Guidelines for the conduct of tests

for Distinctiveness, Uniformity and Stability

Little millet (*Panicum sumatrense* Roth. Ex Roemer And Schultes)

Protection of Plant varieties and Farmer's Rights Authority

Government of India

Little millet (*Panicum sumatrense* Roth. Ex Roemer And Schultes)

I Subject:

These test guidelines apply to all the varieties, hybrids and parental lines of Little millet (*Panicum sumatrense* Roth. Ex Roemer And Schultes).

II Material required:

1. The Protection Plant Varieties and Farmers' Right Authority (PPV & FRA) shall decide when, where and in what quantity and quality of the seed material is required for testing a varietal denomination applied for registration, under The PPV & FR Act 2001. Applicants submitting such seed material from a country other than India shall make sure that all customs and quarantine requirements stipulated under relevant National legislations and regulations are complied with.The minimum quantity of the seed material to be supplied by the applicant shall be 150 grams. The seed shall be packed and sealed in ten equal weighing packets of 15 grams each and submitted in one lot. In addition, 10 panicles need to be submitted, if required.

2. The seeds submitted shall have the following standards:

a. Germination : 80% (Minimum)
b. Moisture content : 12% (Maximum)
c. Physical purity : 97% (Minimum)
d. Inert matter : 3% (Maximum)

3. The applicant shall also submit along with the seed a certified data on germination test made not more than one month prior to the date of submission. It also shall posses the highest genetic purity, uniformity, sanitary and phyto- sanitary standards as per national requirement.
4. The seeds/planting material shall not have been subjected to any chemical and bio-physical treatment.

III Conduct of tests:

1. The minimum duration of the DUS test shall normally be at least two independent similar growing seasons for new varieties and one season in case of farmers' varieties and varieties of common knowledge (VCK).
2. The test shall normally be conducted at least at two test locations.
3. The field test shall be carried out under conditions favoring normal growth and expression of all test characteristics. The size of the plots shall be such that plants or its parts could be removed for measurement and observation without prejudicing the other observations on the plants until the end of growing period. Each test shall include about 360 plants across three replications. Separate plots for observation on

pest/ disease resistance for those varieties claiming resistance shall be laid out in two replications.

4. Test plot design:

Number of rows: 04
Row length: 3.0m
Row to row distance: 30cm
Plant to plant distance: 10 cm
No. of replication: 3

5. Observations shall not be recorded on plants in border rows.
6. Additional tests for special purpose shall be established by the PPV & FR Authority.

IV Methods and observation:

1. The characteristics described in the table of characteristics (Section VII) shall be used for the testing of varieties, parental lines and hybrids for their DUS.
2. For the assessment of Distinctness and Stability, observations shall be recorded on 30 plants or parts of 30 plants, which shall be divided among 4 replications (10 plants in each replication).
3. For the assessment of uniformity of characteristics on the plot as a whole (visual assessment by a single observation of a group of plants or parts of plants), the number of off types (including plant parts) should not exceed 2 in 100.
4. For the assessment of all colour characteristics, the latest Royal Horticultural Society (RHS) color chart shall be used.

V Grouping of varieties:

1. The candidate varieties for DUS testing shall be divided into groups to facilitate assessment of Distinctness. Characteristics which are suitable for grouping purpose are those which do not vary or vary slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.

2. The following characteristics are to be used for grouping of Little millet varieties

1) Days to 50% flowering (Characteristic 3)
2) Plant: Pigmentation at leaf sheath (Characteristic 4)
3) Inflorescence: Shape (Characteristic 8)
4) Panicle: Compactness (Characteristic 14)
5) Grain : Colour(Characteristic 18)

VI Characteristics & symbol

1. To assess Distinctiveness, Uniformity and Stability, the characteristics and their states as given in the Table of characteristics (Section VII) shall be used.
2. Notes (1-9) shall be given for each state of expression for different characteristics for the purpose of electronic data processing.
3. Legend :

(*) Characteristics that shall be observed during every growing season on all varieties and shall always be included in the description of the variety, except when the state of expression of any of these characters is rendered impossible by a preceding phenological characteristic or by the environmental conditions of the testing region. Under such exceptional situation, adequate explanation shall be provided

(+) See Explanation on the Table of characteristics in Section VIII. It is to be noted that for certain characteristics the plant parts on which observations to be taken are given in the explanation or figure(s) for clarity and not the colour variation.

4. A decimal code number in the sixth column of Table of characteristics indicates the optimum stage for the observation of each characteristic during the growth and development of plant.

Decimal code for the growth stage

Stage code	**General Description**
15	Two-Four Leaf stage
26	Vegetative stage
51	50 % Flowering
59	Complete Flowering
67	Dough stage
83	Maturity
95	Post harvest

5. Type of assessment:

MG: Single measurement of a group of plants or parts of plants.
MS: Measurement of a number of individual plants or parts of plants.
VG: Visual assessment by a single observation of a group of plants or plant parts.
VS: Visual assessment by observation of individual plant or parts of plants.

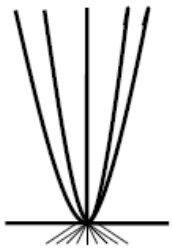
VII Table of Characteristics

Sl no	Characteristics	States	Score/Notes	Example varieties	Stage of observation	Type of assesment
1 (+)	Plant: Growth habit	Erect	3	Co 4	15	VG
		Decumbent	5	OLM 217		
		Prostrate	7	GPMR 18		
2	Basal tillers: Number	Low(<10)	3	GPMR 26	26	MS
		Medium (10.0-20.0)	5	OLM 208		
		High(> 20)	7	GPMR 94		
3 (*) (+)	Days to 50% flowering	Early(<40)	3	OLM 20	51	MG
		Medium(40-50)	5	CO 4		
		Late(> 50)	7	OLM 217		
4 (*)	Plant : Pigmentation at leaf sheath	Absent	1	JK 36	59	VG
		Present	9	OLM 208		
5	Leaf sheath: Pubescence	Absent	1	OLM 208	59	VG
		Present	9	-		
6	Ligule: Pubescence	Absent	1	OLM 217	59	VG
		Present	9	-		
7	Leaf Blade: pubescence	Absent	1	OLM 20	59	VG
		Present	9	-		
8 (*) (+)	Inflorescence: shape	Arched	3	OLM 208	59	VG
		Globose-elliptic	5	OLM 36		
		Diffused	7	CO 4		
9 (+)	Peduncle length (cm)	Short(<10.0)	3	GPMR 3	59	MS
		Medium(10.0-20.0)	5	OLM 203		
		Long(> 20.0)	7	-		
10 (+)	Flag leaf blade : Length (cm)	Short(<20.0)	3	OLM 20	59	MS
		Medium(20.0-30.0)	5	OLM 203		
		Long(>30.0)	7	GPMR 92		
11 (+)	Flag leaf blade: Width(cm)	Narrow(<1.0)	3	OLM 36	59	MS
		Medium(1.0-2.0)	5	OLM 217		
		Wide(>2.0)	7	-		

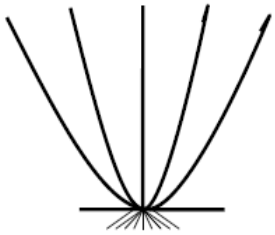
12	Culm: Branching	Absent	1	-	67	VG
		Present	9	OLM 203		
13 (*) (+)	Panicle: Length(cm)	Very short (<10.0)	1	-	67	MS
		Short 10.0-20.0)	2	GPMR 151		
		Short to medium (20.1-30.0)	3	GPMR 4		
		Medium (30.1-40.0)	4	OLM 30		
		Long (40.1-50)	5	OLM 217		
		Very long (>50.0)	9	GPMR 340		
14 (*) (+)	Panicle: compactness	Compact	3	OLM 217	67	VS
		Intermediate	5	OLM 20		
		Open	7	GPMR 115		
15	Lodging	Absent	1	JK 36	83	VG
		Present	9	OLM 36		
16 (*) (+)	Plant : Height (cm)	Dwarf (<80.0)	3	GPMR 1	83	MS
		Semi dwarf (80.0-120.0)	5	OLM 36		
		Tall (120.1-160.0)	7	OLM 217		
		Very Tall (>160)	9	-		
17	Seed: Shattering	Absent	1	-	83	VG
		Present	9	JK 36		
18 (*)	Grain: Colour	Straw white/cream RHS NO 159C	1	OLM 203	83	VG
		Golden yellow RHS NO 13A	2	-		
		Light Brown RHS NO 177C	3	Co 4		
		Brown RHS NO 177 B	5	Paiyur 2		
		Grey RHS NO N199D	6	GPMR 4		
		Dark Grey RHS NO N199C	7	GPMR 30		
19	Grain: Shape	Elliptical	2	GPMR1166	95	VG
		Oval	4	OLM 217		
20 (*)	1000 grain weight (g) at 12% moisture content	Low (<2.0)	3	GPMR 13	95	MG
		Medium (2.0-3.0)	5	Paiyur 2		
		High (>3.0)	7	GPMR 49		

VIII. Explanations for Table of Characteristics

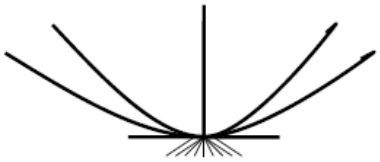
Characteristic 1 Plant: Growth habit



3
Erect



5
Decumbent

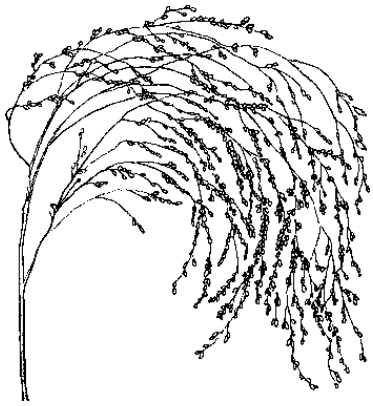


7
Prostrate

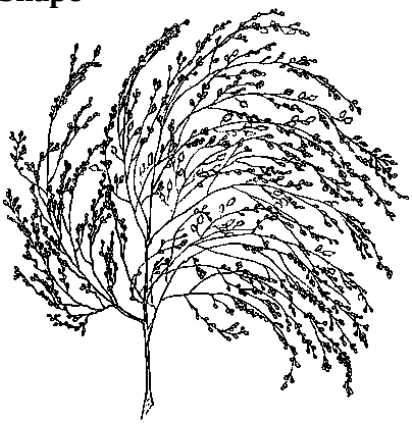
Characteristic 3 Days to 50 percent flowering

Days to 50% flowering is from sowing to the stage when ears have emerged from main tiller in 50 percent population.

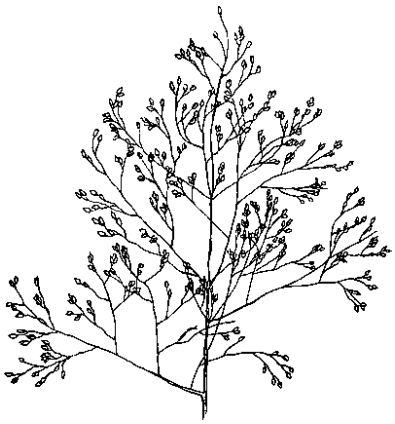
Characteristic 8 Inflorescence: Shape



3
Arched



5
Globose – Elliptic



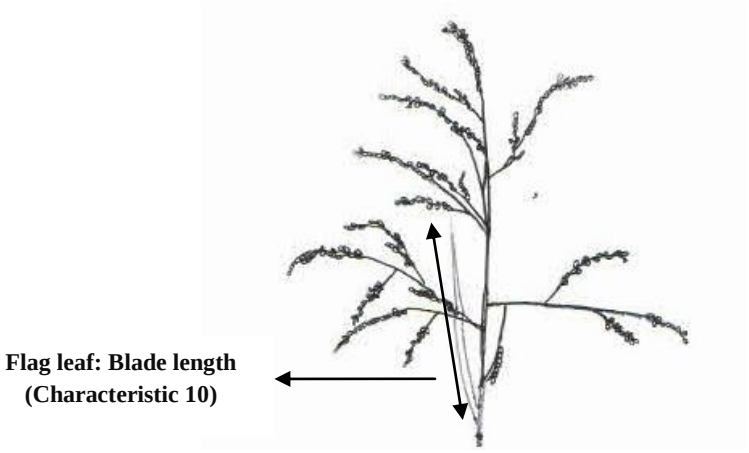
7
Diffused

Characteristic 9 Peduncle: Length (cm)

Peduncle length is measured from earhead base to the top most node on main tiller.

Characteristic 10 Flag leaf blade: Length (cm)

Flag leaf blade length is measured from ligule to flag leaf blade tip.

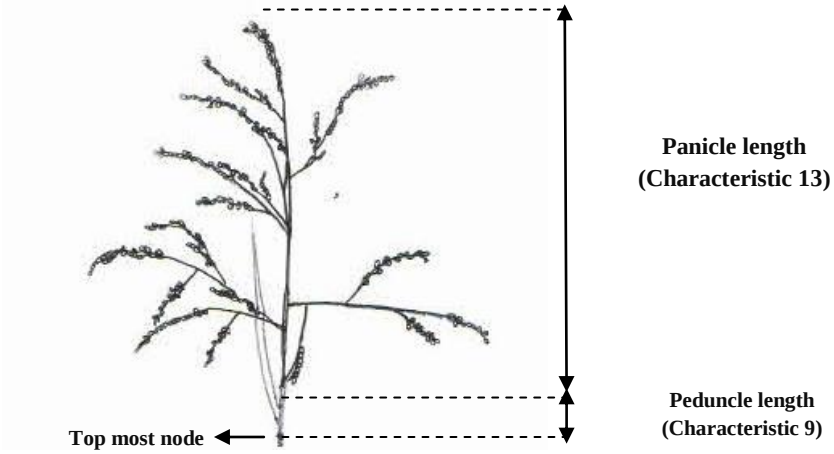


Characteristic 11 Flag leaf blade: Width (cm)

Flag leaf blade width is measured at the widest point of the flag leaf

Characteristic 13 Panicle: Length (cm)

Panicle length is measured from base of panicle to the tip of panicle.



Characteristic 14 Panicle: Compactness

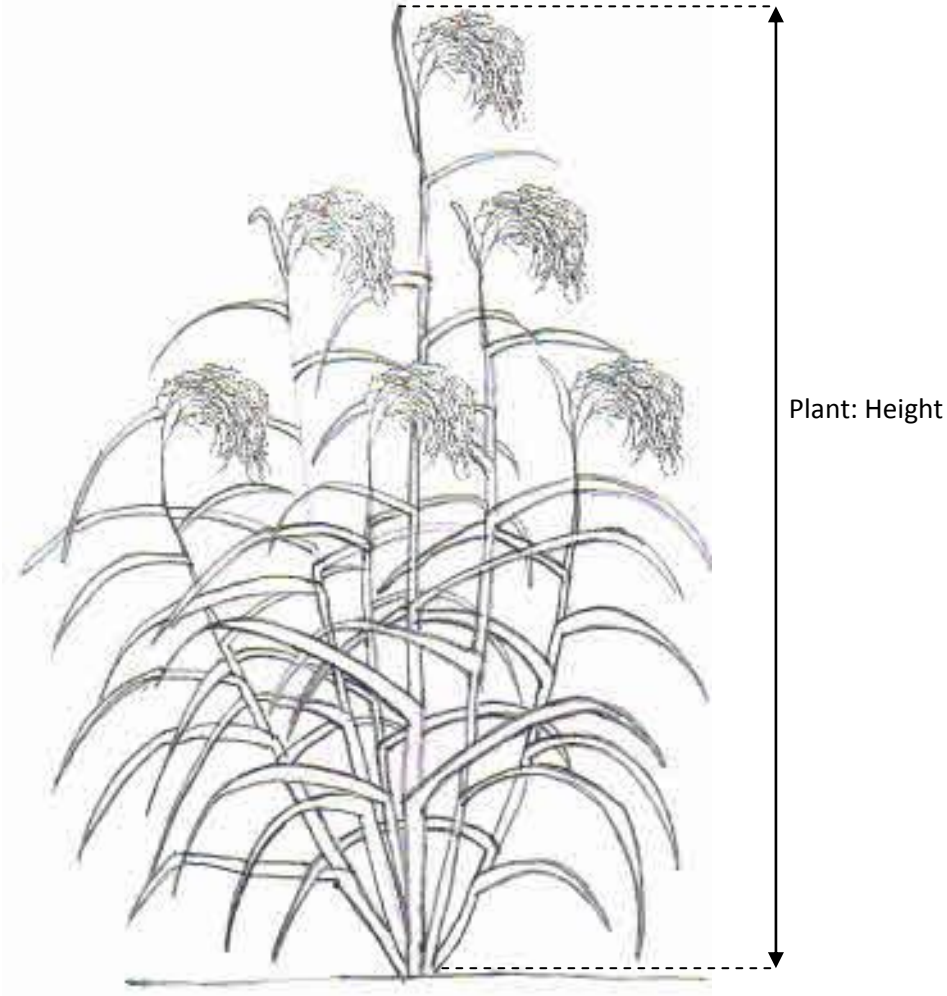
3
Compact

5
Intermediate

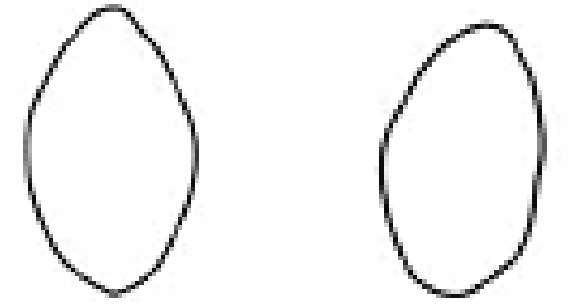
7
Open

Characteristic 16 Plant: Height (cm)

Plant height is measured from ground level to the tip of the earhead of main tiller.



Characteristic 19 grain: Shape



2
Elliptical

4
Oval

IX. Working Group Details:

These Test guidelines have been developed by the National Core Committee in Consultation with the Project Coordinator, All India Coordinated Small Millets Improvement Project at UAS, GKVK, Bangalore-560 065 and the Nodal Officer, DUS Test Centre and Task Force constituted by the Authority.

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X. DUS Test Centers

Nodal DUS centre	Other Test Centre(s)
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