Key access and utilization descriptors for pearl millet genetic resources

This list consists of an initial set of characterization and evaluation descriptors for pearl millet genetic resources utilization. This strategic set of descriptors, together with passport data, will become the basis for the global accession level information portal being developed by Bioversity International with the financial support of the Global Crop Diversity Trust (GCDT). It will facilitate access to and utilization of pearl millet accessions held in genebanks and does not preclude the addition of further descriptors, should data subsequently become available.

Based on the comprehensive list 'Descriptors for Pearl millet [*Pennisetum glaucum* (L.) R. Br.]' published by ICRISAT and IBPGR (now Bioversity International) in 1993, the list was subsequently compared with a number of sources such as 'Descriptors for PMILLET' (USDA, ARS, GRIN), 'Establishment of a pearl millet [*Pennisetum glaucum* (L.) R. Br.] core collection based on geographical distribution and quantitative traits' (Euphytica (2007) 155:35–45), 'Pearl millet germplasm at ICRISAT genebank – status and impact' (ICRISAT, Vol. 3, Issue 1., 2007), 'Guidelines for the Conduct of Test for Distinctness, Uniformity and Stability on Pearl millet (*Pennisetum glaucum* (L.) R. Br.)' (PPV & FRA, 2007), as well as with those descriptors that were awarded funds for further research by the Global Crop Diversity Trust in 2008 Evaluation Award Scheme (EAS). The initial list was further refined during a crop-specific consultation meeting held at the National Bureau of Plant Genetic Resources (NBPGR, India) in June 2009. It involved several scientists from the National Bureau of Plant Genetic Resources (NBPGR), Indian Agricultural Research Institute (IARI) and All India Coordinated Research Project on Pearl Millet (AICRP-Pearl Millet).

A worldwide distribution of experts was involved in an online survey to define a first priority set of descriptors to describe, to access and to utilize pearl millet genetic resources. This key set was afterwards validated by a Core Advisory Group (see 'Contributors') led by Dr Prem Mathur of Bioversity International, Dr I. S. Khairwal, Project Coordinator, AICRP-Pearl Millet and Dr Hari D. Upadhyaya of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

Biotic and abiotic stresses included in the list were chosen because of their wide geographic occurrence and significant economic impact at a global level.

Numbers in parentheses on the right-hand side are the corresponding descriptor numbers listed in the 1993 publication. Descriptors with numbers ending in 'letters' are either modified or new descriptors that were added during the development of the list below.

PLANT DATA

Plant height [cm] (4.1.1)
From the ground level to the tip of the spike. At dough stage

Number of productive tillers (4.1.6)
Number of spikes which bear seed at dough stage. Spikes younger than the dough stage are not counted

Green fodder yield per plant [kg] (4.1.10)
At flowering

Days to 50% flowering (4.2.4)
Number of days from field emergence to when 50% of plants flower. Stigma emergence on the main spike is considered as flowering

Spike length [cm] (4.3.1)
At dough stage

Spike thickness [mm] (4.3.2)
Maximum diameter of the spike, excluding bristles. At dough stage

Spike density (4.3.3)
At maturity

3 Loose
5 Intermediate
7 Compact

Grain colour (4.4.1)
After threshing. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

1 Ivory (yellow-white group 158A)
2 Cream (orange-white group 159A)
3 Yellow (yellow group 8C)
4 Grey (grey group 201)
5 Deep grey (black group 202B)
6 Grey brown (brown group 199)
7 Brown (brown group 200)
8 Purple (purple group 79B)
9 Purplish black
10 A mixture of white and grey grains (on the same spike)

1000-seed weight [g] (4.4.5)
At 12% moisture content

Grain yield per plant [g] (4.4.9)

ABIOTIC STRESSES

Reaction to drought (7.1)

BIOTIC STRESSES

Downy mildew (*Sclerospora graminicola*) (8.1.1)

Blast (*Pyricularia grisea*) (8.1.X)

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