

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 pearl millet

Vegetative phase

Plant height (cm): Mean height of five plants measured from ground level to the tip of the panicle at dough stage (Fig.1).

Productive tillers number: Number of tillers bearing panicles, counted at dough stage. Recorded as mean of five plants.

Nodal tillers: Visual score on 1–9 scale for number of nodal tillers at dough stage.

3 Few, 5 Intermediate, 7 Many

Total tillers number: Total number of tillers including main stem, counted at dough stage. Recorded as mean of five plants.

Photoperiod sensitivity: Visual score on 1–9 scale for sensitivity to photoperiod.

3 Insensitive, 5 Partly sensitive, 7 Highly sensitive



Figure 1. Recording plant height in pearl millet germplasm.

Fodder yield potential: Visual score on 1-9 scale for green fodder yield potential considering tillering, leafiness and bulk at flowering.

- 3 Poor
- 5 Intermediate
- 7 Good

Reproductive phase

Days to 50% flowering: Number of days from first irrigation after sowing to when 50% of plants flower in the accession. Stigma emergence on the main panicle is considered as flowering.

Panicle exertion (cm): Distance between ligule of the flag leaf and the base of the panicle on main plant.

Panicle length (cm): Mean length of five panicles on main axis of five representative plants, measured at dough stage.

Panicle thickness (mm): Mean thickness of five panicles at widest portion on main tiller of five plants, measured at dough stage.

Panicle shape: Shape of panicle at dough stage (Fig. 2 and 3).

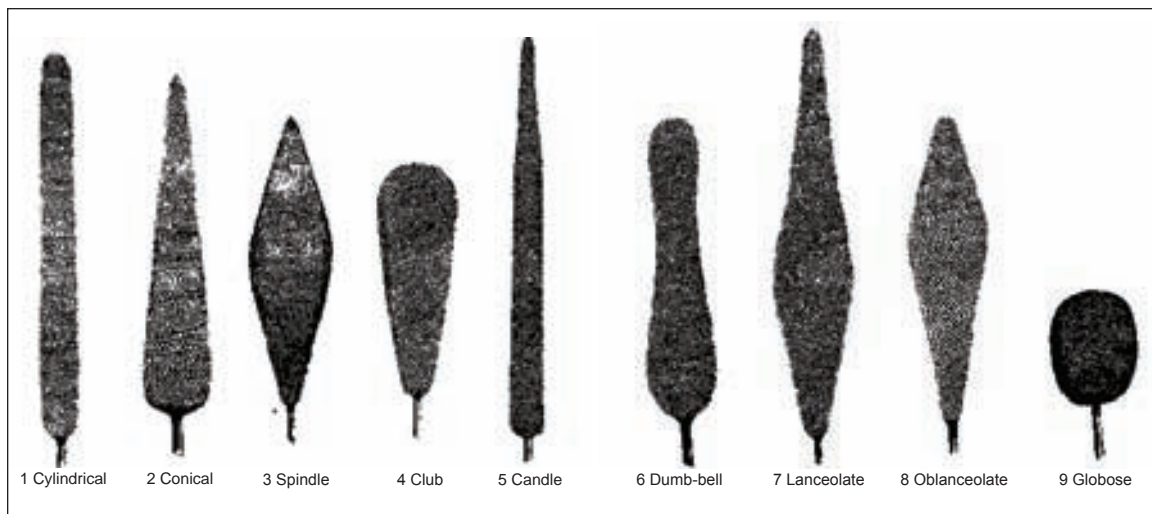


Figure 2. Panicle shapes in pearl millet.



Figure 3 Diversity for panicle traits in pearl millet germplasm.

Spikelet density: Density of spikelets, visually scored on 1–9 scale at maturity. Also referred to as compactness of panicle.

- 3 Loose
- 5 Intermediate
- 7 Compact

Synchrony of panicle maturity: Uniformity for maturity, visually scored on 1–9 scale at dough stage.

- 3 Non-synchronous
- 5 Intermediate
- 7 Synchronous

Bristle length: Length of bristles, visually scored on 1–9 scale at dough stage.

- 3 Short (bristles below the level of apex of the seed)
- 5 Medium (bristle length between 0 and 2 cm above the seed)
- 7 Long (bristles longer than 2 cm above the seed)

Seed color: Color of freshly harvested seeds recorded after threshing.

- | | |
|-------------|------------------------------|
| 1 Ivory | 6 Grey brown |
| 2 Cream | 7 Brown |
| 3 Yellow | 8 Purple |
| 4 Grey | 9 Purplish black |
| 5 Deep grey | 10 Mixture of white and grey |

Seed weight (g): Weight of 1,000 seeds drawn randomly from plot yield, at 12% moisture content.

Seed shape: Shape of seed after drying (Fig. 4).

Seed yield potential: Seed yield potential of the accession, visually scored on 1 – 9 scale considering panicle number, size and density.

- 3 Low
- 5 Intermediate
- 7 High

Endosperm texture: Texture of endosperm visually scored on 1–9 scale.

- 3 Mostly corneous
- 5 Partly corneous
- 7 Mostly starchy

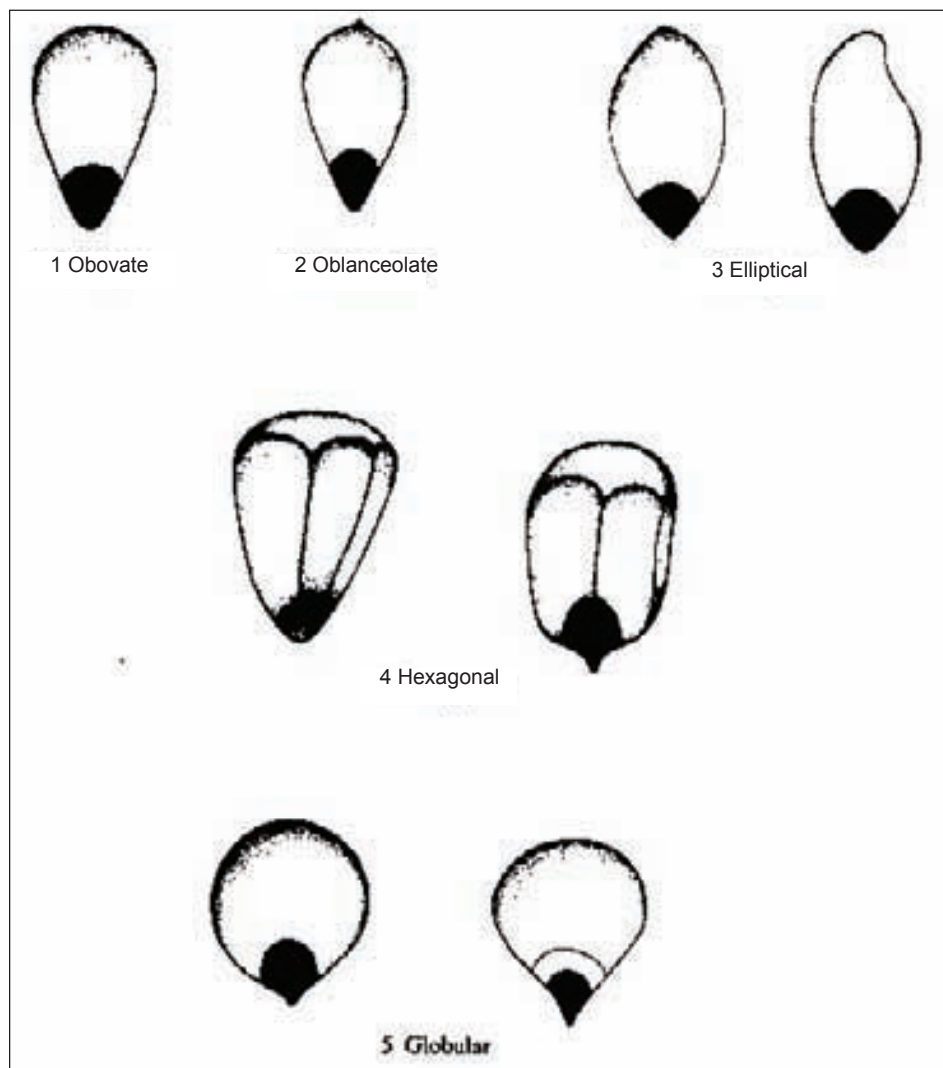


Figure. 4. Seed shapes in pearl millet.