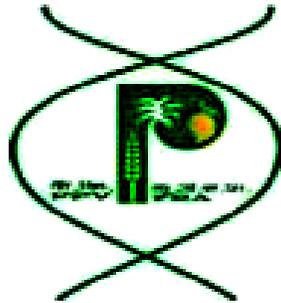


Guidelines for the Conduct of Test for Distinctiveness, Uniformity and Stability

on

Jamun

(Syzygium cuminii Skeels)



**Protection of Plant Varieties and Farmer's Rights Authority
(PPV & FRA)
Government of India, New Delhi**

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Jamun (*Syzygium cuminii* Skeels)

I. Subject

These test guidelines shall apply to all varieties and hybrids of **Jamun** (*Syzygium cuminii* Skeels)

II. Planting Material required

1. The Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA) shall decide on the quantity and quality of the planting material(s) required for testing the variety and when and where it is to be delivered for registration under the Protection of Plant Varieties and Farmers' Rights (PPV & FRA) Act, 2001.
2. Applicants submitting such planting material(s) 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.
3. The minimum number of planting material to be supplied by the applicant 07 grafts for each location.
4. The planting materials supplied shall be healthy, not lacking in vigour or nutrition as well as free from pests or diseases or any mechanical damage.
5. The plant material should not have undergone any treatment, which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.
6. The age of the plant(s) shall be minimum nine months from the date of grafting (propagated through softwood grafting or veneer grafting) on the *S. cuminii* Skeels rootstock and raised in the polythene bags.

III. Conduct of tests

1. The minimum duration of the DUS tests shall normally be at least two similar fruiting seasons in different years.
2. The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the germplasm/ variety to conduct the

examination. In particular, it is essential that the trees produce a satisfactory crop of fruit in each of the two growing seasons.

3. The minimum duration of the tests shall normally be at least two independent similar fruiting seasons in different years. Tests shall be conducted at least at two places or on site testing. If any essential characteristic 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 by the applicant, for which additional quantity of planting material shall be required.

4. **Test design**

The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle. The addition test protocol for special purpose if any may be established by PPV & FRA. As a minimum, each test shall include five plants per location, planted at DUS test centre, with a spacing of 5 m x 5 m.

5. **On-site DUS testing**

The applicant or his/her nominee on his/her behalf shall submit a request to the Authority for conducting a reliable trial according to Test Guidelines and the instructions from Authority before on-site examination of the candidate variety.

The applicant or his/her nominee shall submit a request to the Authority for on-site examination prior to start of growing cycle as mentioned in Test Guidelines for site examination of the candidate variety. On-site testing may be conducted at the places specified by the applicant. The age of the trees at on-site shall be minimum 5 years. As a minimum, 5 plants planted in uniform spacing, should be available for inspection and examination for 'on site' DUS testing. The trees must be healthy and free from pest & disease and raised under standard and uniform management practices. For farmer's variety or landraces, the authority may notify suitable guidelines on the number of plant(s) and season(s), if any.

On-site examination shall be arranged during the fruiting season, when distinguishing characteristics of candidate variety can most easily be seen. The characteristics of the

candidate variety can be examined and compared with those of the comparative varieties as per the Test guidelines.

The Expert Committee constituted by the PPV & FRA in consultation with the DUS Centre shall be authorized to inspect on-site testing and recording of the appropriate characters. Applicant shall supply the Expert Committee with summary of distinct characteristics supported by photographs. The Expert Committee shall take notes and observations on distinctness and shall confirm preliminary data and/or summary of distinctness from applicant.

The Expert Committee shall submit examination report to the Authority.

IV. Methods and observations

The characteristics described in the Table of characteristics (see section VII) table shall be used for the testing varieties and hybrid for their DUS.

1. For the assessment of Distinctiveness and Stability observation shall be made on 5 plants or parts taken from each of 5 plants. In the case of parts of plants, the number to be taken from each of the plants should be 2.
2. Mature leaves in the middle third of the youngest shoots not showing signs of active growth should be selected for the observations on the leaf.
3. Observations on the mature fruit should be recorded when fruit is ready for harvesting.

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 purpose.
2. The following characteristics are recommended for grouping of varieties
 - i. Growth habit (Characteristic 1)
 - ii. Leaf Apex (Characteristic 5)

- iii. Leaf Base (Characteristic 6)
- iv. Mature fruit: Shape (Characteristic 14)
- v. Mature fruit: base stalk end (Characteristic 16)
- vi. Pulp: Seed ratio (Characteristic 26)

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. Notes (1-9) shall be given for each state of expression of characters for different characteristics for the purpose of electronic data processing.

3. **Legend**

(a) Characteristics with plus (*) sign: The observations 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 are rendered impossible by preceding phenological characteristics or by the environmental conditions of the testing region, under such exceptional situation, adequate explanation shall be provided.

(b) Characteristics with plus (+) sign: 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 are to be taken are given in the explanation or figure(s) for clarity and not the colour variation.

4. Type of assessment of characteristics indicated in column seven of Table of Characteristics are as follow:

- a) **VG:** *Visual assessments by a single observation of a group of plants or parts of plants*
- b) **VS:** *Visual assessments by a single observation of individual plants or parts of plant*
- c) **MG:** *Measurement by a single observation of a group of plants or parts of plants*
- d) **MS:** *Measurement by a single observation of individual plants or parts of plant*

5. A 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. The relevant growth stages corresponding to these code numbers are described below-
- a) Tree type and habit: Observation should be made on growth pattern during winter.
 - b) Leaf characteristics: Observations should be recorded from the middle leaf (mature) of branches.
 - c) Observations on flowers should be made at the time of full bloom (75% flowering).
 - d) Fruit: Observations on the mature fruits should be taken with minimum sample of 5 numbers.

e)

VII. Table of characteristics

S.N.	Characteristics	States	Notes	Example accession/ varieties	State of observation	Type of assessment
1	2	3	4	5	6	7
1 (* (+)	Growth habit	Spreading	3	Goma Priyanka, Gokak-1, Gokak-2,	5(a)	VS
		Semi-spreading	5	Konkan Bahadoli, Gokak-3,		
		Upright	7	CISH J-42, CISH J-37		
2	Tree foliage type	Sparse	1	-	5(a)	VS
		Dense	3	CISH J-42, CISH J-37, Goma Priyanka, Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3 ,		
3 (* (+)	Mature Leaf Colour	Green	3	Gokak-1	5 (b)	VG
		Dark green	5	CISH J-42, CISH J-37, Goma Priyanka, Konkan Bahadoli, Gokak-2, Gokak-3		
4 (* (+)	Leaf Lamella Surface	Smooth	3	CISH J-42, CISH J-37, Goma Priyanka, Konkan Bahadoli	5 (b)	VG
		Wavy	5	Gokak-1, Gokak-2 Gokak-3		
5 (* (+)	Leaf Apex	Acute	3	Konkan Bahadoli	5 (b)	VG
		Acuminate	7	CISH J-42, CISH J-37, Goma Priyanka, Gokak-1, Gokak-2, Gokak-3		
6 (* (+)	Leaf Base	Acute	3	CISH J-42, CISH J-37, Goma Priyanka, Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3	5 (b)	VG
		Round	7	-		
7 (* (+)	Leaf length: width ratio	Low (<2.0)	3	CISH J-42, Konkan Bahadoli, Gokak-1	5 (b)	MG
		High (>2.0)	7	CISH J-37, Goma Priyanka, Gokak – 2,		

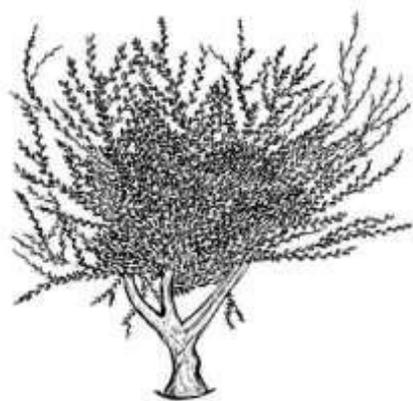
				Gokak – 3		
8 (* (*)	Inter nodal length	Short (<6.0 cm)	3	-	5 (b)	MS
		Medium (6.0 to 7.5 cm)	5	CISH J-42, CISH J-37, Gokak –1, Gokak-2		
		Long (>7.5 cm)	7	Goma Priyanka, Konkan Bahadoli, Gokak-3		
9 (* (*)	Petiole length	Short (<1.5 cm)	3	-	5 (b)	MG
		Medium (1.5 to 2.5 cm)	5	CISH J-37, Goma Priyanka, Gokak – 3		
		Long (>2.5 cm)	7	CISH J-42, Konkan Bahadoli, Gokak-1, Gokak – 2		
10 (* (*)	Newly flush color	Light pinkish brown	3	Goma Priyanka, Gokak-1, Gokak-2, Gokak-3	5 (b)	VG
		Light greenish brown	7	CISH J-42, CISH J-37, Konkan Bahadoli		
11	Initiation of bloom	Early (2 nd week February)	3	CISH J-42	5 (c)	MG
		Medium (3 rd to 4 th week February)	5	CISH J-37, Goma Priyanka, Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3		
		Late (1 st week March)	7	-		
12 (* (*)	Inflorescence length: diameter ratio	Low (<1.0cm)	3	CISH J-42, CISH J-37, Goma Priyanka,	5 (c)	MS
		Medium (1.0 to 1.2 cm)	5	Gokak-1		
		High (>1.2cm)	7	Konkan Bahadoli, Gokak- 1, Gokak-2, Gokak-3		
13 (* (*)	Mature fruit colour	Purple red	1	CISH J-42, CISH J-37	5 (d)	VG
		Dark purple	2	Goma Priyanka, Konkan Bahadoli, Gokak-2, Gokak-3,		
		Purple black	3	Gokak-1		
14 (* (+ (+)	Mature fruit shape	Oblong	3	Goma Priyanka, Konkan Bahadoli	5 (d)	VG
		Elliptic	5	Gokak –1, Gokak-2, Gokak-3		
		Ovoid	7	CISH J-42, CISH J-37		
		Round	9	-		
15 (* (+)	Mature fruit apex	Flat	3	Goma Priyanka, Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3	5 (d)	VS

		Depressed	5	CISH J-42, CISH J-37		
		Round	7	-		
16 (* (+)	Mature fruit: stalk end	Nipple shape	3	CISH J-42, CISH J-37	5 (d)	VS
		Flattened	5	Goma Priyanka		
		Depressed	7	Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3		
17	Mature fruit pulp colour	Cream white	1	CISH J-42, CISH J-37, Goma Priyanka, Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3	5 (d)	VG
		Purple white	9	--		
18 (* (+)	Ripe fruit weight	Low (<10.0g)	3	CISH J-42	5 (d)	MS
		Medium (10.0 to 15.0 g)	5	Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3		
		High (>15.0g)	7	CISH J-37, Goma Priyanka		
19 (* (+)	Ripe fruit length	Short (<3.0 cm)	3	CISH J-42	5 (d)	MS
		Medium (3.0 to 4.0 cm)	5	Konkan Bahadoli, Gokak-2, Gokak-I, Gokak-3		
		Long (>4.0 cm)	7	CISH J-37, Goma Priyanka, Gokak-1		
20 (* (+)	Ripe fruit breadth	Narrow (<2.0 cm)	1	CISH J-42	5 (d)	MS
		Medium (2.0 to 2.5 cm)	2	Konkan Bahadoli		
		Wide (>2.5 cm)	3	CISH J-37, Goma Priyanka, Gokak-1, Gokak-2, Gokak-3		
21 (* (+)	Ripe fruit Size	Small (<7.0 cm ²)	3	CISH J-42	5 (d)	MS
		Medium (7.0 to 11.0 cm ²)	5	Konkan Bahadoli, Gokak-1, Gokak-2, Gokak-3		
		Large (>7.0 cm ²)	7	CISH J-37, Goma Priyanka		
22 (* (+)	Seed weight	Low (<1.7 g)	3	-	5 (d)	MG
		Medium (1.7 to 2.0 g)	5	Goma Priyanka, Gokak-1, Gokak-2, Gokak-3		
		High (>2.0g)	7	CISH J-37, Konkan Bahadoli		
23 (* (+)	Pulp Content	Low (<80%)	3	-	5 (d)	MG
		Medium (80 to 90%)	5	Goma Priyanka, Konkan Bahadoli, Gokak-1,		

				Gokak-2, Gokak-3		
		High (>90%)	7	CISH J-42		
24 (*)	Seed	Absent	1	-	5 (d)	MG
		Rudimentary	5	CISH J-42		
		Present	9	CISH J-37, Goma Priyanka, Gokak-1, Gokak-2, Gokak-3, Konkan Bahadoli		
25 (*)	Pulp TSS	Low (<12.0 °B)	3	CISH J-42, Gokak -1, Gokak -2, Gokak -3	5 (d)	MG
		Medium (12.0 to 15.0 °B)	5	Konkan Bahadoli,		
		High (>15.0 °B)	7	CISH J-37, Goma Priyanka		
26 (*)	Pulp: Seed Ratio	Low (<10.0)	3	Konkan Bahadoli	5 (d)	MG
		Medium (10.0 to 16.0)	5	Goma Priyanka, Gokak-1, Gokak-2, Gokak-3,		
		High (>16.0)	7	CISH J-37		

VIII. Explanation on the Table of Characteristics

Characteristic 1: Growth habit



(3)
Up right



(5)
Semi- Spreading



(7)
Spreading

Characteristic 5 :Leaf Apex



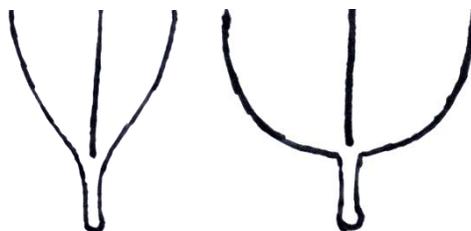
Acute

(3)

Acuminate

(7)

Characteristic 6 : Leaf Base



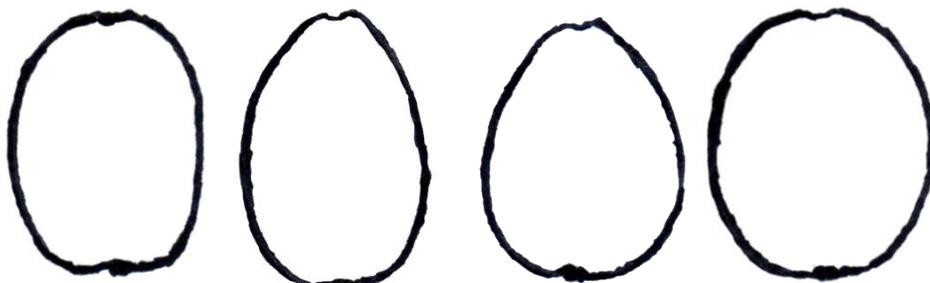
Acute

(3)

Round

(7)

Characteristic 14 : Mature fruit shape



Oblong

(3)

Elliptic

(5)

Ovoid

(7)

Round

(9)

Characteristic 15 : Mature fruit apex

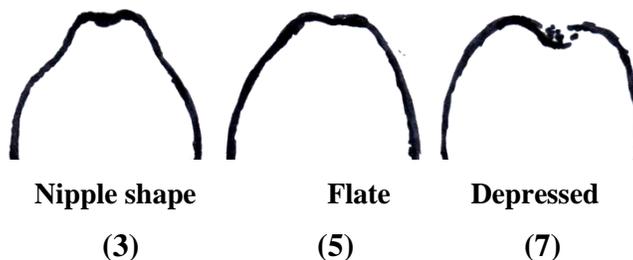


(3)
Flat

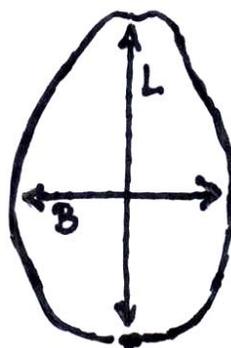
(5)
Depressed

(7)
Round

Characteristic 16 : Mature fruit : stalk end



Characteristic 19&20 : Mature fruit length & breadth (from middle part of fruit)



Characteristic 25: Pulp TSS (°Brix)

The fruits of the variety under test shall be harvested as per uniformity in size, shape and colour at maturity stage. For determination of total soluble solid (TSS), the fruits should be taken in 5 replication. After washing and wrapping fruit pulp in cheesecloth, squeezing the juice to measure TSS by using hand Refractometer (ERMA, Japan) and the TSS expressed in ° Brix.

Characteristic 26: Pulp: Seed ratio

The seed shall be removed from the fruit. Then seed and pulp of fruit weighed separately.

The Pulp: Seed ratio shall be determined by following formula-

$$\text{Pulp: Seed ratio} = \frac{\text{Average pulp weight (g)}}{\text{Average seed weight (g)}}$$

IX. Working Group details:

The Test Guidelines developed by the Task Force (01/2015) constituted by the PPV & FR Authority consultation with the Director, CISH, Lucknow and Nodal officer Dr. A. K. Singh, Pr. Scientist, CISH, Lucknow.

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IX. DUS testing centers

Nodal DUS Centre	Other DUS Centre
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