

## Characterization and Preliminary Evaluation

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Characterization and preliminary evaluation of germplasm are the prerequisites for utilization in crop improvement.

### Phenotypic characterization and evaluation

- Characterization involves recording characters, which are
  - highly heritable,
  - easily seen by the eye, and
  - are expressed in all environments.
- Preliminary evaluation consists of recording a limited number of additional agronomic traits considered to be desirable by users of the crop.

Follow the same sowing and cultural practices for the field grow-out. Grow the accessions in 1-3 rows of 4 m each. Maintain the row to row distance at 75 cm and plant-to-plant distance at 50 cm. Evaluate the accessions in an augmented block design. Plant standard check cultivars at every 10 or 20 accessions. Use the descriptors developed by ICRISAT and IBPGR (now Bioversity International) for characterization and preliminary evaluation (ICRISAT/IBPGR 1992a,b and 1993a,b; ICRISAT/IBPGR/ICARDA 1993).

## Descriptors for characterization of pigeonpea

### Vegetative phase

Growth habit: Pattern of growth and plant habit.

- C Compact — having relatively few branches, borne at narrow angles to the stem
- S Spreading — having relatively many branches, resulting in a broad canopy
- SS Semi-spreading — intermediate between the above two types

Plant height (cm): Average height of three randomly chosen plants measured at maturity.

Primary branches number: Average number of branches borne on the main stem, recorded from three plants at the time of harvest.

Secondary branches number: Average number of branches borne on the primary branches, recorded from three plants at the time of harvest.

Plant pigmentation: Color of the stem at the time of 50% flowering.

- D Dark purple
- G Green
- P Purple
- R Sun red

### Reproductive phase

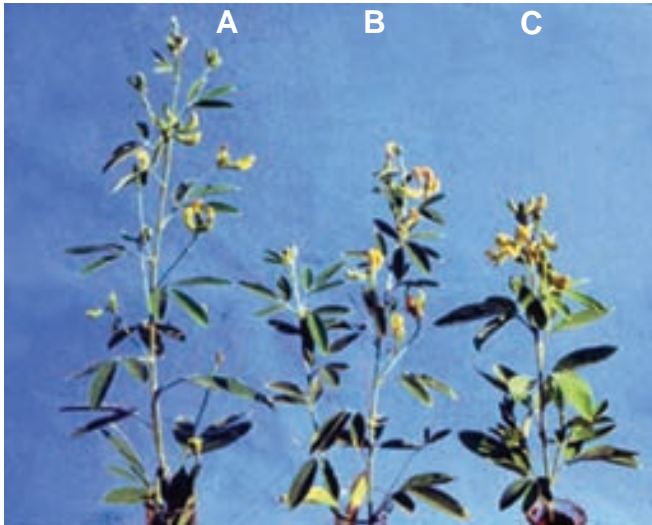
Days to 50% flowering: Days from effective sowing date to when 50% of the plants in the plot have at least one open flower.

Flowering Pattern: The pattern of flowering habit (Fig.1).

- DT (Determinate): Apical buds of the main shoots develop into inflorescence, the sequence of inflorescence production is basipetal.
- NDT (Indeterminate): Inflorescences develop as axillary racemes from all over the branches, flowering proceeds acropetally from base to apex both within the racemes and on the branches.
- SDT (Semi-determinate): Flowering starts at nodes behind the apex and proceeds both acropetally and basipetally.

Flower color: The main color of the standard petal recorded from the plot.

- I Ivory
- L Light yellow
- OY Orange yellow
- Y Yellow



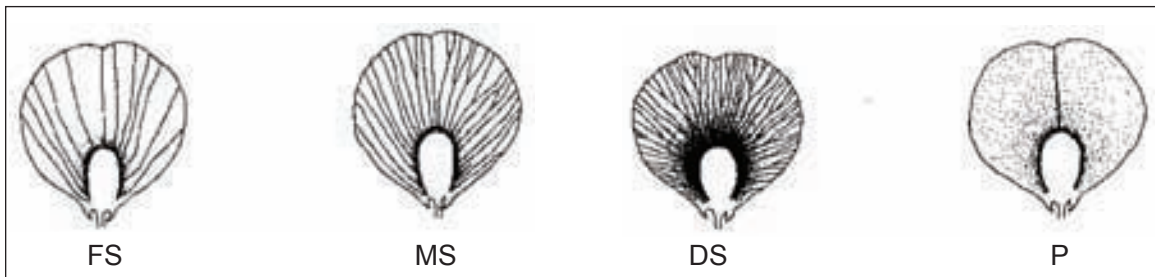
*Figure 1. Flowering pattern in pigeonpea – Indeterminate (A), semi-determinate (B) and determinate (C).*

Streak color: Color of streaks on the dorsal side of the standard petal.

- NO None
- Pu Purple
- R Red

Streak pattern: Pattern of streaks on the dorsal side of the standard petal (Fig. 2).

- FS Few streaks
- MS Medium streaks
- DS Dense streaks
- P Plain, uniform coverage
- NO None



*Figure 2. Pattern of streaks on standard petal in pigeonpea.*

Raceme number: Average number of racemes per plant, recorded from three plants at the time of 50% flowering.

Days to 75% maturity: Number of days taken from effective sowing date to when 75% of the plants in the plot reach maturity.

Pod color: Main color of the pod (Fig.3)

- DP Dark purple
- G Green
- M Mixed green and purple
- P Purple



*Figure 3. Diversity for pod color in pigeonpea germplasm at ICRISAT genebank.*

Seeds per pod: Number of seeds per pod, determined from 10 pods randomly picked from three plants at harvest maturity.

Seed color pattern: Color pattern of seed coat recorded after drying (Fig. 4).

- P Plain
- M Mottled
- S Speckled
- MS Mottled and speckled
- R Ringed



*Figure 4. Seed color pattern in pigeonpea.*

Primary seed color: Main color of the seed coat recorded after drying (Fig.5).

|    |        |    |               |
|----|--------|----|---------------|
| W  | White  | DP | Dark purple   |
| BL | Black  | LB | Light brown   |
| C  | Cream  | LC | Light cream   |
| O  | Orange | LG | Light grey    |
| G  | Grey   | RB | Reddish brown |
| P  | Purple |    |               |



*Figure 5. Diversity for seed color in pigeonpea germplasm.*

Secondary seed color: Eventual other color on the seed coat, coded as in primary seed color.

Seed eye color: Color around hilum, recorded after drying, coded as in primary seed color.

Seed eye color width: Width of color around hilum, recorded after drying.

|   |        |
|---|--------|
| N | Narrow |
| M | Medium |
| W | Wide   |

Seed shape: Shape of the seed recorded after drying (Fig. 6).

|   |                |
|---|----------------|
| O | Oval           |
| P | Pea (globular) |
| S | Square         |
| E | Elongate       |





*Figure 6. Seed shape in pigeonpea.*

Seed hilum: Presence or absence of strophiole.

A Absent

P Present

Seed weight (g): Weight of 100 seeds, from a random sample taken from the whole plot, recorded after the seed is sun dried.

Shelling percentage: Seed:pod ratio expressed as percentage based on weight from three randomly selected plants after harvesting and drying.

Protein content (%): Crude protein percentage of seed on dry weight basis.

Seed yield per plant (g): Average seed yield from three randomly selected plants.

Harvest index (%): Ratio of total seed yield to the total biological yield expressed as percentage from three plants.