Characterization and Preliminary Evaluation

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 10 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 sorghum

Vegetative phase

**Plant height (cm):** Height of the main axis from ground to the top of inflorescence at 50% flowering. Mean of 5 randomly selected plants (Fig. 1).

![Figure 1. Plant height in sorghum.](image)
Plant pigmentation: Stem and plant pigmentation at maturity.

P       Pigmented
T       Tan

Basal tillers number: Number of basal tillers, main plant as 1.

Nodal tillers number: Presence or absence of nodal tillers.

P       Present
A       Absent

Midrib color: Color of the midrib.

W       White
D       Dull green
Y       Yellow
B       Brown

Reproductive phase

Days to flowering: Number of days from the day of first irrigation to the date when 50% of plants started flowering within an accession.

Panicle exsertion: Length of peduncle from ligule flag leaf to base of inflorescence (Fig. 2).

Figure 2. Panicle exsertion in sorghum.
1 Slightly exserted  
2 Exserted  
3 Well-exserted  
4 Peduncle recurved

Panicle length (cm): Length of panicle from base to the tip. Mean from five representative plants.

Panicle width (cm): In natural position at the widest portion. Mean from five representative plants.

Panicle compactness and shape (Fig. 3 and 4)

![Inflorescence compactness and shape in sorghum.](image)

VLSB Very loose stiff branches  
VLDB Very loose drooping branches  
LSB Loose stiff branches  
LDB Loose drooping branches
SLSB  Semi-loose stiff branches  
SLDB  Semi-loose drooping branches  
SCE  Semi-compact elliptic  
CE  Compact elliptic  
CO  Compact oval  
SCO  Semi-compact oval

Figure 4. Diversity for panicle traits in sorghum germplasm assembled at ICRISAT.

**Glume color:** Color of the seed covering structures.

<table>
<thead>
<tr>
<th>W</th>
<th>White</th>
<th>R</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Straw</td>
<td>DR</td>
<td>Dark red</td>
</tr>
<tr>
<td>Y</td>
<td>Yellow</td>
<td>P</td>
<td>Purple</td>
</tr>
<tr>
<td>LB</td>
<td>Light brown</td>
<td>B</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>Brown</td>
<td>G</td>
<td>Grey</td>
</tr>
<tr>
<td>RB</td>
<td>Reddish brown</td>
<td>PSB</td>
<td>Partly straw and brown</td>
</tr>
<tr>
<td>LR</td>
<td>Light red</td>
<td>PSP</td>
<td>Partly straw and purple</td>
</tr>
</tbody>
</table>

**Glume covering:** Extent of seed covered by glumes at maturity (Fig. 5).

1. 25% seed covered
2. 50% seed covered
3  75% seed covered
4  Seed fully covered
5  Glumes longer than seed

![Figure 5. Seed covering in sorghum.]

**Seed color:** Color of freshly harvested seeds.

- CW  Chalky white
- W   White
- S   Straw
- Y   Yellow
- LB  Light brown
- B   Brown
- RB  Reddish brown
- LR  Light red
- R   Red
- G   Grey
- P   Purple
- WR  White and red mixed

**Seed lustre:** Shininess of seed.

- L   Lustrous
- NL  Nonlustrous

**Seed sub-coat:** Presence or absence of black layer below the testa.

- P   Present
- A   Absent

**Seed size (mm):** Width of the seed at the broadest point.

**Seed weight (g):** Weight of 100 seeds at 12% moisture content.

**Endosperm texture:** Nature of endosperm (Fig. 6).

1  Completely corneous
2  Almost corneous
3  Partly corneous
4  Almost starchy
5  Completely starchy
Figure 6. Endosperm texture in sorghum seed.

**Threshability:** Ease with which seeds can be separated from the panicle.

| FT  | Freely threshable |
| PT  | Partly threshable |
| DT  | Difficult to thresh |