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Guidelines for the Conduct of Test for Distinctiveness, Uniformity and Stability

On

Blackgram

(*Vigna mungo* (L.) Hepper)

Protection of Plant Varieties and Farmers' Rights Authority
(PPV & FRA)

Government of India

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1. Subject

These test guidelines shall apply to all varieties, hybrids and parental lines of Blackgram (*Vigna mungo* (L.) Hepper).

II. Seed material required

1. The Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA) shall decide when, where and in what quantity and quality of the seed material are required for testing a variety denomination applied for registration under the Protection of Plant Variety and Farmers' Rights (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 to be provided by the applicant shall be 1000 gram in the case of the candidate variety. Each of these seed lots shall be packed and sealed in ten equal weighing packets and submitted in one lot.

2. The seed submitted shall have at least 95 % germination, 98% physical purity, highest genetic purity, uniformity, sanitary and phyto-sanitary standards. In addition the moisture content of the seed shall not exceed 8 - 9% to meet the safe storage requirement. 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.

3. The seed material shall not be subjected to any chemical or bio-physical treatment.

III. Conduct of tests

1. The minimum duration of the DUS tests shall normally be at least two independent similar growing seasons.

2. The test shall normally be conducted at least at two test locations. If any essential characteristics of the candidate variety are not expressed for visual observation at these locations, the variety shall be considered for further examination at another appropriate test site or under special test protocol on expressed request of the applicant.

3. The field tests shall be carried out under conditions favouring normal growth and expression of all test characteristics. The size of the plots shall be such that plants or parts of plants could be removed for measurement and observation without prejudicing the other observations on the standing plants until the end of the growing period. Each test shall include about 1000 plants, in the plot size and planting space specified below across three replications. Separate plots for observation and measurement can only be used if they have been subjected to similar environmental conditions. All the replications shall be sharing similar environmental conditions of the test location.

4. **Test plot design**

Number of rows	:	4
Row length	:	5m
Row to row distance	:	45 cm
Plant to plant distance	:	15 cm
Expected plants / replication	:	140
Number of replications	:	3

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

IV. Methods and observations

1. The characteristics described in the Table of characteristics (see section VII) shall be used for the testing of varieties, inbred lines and hybrids for their DUS.
2. For the assessment of Distinctiveness and Stability observations shall be made on 30 plants or parts of 30 plants, which shall be equally divided among 3 replications (10 plants per replication).
3. For the assessment of Uniformity of characteristics on the plot as a whole which shall be done by single visual observation of a group of plants or parts of plants a population standard of 0.5% with an acceptance probability of at least 95% shall be applied. In the case of a sample size of 250 plants, the number of off-types shall not exceed 4.
4. All pod characteristics shall be recorded in the middle portion of the main stem.
5. For the assessment of all colour characteristics, the latest Royal Horticultural Society (RHS) colour chart shall be used.

V. Grouping of varieties

1. The candidate varieties for DUS testing shall be divided into groups to facilitate the assessment of distinctiveness. Characteristics, which are known from experience not to vary, or to vary only slightly within a variety and which in their various states are fairly evenly distributed across all varieties in the collection are suitable for grouping purposes.
2. The following characteristics are proposed to be used for grouping Urd / Blackgram varieties:
    a) Time of flowering (Characteristic 2)
    b) Plant: Habit (Characteristic 4)
    c) Pod: Pubescence (Characteristic 14)
    d) Seed: Lusture (Characteristic 19)
    e) Seed: Size (Characteristic 21)

VI. Characteristics and symbols

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. Note (1 to 9) shall be used to describe the state of each character for the purpose of digital 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 shown in the explanation or diagram for clarity and not the colour variation.

4. The optimum stage of plant growth for assessment of each characteristic is given in the sixth column of Table of characteristics.

5. Type of assessment of characteristics indicated in column seven of Table of characteristics is as follows:

MG : Measurement by a single observation 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 parts of plants

VS : Visual assessment by observation of individual plants or parts of plants

VII. Table of characteristics

S.No	Characteristics	States	Note	Example varieties	Stage of observation	Type of assessment
1	2	3	4	5	6	7
1. (*)	Hypocotyl: Anthocyanin colouration	Absent	1	---	Cotyledons unfolded	VS
		Present	9	IPU 94-1, Pant U 35		
2. (*)	Time of flowering	Early (<40days)	3	Pant U 19, T 9	50% plants with at least one open flower	VG
		Medium (40-50 Days)	5	LBG 685, CO 5		
		Late (>50 days)	7	LBG 17, LBG 402		
3. (+)	Plant: Growth habit	Erect	3	T 9, TAU 1	50% flowering	VG
		Semi-erect	5	Pant U 35, NDU 1		
		Spreading	7	Vamban 1, Naveen		
4. (*) (+)	Plant: Habit	Determinate	1	T 9, Pant U 19, Pant U 30	50% flowering	VG
		Indeterminate	3	IPU 94-1		
5. (*)	Stem : Colour	Green	1	---	50% flowering	VS
		Green with purple splashes	2	NDU 1, RBU 38		
		Purple with green splashes	3	IPU 94-1, Azad Urd 2		
		Purple	4	---		
6. (*)	Stem: Pubescence	Absent	1	---	50% flowering	VS
		Present	9	Pant U 19, NDU 1		
7. (*) (+)	Leaflet(terminal) : Shape	Deltoid	1	---	50% flowering	VG
		Ovate	2	CO 5		
		Lanceolate	3	Pant Urd 19,		
		Cuneate	4	WBU108 Vamban 1		

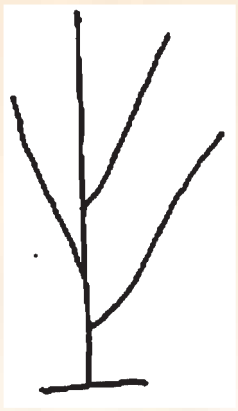
8. (*)	Foliage: Colour	Green Dark green	1 2	PDU 1, Mash 1 Uttara, NDU 1	50% flowering	VG
9.	Leaf: Vein colour	Green Purple	1 2	Pant U 19, NDU 1 LBG 20, LBG 648,	50% flowering	VG
10. (*)	Leaf: Pubescence	Absent Present	1 9	--- KU96-3, WBU 108	50% flowering	VS
11.	Petiole: Colour	Green Green with Purple splashes Purple	1 2 3	--- NDU 1, RBU 38 ---	Fully developed green pods	VG
12.	Pod: Intensity of green colour of premature pods	Yellowish green Green Dark green	3 5 7	PDU 1, Shekhar U 2 AKU 9904, T 9 Uttara	Fully developed green pods	VG
13. (*)	Pod: Pubescence	Absent Present	1 9	T 9, TAU 2, Pant U 19, NDU 1	Fully developed green pods	VG
14. (*)	Peduncle : Length	Short (< 5 cm) Medium (5-10 cm) Long (>10 cm)	3 5 7	--- NDU 1, PDU 1 ---	Harvest maturity	MS
15.	Pod: Length	Small (<5cm) Medium (5-7 cm) Long (>7cm)	3 5 7	Azad Urd 2 Shekhar Urd 2 ---	Harvest maturity	
16. (*)	Pod: Colour of mature pod	Buff (off-white) Brown Black	1 2 3	PDU 1 Shekhar 2, TU 94-2 Uttara, TAU 1	Harvest maturity	VG

17. (*)	Plant: Height	Short (<45 cm) Medium (45-60 cm) Long (>60 cm)	3 5 7	T 9, WBU 108 Shekhar U 1 Pant U 30, RBU 38	Harvest maturity	MS
18. (*)	Seed: Colour	Green Greenish brown Brown Black Mottled	1 2 3 4 5	Shekhar U 2 JU 2 Pant Urd 30 IPU 94-1 ---	Mature seeds	VG
19. (*)	Seed: Lusture	Shiny Dull	1 2	LBG 17 Uttara, NDU 1	Mature seeds	VG
20. (*) (+)	Seed: Shape	Globose Oval Drum shaped	1 2 3	--- Uttara KU 96-3, LBG 623	Mature seeds	VG
21. (*)	Seed : Size (weight of 100 seeds)	Small (<3 g) Medium (3-5 g) Large (>5 g)	3 5 7	--- IPU 94-1, Pant Urd 30 ---	Mature seeds	MG

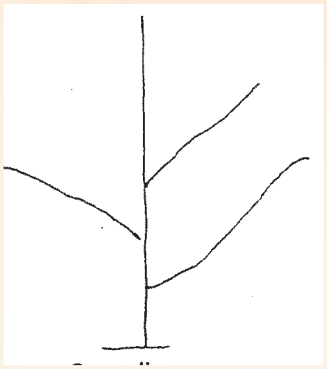
VIII. Explanation on the Table of characteristics

Characteristic 3. Plant: Growth habit

3
Erect



5
Semi-erect



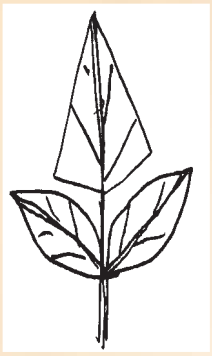
7
Spreading

Characteristic 4. Plant: habit

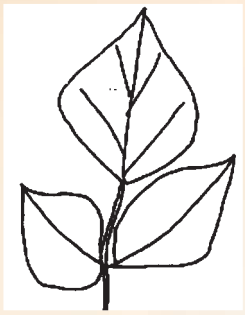
1
Determinate

3
Indeterminate

Characteristic 7. Terminal leaflet: Shape



1
Deltoid



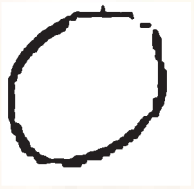
2
Ovate

3
Lanceolate

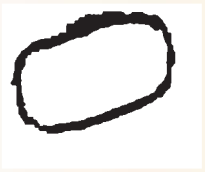
4
Cuneate

Characteristic 20. Seed: Shape

1
Globose



2
Oval



3
Drum shaped

IX. Working Group details

The Test Guideline developed by the National Core Committee in consultation with the Project co-ordinator(Mulla RP, Indian Institute of Pulses Research (IIPR), Kanpur, the Nodal Officer, DUS Testing, IIPR, Kanpur and the Task Force (1/2005) constituted by the PPV & FR Authority

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