 SOWING DATE

5.5. HARVEST DATE

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* See footnote on page 1

6. PEST AND DISEASE SUSCEPTIBILITY

Scored for natural infection or infestation on a 1-9 scale, under unsprayed conditions

0 Immunity
1 Extremely low susceptibility
3 Low susceptibility
5 Moderate susceptibility
7 High susceptibility
9 Extremely high susceptibility

6.1 PESTS

6.1.1	Helionthis armigera, etc.	Pod borer
6.1.2	Agrotis ypsilon, etc.	Cutworm
6.1.3	Liriomyza cicerina	Leaf miner
6.1.4	Callosobruchus chinensis C. maculatus, etc.	Storage bruchid beetles

6.2 FUNGI

6.2.1	Alternaria alternata	Alternaria blight
6.2.2	Ascochyta rabiei	Ascochyta blight
6.2.3	Botrytis cinerea	Grey mould
6.2.4	Fusarium oxysporum f. sp. ciceri	Fusarium wilt
6.2.5	Fusarium solani	Root rot
6.2.6	Operculella padwickii	Foot rot
6.2.7	Phytophtora megasperma	Phytophtora blight
6.2.8	Pythium ultimum	Damping off
6.2.9	Rhizoctonia bataticola	Dry root rot
6.2.10	Sclerotinia sclerotiorum	Stem rot
6.2.11	Sclerotium rolfsii	Collar rot
6.2.12	Stemphylium sarciniforme	Stemphylium blight
6.2.13	Uromyces ciceris-arietini	Rust

6.3 BACTERIA

6.3.1 Xanthomonas cassiae — Seedling rot

6.4 VIRUS AND MYCOPLASM

6.4.1 Chickpea stunt — Pea leafroll virus

6.5 NEMATODES

7. STRESS SUSCEPTIBILITY

Scored on a 1-9 scale:

3 Low susceptibility
5 Medium susceptibility
7 High susceptibility

7.1 DROUGHT

7.2 LOW SEEDBED MOISTURE CONDITIONS

7.3 HIGH TEMPERATURES

7.3.1 Susceptibility to heat

1 Highly tolerant
3 Tolerant
5 Moderately tolerant
7 Susceptible
9 Highly susceptible

7.4 LOW TEMPERATURES

7.4.1 Susceptibility to cold

1 Highly tolerant
3 Tolerant
5 Moderately tolerant
7 Susceptible
9 Highly susceptible

7.4.2 Susceptibility to frost

1 Highly tolerant
3 Tolerant
5 Moderately tolerant
7 Susceptible
9 Highly susceptible

7.5 SUSCEPTIBILITY TO IRON DEFICIENCY

1 Tolerant
5 Intermediate
9 Susceptible

7.6 SALINE - ALKALINE SOILS

8. QUALITY ANALYSES

8.1 PROTEIN CONTENT [%]

Whole seed crude protein percentage measured by the dyebinding method or Autotechnicon Analyses on dry weight basis

8.2 DHAL MILLING [%]

Percentage of dhal (dehusked spilt peas) after milling

8.3 COOKABILITY OF DHAL

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

8.4 COOKABILITY OF DRY SEEDS

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

9. NOTES

Give additional information where the descriptor state is noted "Other", e.g. 2.20, and any further relevant information such as upright or stiff pod pedicel, mutant leaf shape (simple, multipinnate); leaflet shape (normal = elliptic, or spatulate, hastate, etc.), unusual number of leaflets. Temperature records of the evaluation site are also appropriate here

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CHICKPEA DESCRIPTORS.

REF
635.657.001.3 26516
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