

# DESCRIPTORS FOR PIGEONPEA

[*Cajanus cajan* (L.) Millsp.]



# DESCRIPTORS FOR PIGEONPEA

[*Cajanus cajan* (L.) Millsp.]

IBPGR/CRISAT  
ROME 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-arids 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)

#### Citation

IBPGR and ICRISAT. 1993. Descriptors for pigeonpea [*Cajanus cajan* (L.) Millsp.]. International Board for Plant Genetic Resources, Rome, Italy; International Crops Research Institute for the Semi-Arid Tropics, Patancheru, India

ISBN 92-9043-138-5

IBPGR  
Via delle Sette Chiese 142  
00145 Rome  
Italy

ICRISAT  
Patancheru  
Andhra Pradesh 502 324  
India

Printed at ICRISAT, Patancheru, India

Copyright. International Board for Plant Genetic Resources, 1993

# CONTENTS

PREFACE	iv
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	15
4.3 Seed	18
FURTHER CHARACTERIZATION AND EVALUATION	20
5. Site data	20
6. Plant data	22
7. Abiotic stress susceptibility	23
8. Biotic stress susceptibility	24
9. Biochemical composition	26
10. Cytological characters and identified genes	26
MANAGEMENT	27
M1. Seed management data	27
M2. Multiplication/regeneration data	28
CONTRIBUTORS	29
ACKNOWLEDGEMENTS	31

## PREFACE

*Descriptors for pigeonpea [Cajanus cajan (L.) Millsp.]* is a revision of the original IBPGR and ICRISAT publication *Descriptors for pigeonpea* (1981) which was based on the work of an International Workshop on Pigeonpeas held in 1980 at ICRISAT. The current list has been revised by IBPGR and ICRISAT. The descriptors from the 1981 list are cross-referenced with the current list with the descriptor numbers in parentheses beside the current descriptor.

IBPGR encourages the collection of data on the first four categories of this list: 1. Accession; 2. Collection; 3. and 4. Characterization and Preliminary Evaluation. IBPGR endorses the information in categories 1-4 as the minimum that ideally should be available for any one accession. Descriptors given in categories 5 onwards enable the encoding of further characterization and evaluation data and can serve as examples to create additional descriptors in the IBPGR form. Management descriptors are intended for curators of germplasm collections and may act as guidelines for the management of accessions in medium- and long-term storage and for their multiplication/regeneration.

Although the suggested coding should not be regarded as the definitive scheme, this format has the full backing of IBPGR and is promoted worldwide. This descriptor list serves as an international format and thereby produces a universally understood 'language' for all plant genetic resources data. By adopting this scheme to encode data, or producing a method of transformation for converting other schemes to the IBPGR format, a rapid, reliable and efficient means of information storage, retrieval and communication will be produced. This will assist the utilization of germplasm throughout the international plant genetic resources network. It is recommended that data be produced by using this descriptor list's descriptors and descriptor states, with the original order and numbering.

Any suggestions for modifications will be welcomed by IBPGR and ICRISAT.

## 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 PIGEONPEA

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 throughout the 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 it 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 (1.5)

Name of institution or individual responsible for donating the germplasm

### 1.3 DONOR NUMBER (1.6)

Number assigned to accession by the donor

### 1.4 OTHER NUMBER(S) ASSOCIATED WITH THE ACCESSION (1.7)

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

#### 1.4.2 Other number 2

### 1.5 SCIENTIFIC NAME (1.2)

#### 1.5.1 . Genus (1.2.1)

#### 1.5.2 Species (1.2.2)

#### 1.5.3 Subspecies (1.2.3)



## **4 DESCRIPTORS FOR PIGEONPEA**

### **1.6 PEDIGREE**

Parentage, or nomenclature and designations assigned to breeders' material

### **1.7 CULTIVAR NAME**

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

### **1.8 ACQUISITION DATE**

Date on which the accession entered the collection (in the format DDMMYYYY)

### **1.9 DATE OF LAST REGENERATION OR MULTIPLICATION (1.3)**

(in the format DDMMYYYY)

### **1.10 ACCESSION SIZE**

Approximate number or weight of seeds of an accession in the genebank

### **1.11 NUMBER OF TIMES ACCESSION REGENERATED (1.4)**

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) (2.1)**

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

## 2.2 COLLECTOR'S NUMBER (2.2)

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 (2.8)

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

## 2.8 LATITUDE OF COLLECTION SITE (2.6)

Degrees and minutes followed by N (North) or S (South) (e.g. 01030S)

## 2.9 LONGITUDE OF COLLECTION SITE (2.7)

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

## 6 DESCRIPTORS FOR PIGEONPEA

### 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, 2.29)

### 2.12 STATUS OF SAMPLE (2.11)

- 1 Wild
- 2 Breeding/research material
- 3 Landrace
- 4 Interspecific derivative
- 5 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

### 2.13 NUMBER OF PLANTS SAMPLED

### 2.14 WEIGHT OF SEED COLLECTED [g]

### 2.15 HERBARIUM SPECIMEN

Was a herbarium specimen collected? If so, provide an identification number in the descriptor COLLECTOR'S NOTES, 2.29

- 0 No  
+ Yes

### 2.16 FREQUENCY OF ACCESSION AT COLLECTION SITE

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

## 2.17 CULTURAL PRACTICES

- 1 Rainfed
- 2 Irrigated
- 3 Flooded
- 4 River banks
- 5 Transplanted
- 6 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

## 2.18 CROPPING SYSTEM

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

## 2.19 PLANT POPULATION, DENSITY

- 3 Low
- 5 Medium
- 7 High

## 2.20 LOCAL/VERNACULAR NAME

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

## 2.21 ETHNIC GROUP

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

## 2.22 USES OF THE ACCESSION

- 1 Grain (dry)
- 2 Fresh whole pods
- 3 Fresh green seeds
- 4 Flour
- 5 Fodder
- 6 Forage
- 7 Fuel
- 8 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

## 8 DESCRIPTORS FOR PIGEONPEA

### 2.23 PHOTOGRAPH

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, 2.29

- 0 No
- + Yes

### 2.24 COLLECTION SOURCE ENVIRONMENT

2.24.1 Growing period (state months)

2.24.2 Maturity

2.24.3 Vigour

- 3 Low
- 5 Intermediate
- 7 High

2.24.4 Topography

- 1 Swamp
- 2 Flood plain
- 3 Plain level
- 4 Undulating
- 5 Hilly
- 6 Mountainous
- 7 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.24.5 Soil fertility

- 3 Poor
- 7 Good

2.24.6 Soil pH

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

2.24.7 Soil moisture

- 3 Low
- 7 High

2.24.8 Soil drainage

- 3 Poor
- 7 Good

2.24.9 Soil texture

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

## 2.25 CLIMATE OF COLLECTION SITE

2.25.1 Temperature range [°C]2.25.2 Rainfall range [mm]2.25.3 Wind [km s<sup>-1</sup>]2.25.4 Frost

Number of frost-free days during growing season

2.25.5 Light

- 3 Shady
- 7 Sunny

## 2.26 NODULES COLLECTION

Were nodules collected?

- 0 No
- + Yes

## 10 DESCRIPTORS FOR PIGEONPEA

### 2.27 ASSOCIATED CROPS

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

### 2.28 PREVAILING STRESSES

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

### 2.29 COLLECTOR'S NOTES

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

(See instructions in COUNTRY OF COLLECTION, 2.4)

#### 3.2 SITE (RESEARCH INSTITUTE) (3.1)

##### 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 (3.2)

#### 3.4 SOWING DATE (3.3)

(in the format DDMMYYYY)

#### 3.5 HARVEST DATE (3.4)

(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)



## 12 DESCRIPTORS FOR PIGEONPEA

3.7 PERCENTAGE SEED GERMINATION [%]

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 Growth habit (4.1)

- 1 Erect and compact
- 2 Semi-spreading
- 3 Spreading
- 4 Trailing

4.1.2 Plant height [cm] (5.3)

At maturity

4.1.3 Plant stand

Number of plants at harvest

4.1.4 Number of branches

4.1.4.1 Primary

4.1.4.2 Secondary

4.1.4.3 Tertiary

Branches born on secondary branches

4.1.5 Stem colour (4.2)

Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

- 1 Green (yellow-green group 144B)
- 2 Sun red (greyed-red group 178B)
- 3 Purple (greyed-purple group 183A)
- 4 Dark purple (greyed-purple group 187A)

4.1.6 Stem thickness [mm]

- 3 Thin (<5 mm)
- 5 Intermediate (5-13 mm)
- 7 Thick (>13 mm)

4.1.7 Leaf size [cm<sup>2</sup>]

Area of middle leaflet on a secondary branch

4.1.8 Leaflet shape

- 1 Lanceolate
- 2 Narrow-elliptic
- 3 Broad-elliptic
- 4 Obcordate

4.1.9 Leaf hairiness (lower surface of the leaves)

- 1 Glabrous
- 2 Pubescent

## 4.2 INFLORESCENCE AND FRUIT

4.2.1 Days to 50% flowering (5.1)

From sowing or first irrigation/rainfall to when 50% of plants flower

4.2.2 Duration of flowering

From 50% flowering to end of flowering

4.2.3 Vigour at 50% flowering

- 3 Low
- 5 Intermediate
- 7 High

4.2.4 Days to 75% maturity (5.2)

From sowing or first irrigation/rainfall to 75% maturity

4.2.5 Base flower colour (4.3.1)

Main colour of the petals. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

- 1 Ivory (green-yellow group 1)
- 2 Light yellow (yellow group 6D)
- 3 Yellow (yellow-orange group 14A)
- 4 Orange-yellow (orange-red group 31A)

4.2.6 Second flower colour (4.3.2)

Colour of streaks on dorsal side of the vexillum (flag) and second colour of the wings and keel. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

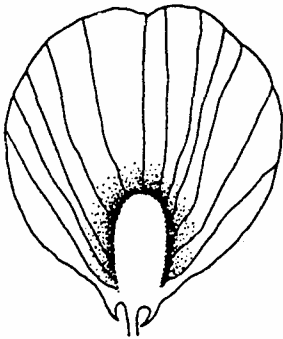
- 1 Red (red group 45A)
- 2 Purple (greyed-purple group 186A)

4.2.7 Pattern of streaks

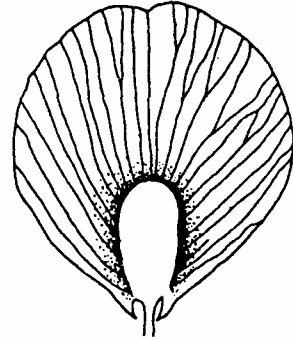
(4.3.3)

Pattern of second colour on the dorsal side of the flag (standard petal). See Fig. 1

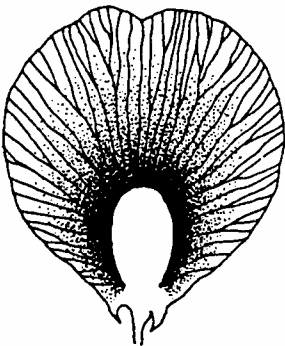
- 3 Sparse streaks
- 5 Medium amount of streaks
- 7 Dense streaks
- 9 Uniform coverage of second colour



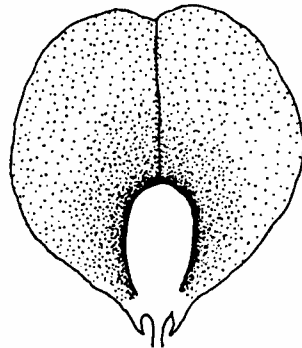
3 Sparse streaks



5 Medium amount of streaks



7 Dense streaks



9 Uniform coverage

**Fig. 1. Pattern of streaks**

4.2.8 Flowering pattern (4.3.4)

- 1 Determinate
- 2 Semi-determinate
- 3 Indeterminate

4.2.9 Raceme number (4.3.5)

Average number of racemes from 3 randomly selected plants in a row

4.2.10 Seeds per pod (5.4)

Average of 10 randomly selected pods from 3 randomly selected plants in a row

4.2.11 Pod colour (4.5)

Main colour of the pod. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

- 1 Green (yellow-green group 144A)
- 2 Purple (greyed-purple group 183A)
- 3 Mixed, green and purple
- 4 Dark purple (greyed-purple group 187A)

4.2.12 Pod form

- 1 Flat
- 2 Cylindrical

4.2.13 Pod hairiness

- 1 Glabrous
- 2 Pubescent

4.2.14 Pod bearing length [cm] (4.4)

Distance between lowest and topmost pod on the plant

4.3 SEED

4.3.1 Seed colour pattern (4.6.1)

See Fig. 2

- 1 Plain
- 2 Mottled
- 3 Speckled
- 4 Mottled and speckled
- 5 Ringed



2 Mottled



3 Speckled



4 Mottled  
and speckled



5 Ringed

**Fig. 2. Seed colour pattern**

4.3.2 Base seed colour (4.6.2)

Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

- 1 White (yellow-white group 158C)
- 2 Cream (greyed-white group 156C)
- 3 Orange (greyed-orange group 163B)
- 4 Light brown (yellow-orange group 22C)
- 5 Reddish-brown (reddish-brown group 200D)
- 6 Light grey (grey-brown group 199B)
- 7 Grey (greyed-green group 197A)
- 8 Purple (greyed-purple group 187A)
- 9 Dark purple (black group 202A)
- 10 Dark grey (black group 202B)

4.3.3 Seed second colour (4.6.3)

Second colour of seed coat coded as in 4.3.2 for base colour

4.3.4 Seed eye colour (4.6.4)

Colour around hilum, coded as in 4.3.2 for base colour

4.3.5 Seed eye width (4.6.5)

- 3 Narrow
- 5 Medium
- 7 Wide

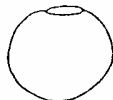
4.3.6 Seed shape (4.6.6)

See Fig. 3

- 1 Oval (egg shaped)
- 2 Globular (pea shaped)
- 3 Square (angular)
- 4 Elongate



1 Oval



2 Globular



3 Square



4 Elongate

**Fig. 3. Seed shape**

4.3.7 Hilum (4.6.7)

Presence of seed strophiole

- 0 Absent
- + Present

4.3.8 100-seed weight [g] (5.5)

Estimated from a random sample taken from total row yield



## FURTHER CHARACTERIZATION AND EVALUATION

### 5. SITE DATA

#### 5.1 COUNTRY

(See instructions in COUNTRY OF COLLECTION, 2.4)

#### 5.2 SITE (RESEARCH INSTITUTE)

##### 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

#### 5.4 SOWING DATE

(in the format DDMMYYYY)

#### 5.5 HARVEST DATE

(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% FIELD EMERGENCE

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

## 22 DESCRIPTORS FOR PIGEONPEA

### 5.16 FERTILIZER

(Specify name and dose)

### 5.17 PLANT PROTECTION

(Specify pesticides used and dose of each)

### 5.18 CLIMATE (during growing season)

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

### 6.1 YIELD (5.6)

Expressed on a 1-9 scale, where

- 3 Low
- 5 Average
- 7 High

#### 6.1.1 Harvest index (5.7)

Ratio of total grain yield and total biological yield taken from 3 randomly selected plants in a row

#### 6.1.2 Shelling percentage [%] (5.8)

Calculated from seed-pod ratio of 3 randomly selected plants in a row

## 6.2 QUALITY CHARACTERISTICS

### 6.2.1 Protein content [%] (8.1)

Whole seed crude protein percentage based on dry weight using the dye-binding method or automatic protein analyzer

### 6.2.2 Dhal milling [%] (8.3)

After milling (dehusked split peas)

### 6.2.3 Cookability of dhal (8.4)

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

### 6.2.4 Cookability of dry seeds (8.5)

Increase in volume (v/v) after soaking for 24 h and boiling for 25 min. 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 REACTON TO LOW TEMPERATURE

### 7.2 REACTION TO HIGH TEMPERATURE

### 7.3 REACTION TO DROUGHT

### 7.4 REACTION TO EXCESS SOIL MOISTURE

### 7.5 REACTION TO SALINITY

### 7.6 REACTION TO SOIL ACIDITY

## 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, 8.6. 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 . INSECT PESTS

	Causal organism	Disease or common name
8.1.1	<u><i>Grapholita critica</i> Meyrick</u>	Leaf tier
8.1.2	<u><i>Megalurothrips usitatus</i> (Bagnall)</u>	Flower thrips
8.1.3	<u><i>Mylabris pustulata</i> Thunberg</u>	Flower beetle
8.1.4	<u><i>Indozocladius asperulus</i> (Faust.)</u>	Bud weevil
8.1.5	<u><i>Clavigralla gibbosa</i> Spinola</u> <u><i>Nezara viridula</i> (L.)</u> <u><i>Anoplocnemis</i> spp.</u>	Pod-sucking bug
8.1.6	<u><i>Helicoverpa armigera</i> (Hun.)</u> <u><i>Etiella zinckenella</i> Treits.</u> <u><i>Maruca testulalis</i> (Geyer.)</u>	Legume pod borer
8.1.7	<u><i>Lampides boeticus</i> (L.)</u> <u><i>Catochrysops strabo</i> (Fabricius)</u>	Blue butterfly
8.1.8	<u><i>Melanagromyza obtusa</i> (Mall.)</u>	Podfly
8.1.9	<u><i>Exelastis atomosa</i> (Wals.)</u>	Plume moth
8.1.10	<u><i>Callosobruchus chinensis</i> (L.)</u>	Bruchid

	<b>Causal organism</b>	<b>Disease or common name</b>
8.1.11	<u>Otinotus oneratus</u> W.	Cow bugs
8.1.12	<u>Empoasca kerri</u> Pruthi	Jassids
8.1.13	<u>Tanaostigmodes cajaninae</u> LaSalle	Pod wasp
8.2	<b>FUNGI</b>	
8.2.1	<u>Phytophthora drechsleri</u> Tucker f.sp. <u>cajani</u> (Pal <i>et al.</i> ) Kannaiyan <i>et al.</i>	Phytophthora blight
8.2.2	<u>Rhizoctonia bataticola</u> (Taub.) Butler <u>(Macrophomina phaseolina</u> (Tassi) Goid.)	Dry root rot
8.2.3	<u>Sclerotium rolfsii</u> Sacc.	Collar rot
8.2.4	<u>Alternaria alternata</u> (Fr.) Keissler	Alternaria blight
8.2.5	<u>Cercospora cajani</u> Hennings <u>(Mycovellosiella cajani</u> (Henn.) Rangel ex. Trotter)	Cercospora leaf spot
8.2.6	<u>Oidiopsis taurica</u> (Lev.) Salmon <u>(Leveillula taurica</u> (Lev.) Arnaud)	Powdery mildew
8.2.7	<u>Fusarium udum</u> Butler <u>(F. oxysporum</u> f.sp. <u>udum</u> )	Wilt
8.3	<b>BACTERIA</b>	
8.3.1	<u>Xanthomonas campestris</u> <u>pv. cajani</u> (Kulkarni <i>et al.</i> ) Dye <i>et al.</i>	Bacterial leaf spot and stem canker
8.4	<b>VIRUSES AND MYCOPLASMA</b>	
8.4.1	<u>Sterility mosaic virus</u>	Sterility mosaic
8.4.2	<u>Witches' broom</u>	Mycoplasma
8.4.3	<u>Yellow mosaic virus</u>	Yellow mosaic

## 8.5 ASSOCIATED NEMATODES

	<b>Causal organism</b>	<b>Disease or common name</b>
8.5.1	<u><i>Heterodera cajani</i> Koshy</u>	Cyst nematode
8.5.2	<u><i>Meloidogyne incognita</i> (Kofoid and White) Chitwood</u>	Root knot nematode
8.5.3	<u><i>Rotylenchus reniformis</i> Linford and Oliveira</u>	Reniform nematode

## 8.6 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)
- M1.5 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 ESTABLISHED

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

## CONTRIBUTORS

Dr. R.P. Ariyanayagam  
Principal Scientist (Breeding)  
Legumes Program  
ICRISAT  
Patancheru 502 324  
Andhra Pradesh  
India

Dr. D.E. Byth  
Program Director  
Cereals Program  
ICRISAT  
Patancheru 502 324  
Andhra Pradesh  
India

Dr. D.N. De  
Professor and Head  
Applied Botany Section  
Indian Institute of Technology  
P.O. Kharagpur II, West Bengal, 721302  
India

Dr. R.B. Deshmukh  
Plant Breeder  
Pulses Improvement Project  
Mahatma Phule Krishi Vidyapeeth  
Rahuri, Dist. Ahmednagar  
Maharashtra  
India

Dr. Laxman Singh  
Systems Agronomist  
CARDI  
c/o Ministry of Agriculture  
Basetterre  
St. Kitts  
West Indies

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

Dr. J.F. Moses Onim  
Project Leader - Pigeonpea Project  
Department of Crop Science  
University of Nairobi  
Kabete Campus, P.O. Box 30197  
Nairobi, 59211  
Kenya

Dr. N. Murthi Anishetty  
Plant Production and Protection Service  
FAO  
Via delle Terme di Caracalla  
00100 Rome  
Italy

Dr. B.P. Pandya  
Head, Dept. of Plant Breeding  
G.B. Pant University of  
Agriculture and Technology  
Pantnagar 263 145  
Dist. Nainital, Uttar Pradesh  
India

Dr. R. Pankaja Reddy  
AICSIP  
IARI Regional Station  
Rajendranagar  
Hyderabad 500 030  
Andhra Pradesh  
India

Dr. L.J. Reddy  
Senior Scientist (Breeding)  
Legumes Program  
ICRISAT  
Patancheru 502 324  
Andhra Pradesh  
India

Dr. W. Reed  
Waterside  
Sherborne Court  
Borton-on-the-Water  
Glos GL 54 2BY  
UK

Dr. P. Remanandan  
Senior Scientist (Germplasm)  
Genetic Resources Program  
ICRISAT  
Patancheru 502 324  
Andhra Pradesh  
India

Dr. D. Sharma  
Plant Breeding Expert  
German Agency for Technical Cooperation  
Agricultural Experiment Station  
Nyankapala P.O. Box 483  
Tamale  
Ghana

Prof. G. Shiva Shankar  
Professor  
Department of Agricultural Botany  
College of Agriculture  
University of Agricultural Sciences  
Hebbal, Bangalore 560 065  
Karnataka  
India

Dr. A.S. Tiwari  
Senior Scientist  
Pulse and Oilseed Project  
Agricultural Research Institute  
Gwalior 474 002  
Madhya Pradesh  
India

## ACKNOWLEDGEMENTS

IBPGR and ICRISAT wish to place on record their sincere thanks to the numerous pigeonpea workers around the world who have contributed to the development of Descriptors for Pigeonpea directly or indirectly.

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

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

