

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

On

**Jackfruit
(*Artocarpus heterophyllus* Lam.)**



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

Contents

- I. Subject
- II. Material required
- III. Conduct of tests
- IV. Methods and observations
- V. Grouping of varieties
- VI. Characteristics and symbols
- VII. Table of characteristics
- VIII. Explanation for the Table of characteristics
- IX. Working Group details
- X. Name of DUS Test Centre

Jackfruit (*Artocarpus heterophyllus* Lam.)

I. Subject

These Test Guidelines shall apply to all the genotypes and varieties of Jackfruit (*Artocarpus heterophyllus* Lam.)

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 plant material 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 Authority (PPV & FRA), 2001. Applicants submitting such plant 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.
2. The plant material has to be supplied in the form of grafts / budded plants. Five plants per genotype, propagated vegetatively needs to be supplied to DUS testing centres.
3. The plant material supplied should be visibly healthy, not lacking in vigour, nor affected by any pest or disease.
4. The plant material should not have undergone any treatment, which would affect the expression of genetic potential of the variety, unless the Registrar of the PPV & FRA may allow or request for such treatment. If it has been treated, full details of the treatment must be provided.
5. The age of the plant(s) shall be minimum nine months from the date of grafting/ budding on the *A. heterophyllus* Lam. rootstock and raised in the polythene bags.

III. Conduct of tests

Minimum growing cycle

1. The minimum duration of the DUS test shall normally be at least for two full-fledged fruiting seasons in two fruit bearing seasons or a tree which shall be a minimum of five years old as assessed by the team/Authority.
2. The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination. In particular, it is essential that the trees produce a satisfactory crop of fruit in each bearing season.

3. If any essential characteristic of the candidate variety is not expressed sufficiently 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. The field test shall be carried out at site under open field conditions favoring normal growth and expression of all the test characteristics.

Testing at DUS testing center

The tests shall normally be carried out at the DUS testing center's for the recommended period of years. However, looking into the perennial nature of the crop, provision has been made for *on-site DUS testing* with prior precautions as mentioned below.

Testing on-site

The applicant should have well grown bearing mother plant *on-site* (for SAU, Institutes and at farmer's field). Since Uniformity & Stability of propagated trees cannot be tested on a single tree *on-site*, the Registrar for this purpose, shall stipulate the applicant to produce grafted trees (27 Nos.) within the first 09 (Nine) years. Failing which the registration shall not be renewed.

- The applicant or his/her nominee shall submit a request to the Authority for *on-site* examination prior to start of bearing season 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.
- All chimeric branches/infested/malformed branches have to be removed before considering the *on-site* tree as mother tree. If the breeder/farmer objects to it such a tree cannot be considered for DUS. Such a tree with GIS position shall be permanently numbered on the procambium under the bark at 10ft or above the ground. The less of this can lead to forfeiture of registration.

Conditions for the conduct of on-site examination will be approved by the PPV and FRA, New Delhi, to ensure the site represents normal grouping structure and not exceptions such as in ponds/shade/slope/canopy restricting structures or density etc.

Test Plot Design

The design of the test should be such that plants shall be grafted ones of same age with seed based mother plant identified and labeled or parts of plants may be removed for measurement or counting without any prejudice to the observations which must be made up to the end of the bearing season. If mother plant is not available, a justifiable reason has to be put on record with the history of how the mutant/diverse scion was obtained.

- Number of rows : 3 (With three plants per row)
- Row to Row distance : 7 m
- Plant to plant distance : 7 m
- Number of replications : 3
- No. of plants per replications : 3

IV. Methods and observations

1. The characteristics described in the Table of Characteristics (see section VII) shall be used for the testing genotypes, varieties and hybrids for their DUS.
2. For the assessment of Distinctiveness and Stability, observations shall be made on 3 plants or parts (fruits) taken from each of 3 plants or single tree for *on-site* DUS testing. In the case of parts of plants and the number to be taken from each plant are discussed in the individual characters, in notes given below.

Notes on DUS characters to be recorded on trees at least 5 years old

- a) **Leaf***: Leaf observations must be made on fully expanded leaf (fourth leaf from the tip of any branch) after cessation of active growth. Twenty leaves, 5 leaves each collected from all four sides of the tree (North, South, East and West directions) should be used for recording all leaf characters.
- b) **Tree***: Foliage density (see section VII) must be recorded on trees aged five years and above. The density of leaves along with branches must be considered to classify them as sparse or dense.
- c) **Mature fruit***: Observations on the mature fruit should be recorded when the fruit is ready for harvesting. At this stage fruit spine become well developed and wide spread.
 - **Spine density* (in 5cm × 5cm area*)**: The spine density will be measured after harvesting of mature fruits. The density needs to be recorded at the middle of the fruit with well-developed spines.
- d) **Ripe fruit***: - All observations on the fruit shall be recorded at edible ripe stage. At this stage a dull, hollow sound is produced when the fruit is tapped by the

finger and an aromatic odour develops. The observations must be recorded on five largest fruits selected from the tree during two bearing seasons.

- **Latex exudation***: Fruits should be dissected in cross section and the latex flow must be recorded from the fruit core in ripe fruits.

The intensity of latex flow and duration will be considered to classify them as Gumless, low and high latex exudation.

- **Ripe fruit surface colour***: The fully ripened fruit colour needs to be recorded just before cutting of the fruit and the colours listed in Table of Characteristics (Section VII) and pictures provided can be considered for the same.
- **Ripe fruit rind colour***: The inner fruit rind colour needs to be recorded soon after cutting the ripe fruit, and the colours listed in Table of Characteristics (Section VII) and pictures provided can be considered for the same.

Note- All flake characters must be recorded from twenty flakes

- **Flake colour***: The flake colour has been categorised into four groups viz., White 2. Yellow 3. Orange 4. Coppery red. The Royal Horticulture Society (RHS) colour chart shall be used for the same. The flake colour was found to vary depending on the sunlight intensity in a given season. Thus it's found to be non-reliable character for assessing distinctness.
- **Flake length***: The flake length must be measured from stalk end to tip.
- **Flake width***: The flake width must be measured from middle of the flake.
- **Weight of flakes* (20 flakes with seed)***: The weight of 20 flakes will be recorded in a ripe fruit and categorised as per the descriptions provided in Table of Characteristics (Section VII).
- **Flake thickness***: The flake needs to be cut in the middle portion and thickness can be measured using scale and expressed in millimeter (mm).
- **Flake shape***: Needs to be recorded as per the descriptions provided in Table of Characteristics (Section VII).
- **TSS***: The TSS of the fruit needs to be measured using Hand refractometer (0-60°Brix) and expressed as °Brix.
- **Seed weight***: Twenty seed weight has to be recorded at the time of taking observations on ripe fruit.
- **Seed shape***: The seed shape varies and it can be recorded as per the Table of Characteristics (Section VII) and explanation of notes provided thorough sketch (Section VIII).

** Flakes for these traits have to be from middle region of the selected fruits.*

e) The optimum stages of plant growth for assessment of each characteristic is given in the sixth column of the Table of characteristics are described below.

	Growth stages	Codes
Vegetative		10
flowering		20
Fruit maturity		30
Fruit ripening		40
Seed separation		50

V. Grouping characteristics

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. Grouping characteristics are those in which the documented states of expression, even when produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctiveness; and (b) to organize the growing trial so that similar varieties are grouped together.

The following characteristics shall be used for grouping Jackfruit genotypes/ varieties

I.	Leaf apex shape	(Characteristics 5)
II.	Leaf base shape	(Characteristics 6)
III.	Upper Leaf surface	(Characteristics 9)
IV.	Ripe fruit Size	(Characteristics 15)
V.	Spine density	(Characteristics 19)
VI.	Fruit rind thickness	(Characteristics 21)
VII.	Flake texture	(Characteristics 28)
VIII.	Flake colour	(Characteristics 29)

VI. Characteristics and symbols

1. To assess Distinctness, Uniformity and Stability, the characteristics and their states as given in the Table of Characteristics (Section VII) shall be followed.
2. Marks/score (1 to 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 for 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.
4. (+) See Explanation on the Table of Characteristics in Section VII. It is to be noted only for certain characteristics mentioned in the table.
5. Characteristics denoted with symbols **QL**, **QN** and **PQ** in the first column of the Table of characteristics shall be indicated as;
 - **QL**: Qualitative characteristic
 - **QN**: Quantitative characteristic
 - **PQ**: Pseudo-qualitative characteristic
6. Type of assessment of characteristics indicated in column 7 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

Sl. No	Characteristics	State	Note	Example varieties	Stage of observation	Type of Assessment
1	2	3	4	5	6	7
1 (+) (* QL	Tree Crown Shape	Broadly pyramidal	3	Janagare, Singapore Jack	10	VG
		Spherical	5	Swarna Halasu, A-1		
		Elliptical	7	Palur-2, All season		
2 (* QN (+)	Leaf Blade: Length	Short (< 100 mm)	3	KK-9, Kokan Prolific, Gomati 7	10	MS
		Medium (101-150 mm)	5	Swarna Halasu, Sindhura, Palur-1, Tura 1		
		Long (> 150 mm)	7	Lalbaugh raja, Pechipari, Sadananda,		
3 (* QN (+)	Leaf Blade: Width	Narrow(< 50 mm)	3	Ananya, Panruthi seedling, Gomati 7	10	MS
		Medium(51-75mm)	5	Swarna Halasu, A-1, Tura 1		
		Broad(> 75 mm)	7	Sadananda		
4 (* (+ QL	Leaf Blade Shape	Obovate	3	Sindhura, Kerala Jack,	10	VG
		Elliptical	5	Swarna Halasu, Singapore,		
		Oblong	7	Lalbaugh Raja, Thalavani Plus		
5 (* (+ QL	Leaf Apex Shape	Acute	3	Janagere, Pechiparai	10	VG
		Acuminate	5	Malaji Bakke, Sompadi Gumless.		
		Retuse	7	Seedless Jack, NKT 1		
6 (* (+ QL	Leaf Base Shape	Oblique	3	NKT 1,Lalbaugh Raja,	10	VG
		Rounded	5	Thalavani Plus, Ampati 8		
7 (* (+ QL	Leaf Orientation	Erect	3	Pechiparai, Thenavarikka	10	VG
		Horizontal	5	Red Jack, Tura 1		

8 (* (+) QL	Leaf posture	Flattened Revolute Conduplicate	3 5 7	Singapore jack, TBT 2 and 3 NSP, Jack Uttam Viswas, Lalbagh Raja	10	VG
9 (* (+) QL	Upper leaf surface	Smooth Blisters	1 3	Swarna Halasu, Byrachandra, Sadananda, ManjulaBiskur	10	VS
10 (* (+) QL	Fruiting position	Trunk, primary and secondary branches Only on branches (Primary, secondary and tertiary branches) All positions(Including roots)	3 5 7	Lalbaugh Madhura, Ashoka Red and yellow, Tura 1 Swarna Halasu, KVK Hadonahalli, Ampati 8 BVV-1	20	VG
11 (* (+) QL	Fruit Clustering Habit	Solitary Clusters	3 5	Singapore Jack, Ramachandra, Ampati 8 Swarna Halasu, Palur-1, Nongpoh 7	30	VS
12 (* (+) QL	Fruit Shape	Spheroid Ellipsoid Clavate Oblong Irregular	1 3 5 7 9	Swarna Halasu, Nongpoh 7 Byrachandra, Ashoka yellow, Tura 1 Palur 1, Thenavarikka, South Tripura 7 Anbalagan, Ampati 8 Hort. Veg-1, RHH 10	30	VS
13 (* (+) QL	Stalk attachment to fruit	Depressed Flattened Inflated	3 5 7	KT 7, KT 10, KT 12 , Tura 1 Palur-1, NSP, Gomati 7 Swarna Halasu	30	VS
14 (* (+) QL	Latex exudation (cross section of fruit core)	Gumless Low(<2ml) High(>2ml)	1 3 5	Somapadigumless, Nelagudigae Singapore Jack, Ampati 8 NSP, Swarna Halasu, Tura 1	40	MS

15 (* QN	Ripe fruit size	Very Small (< 3 kg)	1	Sirsi Rudrakshi small, Kesaramadugu, RHH 10	30	MS
		Small (>3-6kg)	3	Ramachandra Hosur, Ampati 8		
		Medium (>6-12 kg)	5	Singapore Jack, Swarna Halasu, Byrachandra, Tura 1		
		Big (>12-20 kg)	7	LalbaughMadhura, T. Badol		
		Very big(>20 kg)	9	NSP, Palur 1 and 2, T. Gabong		
16 (* PQ (+)	Ripe fruit Peel colour	Green (RHS 134-136)	3	Byrachandra, Rudrakshi,Ampati 8	30	VS
		Greenish yellow (RHS N144 -145)	5	Singapore Jack, Tura 1		
		Brown (RHS 199-200)	7	Tubagare Red, Ramachandra, T. Gabong		
17 (* QL (+)	Fruit Peel Surface	Smooth	3	Rudrakshi types	30	VS
		Spiny	5	Lalbaugh Madura, Palur 1 and 2, Tura 1		
18 (* (+) QL	Shape of Spine	Flat	3	Lalbaugh Madura, Tura 1	30	VS
		Pointed	5	Rudrakshi types		
19 (* (+) QN	Spine Density (5X5 cm ² Area)	Sparse ≤50	3	Swarna Halasu, Rudrakshi types, Gomati 7	30	MS
		Dense >50	5	Byrachandra,, Tura 1		
20 (* (+) QL	Ripe fruit rind color (inner rind)	White (RHS 155)	3	KT-3, Channakrishnappa 3	40	VS
		Yellow (RHS 1-13)	5	KK-1, Palur-2, Gomati 7		
		Orange (RHS 24-26)	7	KT-9, Shivakumar-3, South Tripura 8		
21 (* (+) QN	Fruit rind thickness	Thin (≤5 mm)	3	Byrachadra, Ramachandra Anbalagan	40	MS
		Thick (>5 mm)	5	Singapore Jack, Swarna Halasu, Tura 1		
22 (* QN	Fruit core diameter	Low (≤50mm)	3	Ashoka Yellow, Raja Rudrakshi, Tura 1	40	MS
		High (>50 mm)	5	Swarna Halasu, Lalbaugh Madhura, Gomati 7		

23 (* QN	Number of flakes per kg fruit	Few (<10)	3	Lalbaugh Madhura, Verappa, Tura 1	40	MS
		Medium (10-20)	5	Swarna Halasu, Palur-1, Nongpoh 7		
		More (>21)	7	Byrachandra, NKT-2, Ampati 8		
24 (* QN	Individual flake length	Short (≤ 50 mm)	3	KK 10, Swarna Halasu, Ampati 8	40	MS
		Medium (51-75 mm)	5	Lalbaugh Madhura, Singapore Jack, Nongpoh 7		
		Long (≥ 75 mm)	7	Byrachandra, Palur 1, Palur 2, Tura 1		
		Narrow (≤ 30 mm)	3	Raja Rudrakshi, Pynursla 2, Ampati 8	40	MS
		Medium (31-50 mm)	5	Byrachandra, HV 2, Gomati 7		
		Broad (≥ 51 mm)	7	Lalbaugh Madhura, HV 1, Tura 1		
26 (* (+) QN	Flake thickness	Thin (≤ 0.3 cm)	3	All Season, Byrachandra Palur-1, Ampati 8	40	MS
		Thick (>0.3cm)	5	Singapore Jack, Swarna Halasu, Tura 1		
27 (* (+) QL	Flake Shape	Spheroid	1	Swarna Halasu, Nelugudige, RHH 10	40	VS
		Cordate	2	Singapore Jack, KT 10, Tura 1		
		Twisted	3	Lalbaugh Madhura, KK-4		
		Rectangular	4	NSP, Nelugudige, Ampati 8 Palur-1, Palur-2		
		Oblong with curved tip	5	Byrachandra, Sompadigumless, S. Tripurs 8		
		Irregular	6			
28 (* QL	Flake texture	Soft	3	Ampati 3, Kamrup-1, Ampati 8	40	VS
		Firm	5	Swarna Halasu, Palur-1 and 2, Tura 1		
29 (* PQ (+)	Flake Color	White (RHS 155)	1	Panruthi, HRS 2, VRT 11, BVV 1		
		Yellow (RHS 1-10)	3			

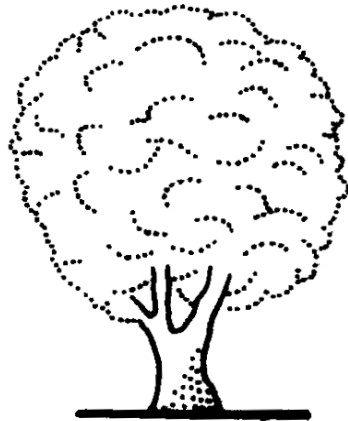
		Orange (RHS 24-26)	5	Mottamvarika, Tenavarikka, Swarna Halasu, Palur-1, Gomati 7	40	VS
		Coppery red (RHS 30-35)	7	Nelugudigae, Byrachandra, Tubagere red, South Tripura 8 Shivu, K V S, V. Kote		
30 (* QL	Fruit: Sweetness (TSS°Brix)	Low (<10° Brix)	1	HV-2	40	MS
		Medium (10.10° to 20° Brix)	3	Palur-1 and 2, Tura 1		
		High (20.10° -30.00° Brix)	5	Swarna Halasu, NSP, Nongpoh 7		
		Very High (> 30.10° Brix)	7	Lalbaugh Madhura, Tenavarikka		
31 (* QN	Flake to Fruit ratio	Low (<0.30)	3	HV 2, ypes, Tura 1	40	VS
		Medium(0.31- 0.50)	5	Swarna Halasu, Byrachandra, S.Tripura 8		
		High (> 0.51)	7	Palur, Lalbaugh Madhura, Gomati 7		
32 (+ (* QL	Seed Shape	Spheroid	1	Harini Kumar, Kesarumadugu, Ampati 3, Tura 1	40	VS
		Ellipsoid	2	KT-12, T. Gabong		
		Elongate	3	Kerala, KT-7, Ampati 8.		
		Oblong	4	NKT-2, HRS-1 Swarna Halasu, Gomati 7		
		Reniform	5	Nongpoh 7, South Tripura 7		
		Irregular	6	HV-1, HV-2		
33 (+ (* QL	Seed colour (with seed coat)	Cream	3	HV-2, NKT-2, Muttamvarika, South Tripura 7	40	VS
		Brown	5	Byrachandra, Swarna Halasu, Tura 1		

VIII. Explanation for the Table of Characteristics

Characteristic 1: Tree crown shape



Broadly pyramidal
(3)



Spherical
(5)



Elliptical
(7)



Broadly pyramidal
(3)



Spherical
(5)



Elliptical
(7)

Characteristic 2: Leaf blade length





Short
(3)

Medium
(5)

Long
(7)

Characteristic 3: Leaf blade width



Narrow
(3)

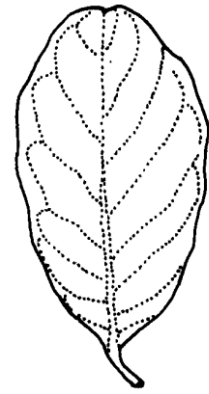
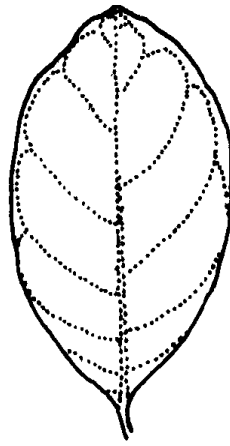
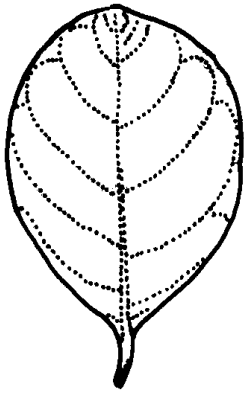


Medium
(5)



Broad
(7)

Characteristic 4: Leaf blade shape



Obovate
(3)



Elliptical
(5)



Oblong
(7)

Characteristic 5: Leaf apex shape



Acute
(3)

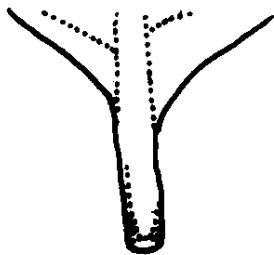


Acuminate
(5)

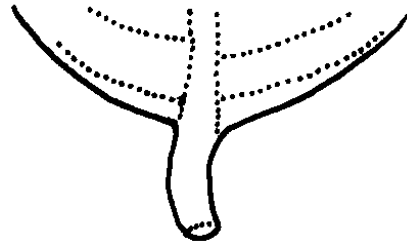


Retuse
(7)

Characteristic 6: Leaf base shape



Oblique
(3)



Rounded
(5)

Characteristic 7: Leaf orientation



Erect
(3)



Horizontal
(5)

Characteristic 8: Leaf posture



Flattened
(3)



Revolute
(5)



Conduplicate
(7)

Characteristic 9: Upper leaf surface



Smooth
(1)



Blisters
(3)

Characteristic 10: Fruiting position



Trunk, Primary and secondary branches
(3)



Only on branches(primary, secondary and tertiary)
(5)



All positions(including roots)
(7)

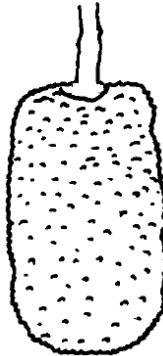
Characteristic 11: Fruit clustering habit



Solitary
(3)

Cluster
(5)

Characteristic 12: Fruit Shape



Spheroid

Ellipsoid

Clavate

Oblong

Irregular

(1)

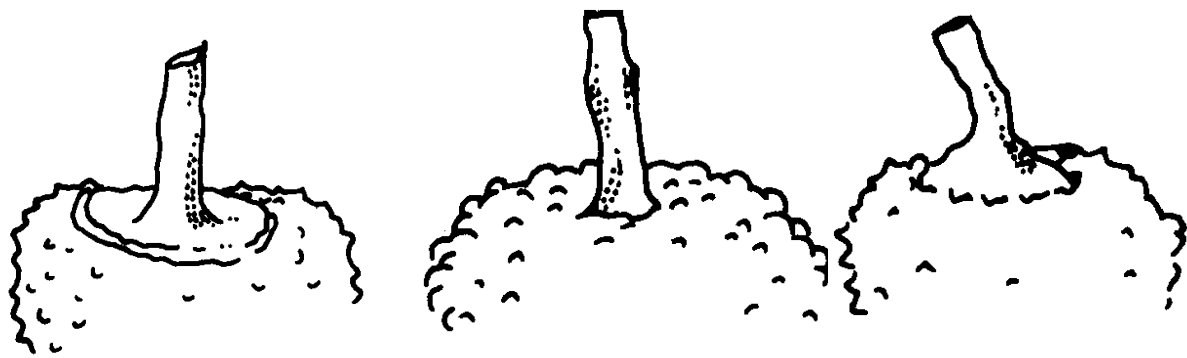
(3)

(5)

(7)

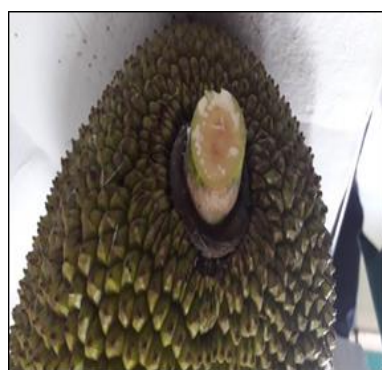
(9)

Characteristic 13: Stalk attachment to fruit



Depressed

(3)



Flattened

(5)



Inflated

(7)

Characteristic 14: Latex exudation at harvest of mature fruits



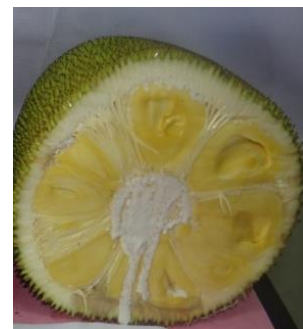
Gumless

(1)



Low

(3)



High

(5)

Characteristic 16: Ripe fruit peel colour



**Green
(3)**



**Greenish yellow
(5)**



**Brown
(7)**

Characteristic 17: Fruit peel surface



**Smooth
(3)**



**Spiny
(5)**

Characteristic 18: Shape of spine

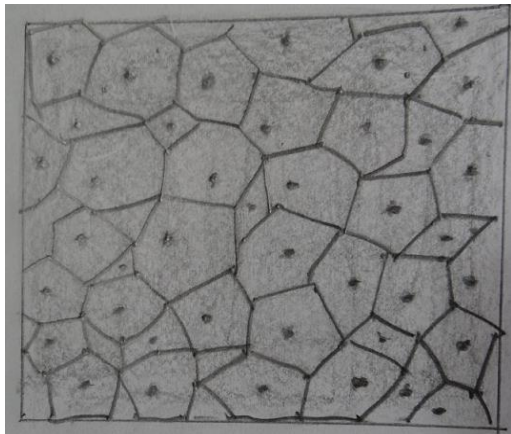


**Flat
(3)**

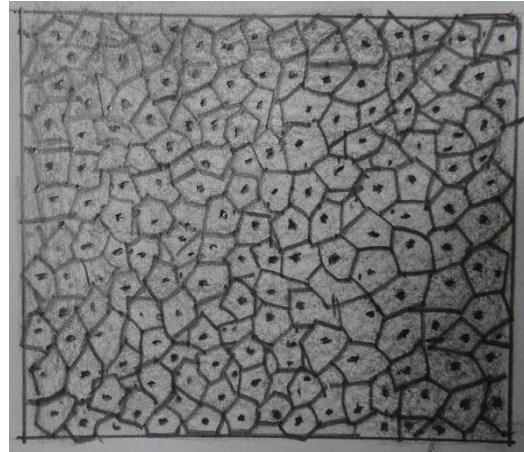


**Pointed
(5)**

Characteristic 19: Spine density



Sparse (≤ 50 per 25cm^2)
(3)



Dense (> 50 per 25cm^2)
(5)

Characteristic 20: Ripe fruit rind color (inner rind)



White
(3)



Yellow
(5)



Orange
(7)

Characteristic 21: Ripe fruit rind thickness



Thin
(3)

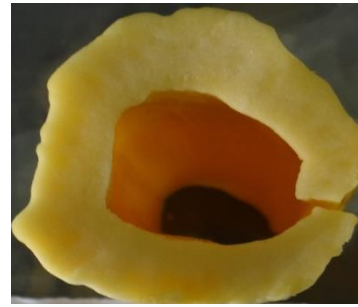


Thick
(5)

Characteristic 26: Flake thickness

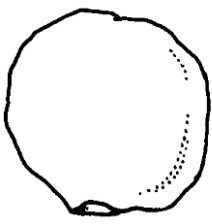


Thin (≤ 0.3 cm)
(3)



Thick (> 0.3 cm)
(5)

Characteristic 27: Flake Shape



Spheroid
(1)



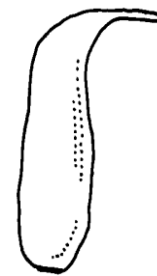
Cordate
(2)



Twisted
(3)



Rectangular
(4)



Oblong with curved tips
(5)



Irregular
(6)



Spheroid
(1)



Cordate
(2)



Twisted
(3)



Rectangular
(4)



Oblong with curved tips



Irregular

(5)

(6)

Characteristic 29: Flake color



**White Group
(1)**



**Yellow group
(3)**



**Orange group
(5)**



**Coppery red
(7)**

Characteristic 32: Seed shape



Spheroid

Ellipsoid

Elongate

Oblong

Reniform

Irregular

(1)

(2)

(3)

(4)

(5)

(6)



Spheroid

Ellipsoid

Elongate

(1)

(2)

(3)



Oblong

Reniform

Irregular

(4)

(5)

(6)

Characteristic 33: Seed colour



Cream
(3)

Brown
(5)

IX. Working Group Details

The DUS test guidelines developed by the Task force (2/2019) constituted by the PPV & FR Authority for **Jackfruit (*Artocarpus heterophyllus Lamk.*)** with consultation by Nodal officer, UAS, GKVK, Bangalore and Co-Nodal officer of Collaborating centre ICAR Research Complex for NEH Region, Umiam, Meghalaya. Technical inputs also provided by the PPV & FR Authority.

1. **Dr. M. R. Dinesh**
Director, **Chairman**
ICAR-Indian Institute of Horticultural Research
Hessaraghatta Lake Post, Bengaluru-560089
2. **Dr. Prakash Patil,**
Principal Scientist and Project Coordinator (Fruits) **Member**
ICAR-IIHR, Hessaraghatta Lake Post, Bengaluru-560089
3. **Dr. Shyamamma,**
Professor & PI of DUS Project **Member**
Department of Biotechnology, University Agriculture
Sciences, GKVK, Bangalore, Karnataka-560065
4. **Dr. S. Ruth Assumi** **Member**
Scientist, ARS
Division of Horticulture
ICAR Research Complex for NEH Region
Umiam-793103, Meghalaya
5. **Dr. Ravi Prakash**
Registrar, PPV & FRA, New Delhi **Member**
Secretary

X. Name of DUS Test Centre:

Lead DUS Test Centre	Collaborating DUS Test Centre
Department of Biotechnology, University Agriculture Sciences, GKVK, Bangalore, Karnataka-560065	Division of Horticulture ICAR Research Complex for NEH Region Umiam-793103, Meghalaya