भारतीय पौधा किस्म जरनल

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पौधा किस्म और कृषक अधिकार संरक्षण प्राधिकरण
एनएएससी काम्प्लैक्स, डीपीएस मार्ग, निकट टोडापुर गांव, नई दिल्ली–110012

PROTECTION OF PLANT VARIETIES & FARMERS' RIGHTS AUTHORITY
NASC COMPLEX, DPS MARG, Opp. Todapur Village, New Delhi-110012

भारतीय पौधा किस्म जरनल, खण्ड 10, अंक 11
नवंबर 07, 2016 / कार्तिक - शुक्ल 07, शक् 1938

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PROTECTION OF PLANT VARIETIES & FARMERS' RIGHTS AUTHORITY
NASC Complex, DPS Marg, Opp. Todapur Village, New Delhi – 110 012

'भारतीय पौधा किस्म जरनल पौधा किस्म और कृषक अधिकार संरक्षण प्राधिकरण (पौ.कि.कृ.अ.सं.प्रा.) का आधिकारिक जरनल है। पीपीवी और एफआर अधिनियम, 2001 तथा पीपीवी और एफआर नियमावली, 2003 के नियम 2 (जी) के अंतर्गत अध्यक्ष, पीपीवी और एफआरए, एस.2, ए ब्लाक, एनएएससी काम्प्लैक्स, डीपीएस मार्ग, निकट टोडापुर गांव, नई दिल्ली–110012 की ओर से प्राधिकरण के रजिस्ट्रार द्वारा प्रकाशित किया जा रहा है।

Plant Variety Journal of India is the Official Journal of the Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA) published by the Registrar on behalf of the Chairperson, PPV & FRA, S-2 A Block, NASC Complex, DPS Marg, Opp. Todapur Village, New Delhi-110012 under the PPV & FR Act, 2001 and Rule 2 (g) of the PPV & FR Rules, 2003.

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10. DUS Test guideline of Kodo millet (*Paspalum scorbiculatum* L.)
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13. DUS Test guideline of elephant foot yam (*Amorphophallus paeoniifolius*).
14. DUS Test guideline of taro (*Colocasia esculenta var. esculenta, Colocasia esculenta var. antiquorum, Colocasia esculenta var. stoloniferum*, *Cyrtosperma chamissonis/ C. merkusii*).
15. DUS Test guideline of Jatropha (*Jatropha curcas* L.)

Corrigendum

It is hereby brought to notice that in the advertisement for the varieties applied for registration by DCM Shriram Limited for the crops Okra with denominations DI 62459 & LR 62216 published in PVJ Vol. 10 No.6, 2016 dated 10/06/2016 Page no. 64-66 & S.No. -26 & 27 for the words Extant inadvertently it has been published as New. These may be read as follows:

(a) Reg/2012/387, Denomination : DI 62459, Category: Extant (VCK)

(b) Reg/2012/380, Denomination: LR 62216, Category: Extant (VCK)

Inconvenience caused in this regard is deeply regretted.

(R. C. Agrawal)
Registrar General

OFFICE ORDER

The PPV&FR Authority in its 25th Meeting had delegated its power under Section 10 read with Regulation 4 of PPV&FR Regulations, 2006 to determine the jurisdiction of the Registrars to the Chairperson of the Authority. Accordingly, Ld. Chairperson in exercise of his powers has determined the jurisdiction of the Registrars as follows:-

S. No.	Registrar	Varieties
1.	Dr. R.C. Agrawal, Registrar-General	All New, extant and Essentially derived varieties. (excluding new and extant farmers' varieties)
2.	Dr. Ravi Prakash, Registrar.	Farmers' varieties (new and extant)

This is issued in super-session to all other office orders in this regard.

sd/-
(Ravi Prakash)
Registrar

Copy to:

1. **PS to Chairperson**
2. **PS to Registrar-General**
3. **Registrar**
4. **Joint Registrar.**
5. **Deputy Registrar**
6. **Legal Advisor-I/II**
7. **Technical Assistant**
8. **Computer Assistants**

Seed sent for DUS Testing to DUS Test centers during the month of October, 2016.

Crop	Category				
	New	VCK	EDV	FV	
Bread Wheat				2	
Coriander				1	

Durum Wheat				**1**	
Indian Mustard (Sarso)	**1**	**2**		**11**	
Indian Mustard (Karan Rai)				**4**	
Rapeseed				**1**	
Total	**1**	**2**	**0**	**20**	**23**

PUBLIC NOTICE

Sub: Advertisement is given under sub-section (2) and (3) of Section 21 of the Protection of Plant Varieties and Farmers' Rights Act, 2001 and Rules 30 and 31 of PPV & FR Rules, 2003

The passport data of each variety furnished by the applicant are herewith advertised as specified for calling objections from any persons.

The place or places where the specimen of the variety may be inspected can be obtained in writing from the Registrar of the PPV & FR Authority.

Any person may, within three months from the date of advertisement of the application(s) give notice of opposition in writing to the registration of variety (as per Form PV-3 of the First Schedule of PPV&FR Rules, 2003). Oppositions, if any, to the registration must be submitted, in triplicate, to the Registrar, PPV&FRA, NASC Complex, DPS Marg, New Delhi -110 012 accompanied with the fee of Rs.10,000/- (Rupees Ten Thousand Only) by way of Demand Draft drawn in favour of " PPV & FR Authority" payable at New Delhi.

FORM O - 1
(See Rule 30)
Government of India, Plant Varieties Registry
Advertisement of accepted application for registration

1. Application No. | **N1** | **GH1** | **12** | **1** | filed on 04.01.2012 by **JK Agri Genetics Ltd., 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401** for a **New** of crop **Tetraploid Cotton** [*Gossypium hirsutum* L.] having denomination **JKCH0109 BGII (JKCH 0109 Double Bt)** the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety **: JKCH0109 BGII (JKCH 0109 Double Bt)**
Applicant : **JK Agri Genetics Ltd.**
Address of the Applicant : 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401

Nationality of Applicant : Indian
Application details : | **N1** | **GH1** | **12** | **1** |
a. Number
b. Date of receipt : 04.01.2012
c. Date of acceptance : --
Crop (Taxonomical Lineage) : **Tetraploid Cotton** [*Gossypium hirsutum* L.]
Denomination : JKCH0109 BGII (JKCH0109 Double Bt)
Type of Variety : New
Classification of Variety : Hybrid & Transgenic
Previously proposed Denomination : Not applicable
Name of Parental Material : **JKC2002 BGII X JKC728**
Source of parental material : Own germplasm, JK Agri Genetics Ltd.
Name of Reference Varieties **: MCU 11, CSHH-198**
Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Leaf: Shape	Palmate
Flower: Petal colour	Cream
Flower: Pollen colour	Cream
Boll: Shape (longitudinal section)	Round
Fibre: Length(2.5% span length)(mm)	---
B. Distinct Characteristics: JKCH0109 BGII (JKCH 0109 Double Bt) has distinguishing character as Boll prominence of tip: **Blunt.**	

C. Reference variety: **MCU 11, CSHH-198** has distinguishing character as Boll prominence of tip: **Pointed.**	
D. Date of commercialization of the variety	Not commercialized
E. Agronomic and commercial attributes	**Details of the candidate variety (JKCH0109 BGII (JKCH 0109 Double Bt))**

S.No.	Particulars			
1	Sowing time (Optimum sowing period)	Middle of the April to May in irrigated and the rainfed conditions with the commencement of the monsoon.		
2	Seed sowing rate/method	Seed Rate should be 1300 to 1400 gm/acre in medium to heavy soils, Dibbling method is suitable for planting.		
3	Major disease and insect-pest control	S.No.	Insect/Disease	Management Practies
		1	Jassids, Aphids	ACTARA or PRIDE @0.4ml per litre of water, or Acephate @ 2gm per/litre of water or CONFIDOR @ 0.4 ml/lit or ADMIRE @0.2 ml etc.
		2	White fly	Triasophos @ 600-800 ml/ha, HOSTOTHION @ 2.5 ml litres of water
		3	Fusarim wilt	Rotation with sorghum and maize reduces disease incidence, how ever, Carbendazim or Copper oxy chloride can be applied to control mycelia growth
		4	Bacteria 1 Blight	JKAL Hybrids are tolerant, however, Carbondazim + Streptocycline or Use Agrimycin with Carbendazim
		5	Gray mildew	Use fungicide calaxin 0.1%
		6	Boll rot	Copperoxychloride or carbendazim should be sprayed along with recommended insecticide
		7	Root rot	Drench the plants in affected patch with carbendazim (0.1%). Inter crop with mothbean in such area. ZnSO4 @ 24 kg/ha should be applied in soil.
4	Critical stages for irrigation	Flowering and boll development stages are most critical periods to moisture stress. Hence, irrigation is essential at these stages.		
5	Yield potential of the variety	25-35 qt/ha		

Commercial attributes:

Sr.No.	(candidate variety)
1	High yielder, Maturity: 150 to 160 days
2	Wider adaptability
3	Chain bearing, stay green character
4	Tolerance, CLCuD hot spot & drought
5	Tolerent to jassids & white flies
6	Recommended for normal crop management, mono cropping, Assured rainfa;; & rain fed areas, Suitable for Punjab, Haryana & Rajasthan States of North Zone.
7	Long fibre

Photographs: (See figure-1)

2. Application No. **E13 AE22 11 1261** filed on 29.09.2011 by **JK Agri Genetics Ltd., 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401.** for a **Extant**

(Variety of Common Knowledge) of crop **Okra** [*Abelmoschus esculentus* (L.) Moench] having denomination **JKOH-6166,** the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : **JKOH-6166**
Applicant : **JK Agri Genetics Ltd.**
Address of the Applicant : 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401.
Nationality of Applicant : Indian
Application details
a. Number : **E13 AE22 11 1261**
b. Date of receipt : 29.09.2011
c. Date of acceptance : --
Crop (Taxonomical Lineage) : Okra [*Abelmoschus esculentus* (L.) Moench]
Denomination : JKOH-6166
Type of Variety : Extant (Variety of Common Knowledge)
Classification of Variety : Other (Parent Line)
Previously proposed Denomination : Not applicable
Name of Parental Material : JKOK 222 x JKOK 564
Source of Parental material **:** R&D Farm, Nuziveedu Seeds Ltd**..**
Name of Reference Varieties **: Parbhani Kranti, Arka Anamika**.

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Stem: Colour	Green
Leaf blade: Depth of lobbing	Medium
Stem: Number of nodes at first flowering	---
Fruit : colour	Green
Fruit : Number of locules	<6
Plant: Number of branches	Many
B. Distinct Characteristics: JKOH-6166 has distinguishing character as Fruit : colour: **Light green.**	
C. Reference variety: Parbhani Kranti, Arka Anamika has distinguishing character as Fruit : colour: **Green.**	
D. Date of commercialization of the variety	30/06/2008

E.Agronomic attributes:

S.No.	**Particulars**	**Details of the candidate variety (JKOH-6166)**
1	Suitability of the variety for the area and soil (Recommended area for which variety has been	Kharif Chili growing areas of Maharashtra, Rajasthan, M.P., West Bengal, Bihar and Gujarat & Andhra Pradesh States of India.

	released/recommended)	
2	Seed treatment (Recommended chemical with dosages)	Recommended dose of *.i.* bavistin @ 2g per kg. JKOH-6166 seed by JK Agri-Genetics Ltd. Is always supplied with seed treatment
3	Sowing time (Optimum sowing period)	Around the year except Winter. July to August and Mid Feb.
4	Seed sowing rate/method	Seed Rate: 2.5 kg/Acre seed is sufficient for sowing.
5	Plant Spacing in main field	Maintain row to row 60 to 60 cm and Plant to Plant 20 cm distance
6	Plant population/density in main field	22,000 plants/acre
7	Fertilizer doses & time of fertilizer's application (Type and quantity of fertilizers)	Eight to ten tons of farm yard manure or compost should be applied per hectare to improve soil fertility. The recommended fertilizer requirements per hectare are 60-80 kg N, 60 kg P205 and 40 kg K20. A basal application of 40kg N and entire does of P205 and K20 should be applied at the time of planting. The remaining N is applied as top dressing in two equal splits at tillering and panicle emergence stages. The dosage of panicle emergence stages. The dosage of fertilizer can be adjusted according to local experience and moisture availability.
8	Major disease and insect-pest control	Foliar spray of Ridomil 25 WP (1000 ppm) is required 21 days after sowing to check fungal diseases. Foliar spray of Larvin 75 WP (1000 ppm) or Monocrotophos 36% SL is required 40 days after sowing to control pest population.
9	Critical stages for irrigation	**Flowering and Fruiting stage are the most critical stage** for Okrai crop. Drainage of the field is most important, as Okra is susceptible to water- logging, particularly in the early stages. Crop should be irrigated at regular intervals or as per need of the crop.
10	Harvesting and drying of produce	At maturity or 45 to 48 days after sowing
11	Yield potential of the variety	JKOH-6166 has potential of fruit yield up to 8 to 10 tones/acres.
12	Quality characteristics of the variety, if any	JKOH-6166 is having good fruit color and useful for Transportability purpose.

Commercial attributes:

Sr.No.	Characters	JKOH-6166 (candidate variety)
1	Days to ist picking	45-48 days
2	Yield potential of the variety	JKOH-6166 has potential of fruit yield up to 8 to 10 Tones/Acres
3	Quality characteristics of the variety	JKOH-6166 is having good fruit color and useful for Transportability purpose.
4	Major disease and insect-pest reaction	Good tolerant.

Photographs: (See Figure-2)

3. Application No. | **E30** | **LL39** | **11** | **240** | filed on 10.05.2011 by **JK Agri Genetics Ltd., 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401.** for a **Extant (Variety of Common Knowledge)** of crop **Tomato** [*Lycopersicum lycopersicum (L.)*Karsten ex. Farw.] having denomination **JK AKSHAY,** the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : **JK AKSHAY**
Applicant : **JK Agri Genetics Ltd.**
Address of the Applicant : 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401.

Nationality of Applicant : Indian
Application details
a. Number : **E30** **LL39** **11** **240**
b. Date of receipt : 10.05.2011
c. Date of acceptance : --
Crop (Taxonomical Lineage) : Tomato [*Lycopersicum lycopersicum (L.)*Karsten ex. Farw.]
Denomination : JK AKSHAY
Type of Variety : Extant (Variety of Common Knowledge)
Classification of Variety : Hybrid
Previously proposed Denomination : Not applicable
Name of Parental Material : JTM 767 x JTM 2001
Source of Parental material : Own germplasm
Name of Reference Varieties **: PUSA UPMA.**
Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Plant : Growth type	Determinate
Leaf : Serration	Less serrated
Fruit : Green shoulder	Absent
Fruit : Shape in longitudinal section	Obovoid
Fruit : Colour at maturity	Red
B. Distinct Characteristics: JK AKSHAY has distinguishing character as Fruit: Size (Avg. Weight of 10 fruits)(g): **Large.**	
C. Reference variety: PUSA UPMA has distinguishing character as Fruit: Size (Avg. Weight of 10 fruits)(g): **Medium.**	
D. Date of commercialization of the variety	23/12/2008

E. Agronomic attributes:

S.No.	Particulars	Details of the candidate variety (JK AKSHAY)
1	Suitability of the variety for the area and soil (Recommended area for which variety has been released/recommended)	Kharif tomato growing areas of Maharashtra, Karnataka, Telangana, M.P., West Bengal, Bihar and Gujarat & Andhra Pradesh States of India.
2	Seed treatment (Recommended chemical with dosages)	Recommended dose of Thiram @ 1.5g per kg. JK AKSHAY seed by JK Agri-Genetics Ltd.
3	Sowing time (Optimum sowing period)	During Kharif and Rabi season from June to November.
4	Seed sowing rate/method	Seed Rate: 50-55 gms/acre seed is sufficient for sowing.
5	Plant Spacing in main field	Maintain row to row 90cms and Plant to Plant 60 cms distance
6	Plant population/density in main	9250 plants/acre

	field	
7	Major disease and insect-pest control	Damping off: Copper oxy chloride @2-2.5 gms/lt Early Blight(In case of Rain): Antracol(Propineb(CM)@2-3mg/lt, Alternate spraying with Rhidomil (Metalaxyl+Mancozeb)@2-2.5gms/lt Coller rot at stem: Pesting of COC@2gms/lt Tospo (Control vector Trips): TYLCV (Control vector white fly): Metasystox@2 ml/lt or acetamipride @ 0.3gms/lt Bacterial Spot, Spec and Canker: Streptomycin Spray Red Mite: Propargite (organosulfide) @ 2ml/lt Fruit borer: Avaunt (Indoxicarb)@0.5 ml/lt or Quinalophos @ 2ml/lt Whitefly, Aphid, Jassids, trips: Metasystox @ 2ml/lt or acetamipride @ 0.3 gms/lt or Dimethoate @2ml/lt
8	Harvesting and drying of produce	At maturity or 45-90 days after sowing
9	Yield potential of the variety	JK AKSHAY has potential of fruit yield upto 50 to 58 tones/ha.
10	Quality characteristics of the variety, if any	JK AKSHAY is deep red colour, very firm suitable for distance transportation.

Commercial attributes:

Sr.No.	JK AKSHAY (candidate variety)
1	Determinate
2	Fruit is attractive deep red colour, square round shape, weight 85-95 gms, firm fruit
3	Suitable for Kharif season
4	Early maturity
5	High yielding
6	Excellent for distant transportation

Photographs: (See Figure-3)

4. Application No. | **E19** | **LL19** | **11** | **82** | filed on 13.01.2011 by **Sungro Seeds Private Limited, 3rd Floor, Manish Chambers, B.N. Block, Local Shopping Centre, Shalimar Bagh, New Delhi-110088.** for a **Extant (Variety of Common Knowledge)** of crop **Tomato** [*Lycopersicum lycopersicum (L.)*Karsten ex. Farw.] having denomination **STH-7008,** the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : **STH-7008**
Applicant : **Sungro Seeds Private Limited.**
Address of the Applicant : 3rd Floor, Manish Chambers, B.N. Block, Local Shopping Centre, Shalimar Bagh, New Delhi-110088.

Nationality of Applicant : Indian
Application details
a. Number : | **E19** | **LL19** | **11** | **82** |
b. Date of receipt : 13.01.2011

c. Date of acceptance : --
Crop (Taxonomical Lineage) : Tomato [*Lycopersicum lycopersicum (L.)*Karsten ex. Farw.]
Denomination : STH-7008
Type of Variety : Extant (Variety of Common Knowledge)
Classification of Variety : Hybrid
Previously proposed Denomination : Not applicable
Name of Parental Material : ST-100739 x ST-110739
Source of Parental material **: I**n-house germplasm of Sungro seeds Research Limited
Name of Reference Varieties **: Arka Ahuti**
Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Plant : Growth type	Determinate
Leaf : Serration	Less serrated
Fruit : Green shoulder	Absent
Fruit : Shape in longitudinal section	Ovoid
Fruit : Colour at maturity	Red

B. Distinct Characteristics: STH-7008 has distinguishing character as Fruit: Number of locules: **3-4.**

C. Reference variety: Arka Ahuti has distinguishing character as Fruit: Number of locules: **2.**

D. Date of commercialization of the variety	14/02/2009 as a Avishkar name	
E. Agronomic and commercial attributes	**Attribute**	**STH-7008**
	Growth Type	Determinate
	Days to maturity	65-70 days after transplanting
	Fruit Size	80-90 (gram)
	Fruit Colour(Mature)	Red
	Fruit Shoulder Colour	White
	Fruit Firmness	Very good

Photographs: (See Figure-4)

5. Application No. | **E3** | **ZM17** | **10** | **205** | filed on **30.06.2010** by **JK Agri Genetics Ltd., 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401** for a **Extant** (Variety of Common Knowledge) of crop **Maize** [*Zea Mays* (L.)] having denomination **M 15-1,** the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : **M 15-1**
Applicant : **JK Agri Genetics Ltd.**
Address of the Applicant : 1-10-177, 4th Floor, Varun Towers, Begumpet, Hyderabad-500016, Telangana -501401

Nationality of Applicant : Indian
Application details
a. Number : **E3** | **ZM17** | **10** | **205**
b. Date of receipt : 30.06.2010
c. Date of acceptance : --
Crop (Taxonomical Lineage) : Maize [*Zea Mays* (L.)]
Denomination : M 15-1
Type of Variety : Extant (Variety of Common Knowledge)
Classification of Variety : Typical
Previously proposed Denomination : Not applicable
Name of Parental Material : (JKM 39 x JKM 22)-0-3-2-5-1-2-1-SB-SB
Source of parental material **:** Own germplasm
Name of Reference Varieties **: HKI 1105, HKI 161**
Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Tassel: Time of anthesis (on middle third of main axis, 50 % of plants)	Late
Ear: Time of silk emergence (50% plants)	Late
Ear: Anthocyanin colouration of silks(on day of emergence)	Present
Plant: Length (up to flag leaf)	-----
Ear: Type of grain (in middle third of ear)	Flint
B. Distinct Characteristics: M 15-1 has distinguishing character as Ear: Anthocyanin colouration of silks (on day of emergence) : **Present,** Ear: colour of top of grain : **Orange**	
C. Reference variety: HKI 1105 has distinguishing character as Ear: Anthocyanin colouration of silks (on day of emergence: **Absent.** **HKI 161** has distinguishing character as Ear: colour of top of grain : **Red**	
D. Date of commercialization of the variety	Hybrid sold 05/04/2003
E. Agronomic and commercial attributes	The candidate variety M 15-1 has been exploited as a male parent to develop hybrid JK Surabhi, M 15-1 is early maturity, Dwarf plant with semi-erect narrow leaves, and semi-loose tassel with 10-12 semi curved lateral branches, orange flint bold kernels, white shank.

Photographs: (See figure-5)

PUBLIC NOTICE

Sub: Advertisement is given under sub-section (2) and (3) of Section 21 of the Protection of Plant Varieties and Farmers' Rights Act, 2001 for registration of farmers' variety [Section 2(j)(ii)] read with Rules 30 and 31 of PPV & FR Rules, 2003

It is hereby advertised that the application (s) for registration of farmers' varieties (falling within the definition of extant variety) listed herein have been accepted by the Registrar, Protection of Plant Varieties & Farmers' Rights Authority. The passport data of each variety furnished by the applicant are herewith advertised as specified for calling objections from the interested persons in the matter.

The place or places where the specimen of the variety may be inspected can be obtained in writing from the Registrar of the PPV & FR Authority.

Any person may, within three months from the date of advertisement of the application(s) give notice of opposition in writing to the registration of variety (as per Form PV-3 of the First Schedule of PPV&FR Rules, 2003). Oppositions, if any, to the registration must be submitted, in triplicate, to the Registrar, PPV&FRA, NASC Complex, DPS Marg, New Delhi -110 012 accompanied with the fee of Rs.10,000/-* (Rupees Ten Thousand Only) by way of Demand Draft drawn in favour of "PPV & FRA" payable at New Delhi.

*Farmer(s) are exempted from payment of any fee in proceeding under Section 44 of PPV&FRAct,2001.

FORM O - 1
(See Rule 30)
Government of India, Plant Varieties Registry
Advertisement of accepted application for registration

01. Application No. | **F 55** | **OS 55** | **14** | **73** | filed on 9/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination BHRAMARMALI, the specification includes its drawing and or photograph(s) of

which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA ----------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : BHRAMARMALI
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F55** | **OS 55** | **14** | **73**
b. Date of receipt : 9/1/2014
c. Date of acceptance : 9/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : BHRAMARMALI
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : BHRAMARMALI
Name of Parental Material : Own Material
Name of Reference Varieties **:** Annada

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Uniform purple
Time of heading (50 % of plants with panicles)	Medium
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	Dark brown
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: BHRAMARMALI has distinguishing characters as Spikelet: Colour of stigma: Purple	
C. Reference varieties: Annada has distinguishing characters as Spikelet: Colour of stigma: White	

D. Date of commercialization of the variety	

02. Application No. **F 73** | **OS 73** | **14** | **91** filed on 9/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination MALSIRA, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : MALSIRA

Applicant : Anjan Kumar Sinha

Address of the Applicant : Village Ranbahal, Post Amarkanan, District Bankura, West Bengal

Nationality of Applicant : Indian

Application details

a. Number : | F73 | OS 73 | 14 | 91 |

b. Date of receipt : 9/1/2014

c. Date of acceptance : 9/1/2014

Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)

Denomination : MALSIRA

Type of Variety : Farmers' variety

Classification of Variety : Typical Variety

Previously proposed Denomination : MALSIRA

Name of Parental Material : Own Material

Name of Reference Varieties : Manoharsali

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Medium
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	White
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: MALSIRA has distinguishing characters as Panicle: Exertion: Mostly exerted	

C. Reference varieties:
Manoharsali has distinguishing characters as Panicle: Exertion: Well exerted

D. Date of commercialization of the variety	

03. Application No. | F 77 | OS 77 | 14 | 95 | filed on 10/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination PANATI, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : PANATI

Applicant : Anjan Kumar Sinha

Address of the Applicant : Village Ranbahal, Post Amarkanan, District Bankura, West Bengal

Nationality of Applicant : Indian

Application details

a. Number	:	F77 OS 77 14 95
b. Date of receipt	:	10/1/2014
c. Date of acceptance	:	10/1/2014
Crop (Taxonomical Lineage)	:	Rice (*Oryza sativa* L.)
Denomination	:	PANATI
Type of Variety	:	Farmers' variety
Classification of Variety	:	Typical Variety
Previously proposed Denomination	:	PANATI
Name of Parental Material	:	Own Material
Name of Reference Varieties	:	Salivahana

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Short
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	
Endosperm: Content of amylose	High
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: PANATI has distinguishing characters as Panicle: Awns: Present	

C. Reference varieties: Salivahana has distinguishing characters as Panicle: Awns: Absent

D. Date of commercialization of the variety	

04. Application No. F 68 OS 68 14 86 filed on 9/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination AGNIBAN-B1, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety	:	AGNIBAN-B1
Applicant	:	Anjan Kumar Sinha
Address of the Applicant	:	Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant	:	Indian

Application details

a. Number	:	F68 OS 68 14 86
b. Date of receipt	:	9/1/2014
c. Date of acceptance	:	9/1/2014
Crop (Taxonomical Lineage)	:	Rice (*Oryza sativa* L.)

Denomination : AGNIBAN-B1
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : AGNIBAN-B1
Name of Parental Material : Own Material
Name of Reference Varieties : Mandya Vijaya

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Medium slender
Decorticated grain: Colour	White
Endosperm: Content of amylose	High
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: AGNIBAN-B1 has distinguishing characters as Panicle: Attitude of branches: Erect to semi-erect	

C. Reference varieties: Mandya Vijaya has distinguishing characters as Panicle: Attitude of branches: Semi-erect

D. Date of commercialization of the variety	

05. Application No. **F 64** | **OS 64** | **14** | **82** filed on 9/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination KATARIBHOG, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : KATARIBHOG
Applicant : Anjan Kumar Sinha
Address of the Applicant : Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant : Indian
Application details
a. Number : **F64** | **OS 64** | **14** | **82**
b. Date of receipt : 9/1/2014
c. Date of acceptance : 9/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : KATARIBHOG
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : KATARIBHOG

Name of Parental Material : Own Material
Name of Reference Varieties **:** Manoharsali

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Medium
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Short
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	Light brown
Endosperm: Content of amylose	High
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: KATARIBHOG has distinguishing characters as Panicle: Curvature of main axis: Dropping	

C. Reference varieties: Manoharsali has distinguishing characters as Panicle: Curvature of main axis: Deflexed

D. Date of commercialization of the variety	

06. Application No. **F 59** **OS 59** **14** **77** filed on 9/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination KAKSAL, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : KAKSAL
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F59** **OS 59** **14** **77**
b. Date of receipt : 9/1/2014
c. Date of acceptance : 9/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : KAKSAL
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : KAKSAL
Name of Parental Material : Own Material
Name of Reference Varieties **:** Salivahana

Variety Description:

A. Group Characteristics	Remarks measured values, example varieties, etc.
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	Dark brown
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: KAKSAL has distinguishing characters as Panicle: Attitude of branches: Semi-erect	

C. Reference varieties: Salivahana has distinguishing characters as Panicle: Attitude of branches: Semi-erect to spreading

D. Date of commercialization of the variety	

07. Application No. **F 62** **OS 62** **14** **80** filed on 9/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination KARTIK SAL, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : KARTIK SAL
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F62** **OS 62** **14** **80**
b. Date of receipt : 9/1/2014
c. Date of acceptance : 9/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : KARTIK SAL
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : KARTIK SAL
Name of Parental Material : Own Material
Name of Reference Varieties **:** Karjat 3

Variety Description:

A. Group Characteristics	Remarks measured values, example varieties, etc.
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Medium
Stem: Length (excluding panicle; excluding floating rice)	Very short

Decorticated grain: Length	Short
Decorticated grain: Shape (in lateral view)	Medium slender
Decorticated grain: Colour	White
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Present
B. Distinct Characteristics: KARTIK SAL has distinguishing characters as Panicle: Attitude of branches: Erect to semi-erect	

C. Reference varieties: Karjat 3 has distinguishing characters as Panicle: Attitude of branches: Semi-erect to spreading

D. Date of commercialization of the variety	

08. Application No. **F 93** **OS 93** **14** **111** filed on 13/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination Narkel Jhopa, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : Narkel Jhopa
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F93** **OS93** **14** **111**
b. Date of receipt : 13/1/2014
c. Date of acceptance : 13/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : Narkel Jhopa
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : Narkel Jhopa
Name of Parental Material : Own Material
Name of Reference Varieties **:** Karjat 3

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Medium
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Medium slender
Decorticated grain: Colour	White
Endosperm: Content of amylose	Medium

Decorticated grain: Aroma	Absent
B. Distinct Characteristics: Narkel Jhopa has distinguishing characters as Panicle:Curvature of main axis: Deflexed	

C. Reference varieties: Karjat 3 has distinguishing characters as Panicle:Curvature of main axis: Semi-straight

D. Date of commercialization of the variety	

09. Application No. **F 49** **OS 49** **14** **67** filed on 09/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination KALO BYAR, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : KALO BYAR
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F49** **OS49** **14** **67**
b. Date of receipt : 09/1/2014
c. Date of acceptance : 09/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : KALO BYAR
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : KALO BYAR
Name of Parental Material : Own Material
Name of Reference Varieties **:** Bhalum 1

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Uniform purple
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Very short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Long bold
Decorticated grain: Colour	Light brown
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: KALO BYAR has distinguishing characters as Leaf: Anthocyanin colouration of auricles: Purple; Lemma: Anthocyanin colouration of apex: Very strong; Stem: Anthocyanin colouration of nodes: Present; Panicle: Curvature of main axis: Deflexed	

C. Reference varieties:
Bhalum 1 has distinguishing characters as Leaf: Anthocyanin colouration of auricles: Colorless; Lemma: Anthocyanin colouration of apex: Absent; Stem: Anthocyanin colouration of nodes: Absent; Panicle: Curvature of main axis: Straight

D. Date of commercialization of the variety	

10. Application No. **F 72** | **OS 72** | **14** | **90** filed on 09/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination MURKIMALA, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : MURKIMALA
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F72** | **OS72** | **14** | **90**
b. Date of receipt : 09/1/2014
c. Date of acceptance : 09/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : MURKIMALA
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : MURKIMALA
Name of Parental Material : Own Material
Name of Reference Varieties **:** Mandya Vijaya

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Uniform purple
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Short
Decorticated grain: Length	Long
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	Light brown
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: MURKIMALA has distinguishing characters as Leaf: Anthocyanin colouration of auricles: Light purple; Stem: Anthocyanin colouration of nodes: Present; Panicle: Awns: Present	

C. Reference varieties:

Mandya Vijaya has distinguishing characters as Leaf: Anthocyanin colouration of auricles: Colorless; Stem: Anthocyanin colouration of nodes: Absent; Panicle: Awns: Absent

D. Date of commercialization of the variety	

11. Application No. **F 87** | **OS 87** | **14** | **105** filed on 13/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination FUL PAGRI, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : FUL PAGRI
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F87** | **OS87** | **14** | **105**
b. Date of receipt : 13/1/2014
c. Date of acceptance : 13/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : FUL PAGRI
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : FUL PAGRI
Name of Parental Material : Own Material
Name of Reference Varieties **:** Mandya Vijaya

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Medium slender
Decorticated grain: Colour	White
Endosperm: Content of amylose	Low
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: FUL PAGRI has distinguishing characters as Spikelet: Density of pubescence of lemma: Medium; Lemma: Anthocyanin colouration of apex: Very strong	

C. Reference varieties: Mandya Vijaya has distinguishing characters as Spikelet: Density of pubescence of lemma: Weak; Lemma: Anthocyanin colouration of apex: Weak

D. Date of commercialization of the variety	

12. Application No. **F 79** | **OS 79** | **14** | **97** filed on 10/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination RADHATILAK-RAN, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA ----------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : RADHATILAK-RAN
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : **F79** | **OS79** | **14** | **97**
b. Date of receipt : 10/1/2014
c. Date of acceptance : 10/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : RADHATILAK-RAN
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : RADHATILAK-RAN
Name of Parental Material : Own Material
Name of Reference Varieties **:** Salivahana

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Very Short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	White
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Present
B. Distinct Characteristics: RADHATILAK-RAN has distinguishing characters as Panicle: Exertion: Well exerted	

C. Reference varieties: Salivahana has distinguishing characters as Panicle: Exertion: Mostly exerted

D. Date of commercialization of the variety	

13. Application No. | F 78 | OS 78 | 14 | 96 | filed on 10/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination SONAGORI, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety	:	SONAGORI
Applicant	**:**	Anjan Kumar Sinha
Address of the Applicant	**:**	Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant	**:**	Indian
Application details		
a. Number	:	**F78 | OS78 | 14 | 96**
b. Date of receipt	:	10/1/2014
c. Date of acceptance	:	10/1/2014
Crop (Taxonomical Lineage)	:	Rice (*Oryza sativa* L.)
Denomination	:	SONAGORI
Type of Variety	:	Farmers' variety
Classification of Variety	:	Typical Variety
Previously proposed Denomination	:	SONAGORI
Name of Parental Material	:	Own Material
Name of Reference Varieties	**:**	Salivahana

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Very Short
Decorticated grain: Length	Short
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	Dark brown
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: SONAGORI has distinguishing characters as Spikelet: Colour of tip of lemma: White; Panicle: Attitude of branches: Semi-erect	

C. Reference varieties: Salivahana has distinguishing characters as Spikelet: Colour of tip of lemma: Yellowish; Panicle: Attitude of branches: Semi-erect to spreading

D. Date of commercialization of the variety	

14. Application No. | F 511 | OS 569 | 13 | 1316 | filed on 19/12/2013 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza sativa* L.) having denomination LAL TIPA, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety	:	LAL TIPA
Applicant	**:**	Anjan Kumar Sinha
Address of the Applicant	**:**	Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant	**:**	Indian
Application details		
a. Number	:	F511 | OS569 | 13 | 1316
b. Date of receipt	:	19/12/2013
c. Date of acceptance	:	19/12/2013
Crop (Taxonomical Lineage)	:	Rice (*Oryza sativa* L.)
Denomination	:	LAL TIPA
Type of Variety	:	Farmers' variety
Classification of Variety	:	Typical Variety
Previously proposed Denomination	:	LAL TIPA
Name of Parental Material	:	Own Material
Name of Reference Varieties	**:**	Manoharsali

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Medium
Stem: Length (excluding panicle; excluding floating rice)	Very Short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Short bold
Decorticated grain: Colour	Dark brown
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: LAL TIPA has distinguishing characters as Panicle: Exertion: Partly exerted	

C. Reference varieties: Manoharsali has distinguishing characters as Panicle: Exertion: Well exerted

D. Date of commercialization of the variety	

15. Application No. | F 52 | OS 52 | 14 | 70 | filed on 9/1/2014 by Anjan Kumar Sinha, Village Ranbahal, Post Amarkanan, District Bankura, West Bengal, **India** for a **Farmers' variety** of crop **Rice** (*Oryza*

sativa L.) having denomination BHURI, the specification includes its drawing and or photograph(s) of which are given below, has been accepted and given registration number ---------NA ----------on ---------- NA --------.

The convention application no. -----NA-----, in respect of the said variety has been filed on -----NA------, in ---NA----.

Appropriate office for the opposition of proceeding under Rule 29, of the Protection of Plant Varieties and Farmers' Rights Rules, 2003 is **Office of the Registrar, PPV & FR Authority, New Delhi – 110 012.**

Passport data of the variety : BHURI
Applicant **:** Anjan Kumar Sinha
Address of the Applicant **:** Village Ranbahal, Post Amarkanan, District Bankura, West Bengal
Nationality of Applicant **:** Indian
Application details
a. Number : | **F52** | **OS52** | **14** | **70** |
b. Date of receipt : 9/1/2014
c. Date of acceptance : 9/1/2014
Crop (Taxonomical Lineage) : Rice (*Oryza sativa* L.)
Denomination : BHURI
Type of Variety : Farmers' variety
Classification of Variety : Typical Variety
Previously proposed Denomination : BHURI
Name of Parental Material : Own Material
Name of Reference Varieties **:** Sonasali

Variety Description:

A. Group Characteristics	**Remarks measured values, example varieties, etc.**
Basal leaf: Sheath colour	Green
Time of heading (50 % of plants with panicles)	Late
Stem: Length (excluding panicle; excluding floating rice)	Very Short
Decorticated grain: Length	Medium
Decorticated grain: Shape (in lateral view)	Long slender
Decorticated grain: Colour	Light brown
Endosperm: Content of amylose	Medium
Decorticated grain: Aroma	Absent
B. Distinct Characteristics: BHURI has distinguishing characters as Leaf: Pubescence of blade surface: Strong	

C. Reference varieties: Sonasali has distinguishing characters as Leaf: Pubescence of blade surface: Weak

D. Date of commercialization of the variety	

PUBLIC NOTICE

Sub: Notice is given under Rule 29 (8 and 9) of the PPV & FR Rules, 2003.

As a requirement under Rule 29 (8) and (9) of the PPV & FR Rules, 2003, it is hereby informed that the crop specific DUS test guideline namely**:** Two species of Buckwheat (Fagopyrum sp.). F. esculentum and F. tataricum, four species of Grain amaranth (Amaranthus hypocondricus, A. cruentus, A caudatus and A. edulis) and Faba bean (Vicia faba L. var. major Harz.), Proso millet (Panicum miliaceum L.), Kodo millet (Paspalum scorbiculatum L.), Little millet (Panicum sumatrense Roth. Ex Roemer And Schultes), Barnyard millet (Echinocloa frumentaceae (Roxb.) Link), elephant foot yam (Amorphophallus paeoniifolius) and taro (Colocasia esculenta var. esculenta, Colocasia esculenta var. antiquorum, Colocasia esculenta var. stoloniferum, Cyrtosperma chamissonis/ C. merkusii). is hereby published in 'Plant Variety Journal of India', Vol. 10, No. 11, November 07, 2016.

Sd/-
(R.C.Agrawal)
Registrar-General

BUCKWHEAT

I. Subject

These test guidelines will be applied to all varieties of cultivated Buckwheat (*Fagopyrum* sp.). Out of the 23 species, *F. esculentum* and *F. tataricum* are the two cultivated species.

II. Seed Material required

1. The Protection of Plant Variety and Farmers' Right Authority (PPV&FRA) shall decide when, where and in what quantity and quality the seed material required for testing of the variety for registration under PPV&FR Act, 2001. Applicants submitting 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 seed to be supplied by the applicant shall be 500 gram.

2. The seed material should meet the minimum germination percentage (80%), moisture content (not more than 10%), physical purity (98%) and highest genetic purity as prescribed for seed certification in India. 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 plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

4. The seed material shall not have undergone any treatment unless the competent authority allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of tests

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

2. The test should normally be conducted at two test locations. If any essential characteristic of the candidate variety is not expressed for visual observation at one place, the variety may be tested at another test site.

3. The field test shall be carried out under conditions ensuring normal growth. The size of the plot should be such that plants or parts of plant may be removed for measuring and counting without prejudicing of the observations on standing crop plants or parts of plants until the end of the growing period. Each test should include a minimum of 150 plants, which should be divided among 3 replications. Separate plots for observation and for 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

Details of Experiment	
Number of rows	6
Row length	2 m
Plant to plant distance	20 cm
Row to Row distance	45 cm
Number of replications	3

5. Observations should not be recorded on plants in border rows.

6. Observation should be recorded from 10 plants from each replication.

7. 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 shall be used for the testing of varieties for DUS (Section VII).

2. For the assessment of distinctiveness, uniformity and stability, observation should be made on 30 plants or parts of plants, which should be divided among 3 replications (10 plants in each replication).

3. For 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 plant), 30 plants (a population standard of 0.5% with an acceptance probability of at least 95% should be applied) are considered for observations and any other observations should be made on all plants in the test. In the case of a sample size of 100 plants, five off-types are allowed.

4. For the assessment of colour characteristics, Royal Horticulture Society (RHS) colour chart be used.

5. All the observations on plant parts should be made as follows:

   (a) all observations on leaves should be observed on leaves from the middle part of the plant
   (b) all observations on inflorescence should be observed from the middle part of the inflorescence/ cyme.
   (c) all observations on seeds should be observed on ripened seeds from the upper part of the plant

V. Grouping of varieties

Grouping characteristics are those, which are known from experience not to vary, or to vary only to lesser extent, within a variety, can be used to divide the candidate varieties for DUS

testing into different groups to facilitate the examination of Distinctiveness. The states of expression (even produced at different locations) should be fairly and evenly distributed throughout the collection.

The following will be the useful grouping characteristics for Buckwheat:

(a) Leaf shape (characteristic 6)
(b) Flower: colour (characteristic 9)
(c) Stem colour (characteristic 14)
(e) Seed colour (characteristic 15)
(f) Seed shape (characteristic 16)

VI. Introduction to Table of Characteristics and symbols

1. To assess Distinctiveness, Uniformity and Stability, the characteristics and their states as given in the table of characteristics (Section VII) should be used.

2. Notes (1 to 9) which are given against the states of the different characteristics at column 4 shall be used to describe the state of each character for the purpose of electronic data processing.

3. Legend

   Asterisked Characteristics

   Asterisked Characteristics (denoted by *) that shall be observed during every growing period for the examination of all the varieties and shall always be included in the description of the variety, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

   (+) See Explanation on the Table of Characteristic in Section VIII B.
   (a)- (f) See Explanations on the Table of Characteristics in Chapter VIII A.

   QL: Qualitative characteristic

   QN: Quantitative characteristic

   PQ: Pseudo-qualitative characteristic

4. The optimum stage of plant growth for assessment of each characteristic is given in the column 6 of Table of Characteristic (Section VII).

5. Example Varieties: Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6. Type of assessment of characteristics indicated in column 7 of Table of characteristics (Section VII) is as follows:

   VG: Visual assessment by a single observation on a group of plants or parts of plants

VS: Visual assessment by observation on individual plant or parts of plants
MG: Measurement by a single observation on a group of plants or parts of plants
MS: Measurement on a number of individual plant or parts of plants
Type of observation: visual (V) or measurement (M)

"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.
Type of record: for a group of plants (G) or for single, individual plants (S)

7. Characteristics containing the following key in the column 6 of the Table of Characteristics should be examined as indicated below:

Code	Description
10	Observations on the seedling which should be made 3-6 days after emergence (see Ad. Characteristic 1)
20	Observations should be made at full flowering: about 50% of the flowers open (see Ad. Characteristic 9)
30	Observations should be made at physiological maturity: 80% of seeds mature (see Ad. Characteristic 13)
40	Observations should be made on matured seed: Seed shows fully-ripe color
50	Observations should be made on Senescence: Harvested product (see Ad. Characteristic 17)

VII. Table of Characteristics

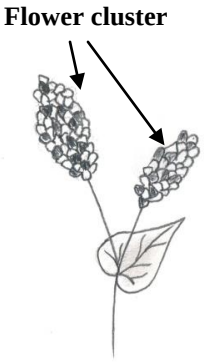
S. N	Characteristics	States	Note	Example variety/ line	Stage of observation	Type of assessment
1. (*) QL	Seedling: anthocyanin coloration	Absent	1	Himpriya	10	VG
		Present	9	PRB 1		
2. (+) QL	Plant: growth type	Determinate	1	-	20	VG
		Indeterminate	2	PRB 1		
3. QN	Leaf blade: length (cm)	Short (<6 cm)	3	Sangla B 214	20	VG/MS
		Medium (6 - 10 cm)	5	Himpriya		
		Long (>10 cm)	7	PRB 1		
4. QN	Leaf blade: width (cm)	Narrow (<5.0 cm)	3	Sangla B 5	20	VG/MS
		Medium (5 -8 cm)	5	PRB 1, VL7		
		Broad (>8 cm)	7	Shimla B 1, Himpriya		

5. QL	Leaf blade colour	Green	3	Himpriya	20	VG
		Pink	5	-		
6. (*) (+) QL	Leaf blade: shape	Sagittate	1	Sangla B 118	20	VG
		Hastate	2	VL 7, PRB 1		
		Cordat	3	Himpriya		
		Ovate	4	IC109729		
7. QL	Leaf margin colour	Green	3	IC 14889, IC 412722	20	VG
		Pink (*Red-Purple group N57A*)	5	PRB 1		
8. (+) QN	Petiole length (cm)	Short (<5 cm)	3	Sangla B 129	20	VG/MS
		Medium (5 - 8 cm)	5	PRB 1, VL 7		
		Long (>8 cm)	7	Himpriya		
9. (*) (+) PQ	Flower colour	White (*White group NN155C*)	1	Himpriya, VL 7	20	VG
		Greenish yellow (*Green-White Group 157C*)	3	Shimla B 1		
		Pink (*Red-Purple group 68A, N74A*)	5	PRB 1, IC 17371		
10. (*) (+) QN	Days to 50% flowering	Early (<45 days)	1	VL 7	20	MG
		Medium (45-65 days)	5	PRB 1, Sangla B 1		
		Late (>65 days)	7	Himpriya		
11. (*) (+) QN	Plant height (cm)	Short (<90 cm)	3	Sangla B 214	20	MG
		Medium (90 -110 cm)	5	PRB1, Himpriya		
		Tall (>110 cm)	7	Shimla B 1		
12. (+) QN	Inflorescence: Cyme length (cm)	Short (<5 cm)	1	IC 202226, IC 274426	20	VG/MS
		Medium (5-8 cm)	2	Himpriya, VL 7		
		Long (>8 cm)	3	PRB 1		
13. (*) (+) QN	Days to 80 % maturity (days)	Early (<90 days)	3	VL 7	30	MG
		Medium (90-110 days)	5	Shimla B 1		
		Late (>110 days)	7	Himpriya		
14. (*) (+) QL	Stem: colour	Green (*Green group 142A*)	3	Shimla B 1	30	VG
		Pink (*Red purple group N66A*)	5	Sangla B1		
		Red (*Red group 43A,C, 41A*)	7	PRB 1, VL 7		
15. (*)	Seed colour	Grey (*Greyey-Green group 197C*)	3	Himpriya	50	VG

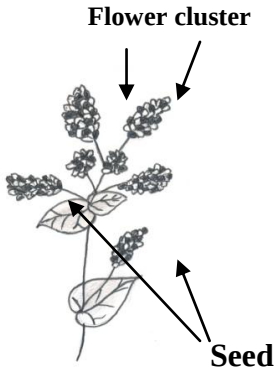
(+) QL		Brown (*Grey-Brown group N199B,C*)	5	PRB 1		
		Black (*Black group 202A*)	7	VL 7		
16. (*) (+) PQ	Seed: shape	Elliptic	1	Himpriya	50	VG
		Ovate	2	Shimla B1		
		Trullate	3	VL 7		
17. (*) QN	Seed: 1000 seed weight (g)	Low (<15 g)	3	EC323730	50	MG
		Medium (15-20 g)	5	PRB 1		
		High (>20 g)	7	VL 7		

VIII. Explanation for the table of characteristics:

Characteristics 2: Plant: Growth type



1
Determinate



2
Indeterminate

Characteristic 3: Leaf blade length

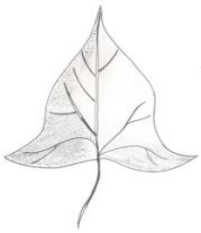
Short (3)

Medium (5)

Long (7)

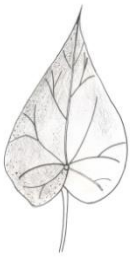
Characteristics 6: Leaf blade: shape

(1)
Sagittate



(2)
Hastate

(3)
Cordat



(4)
Ovate

Hastate (2)

Sagittate (1)

Cordat (3)

Characteristic 7: Leaf margin colour

Green (3)

Pink (5)

Characteristics 8: Petiole length

Petiole length should be measured in centimetre when the plant was in full bloom.

Short (3)

Medium (5)

Long (7)

Characteristic 9: Flower colour

White (1)

Greenish Yellow (3)

Pink (5)

Characteristics 10: Days to 50% flowering

Observations should be taken at the time when 10% of plants have at least one open flower.

Characteristics 11: Plant height

Plant height should be measured from base of the plant to tip of the inflorescence.

Short (3)

Medium (5)

Long (7)

Characteristics 12: Inflorescence: Cyme length

Cyme length should be measured from base of pedicel of first flower to the top flower.

Characteristics 13: Days to 80% maturity

It should be measured at the time when 80% of seeds show fully-ripe color.

Characteristic 14: Stem colour

Green (3)

Red (7)

Characteristic 15: Seed colour

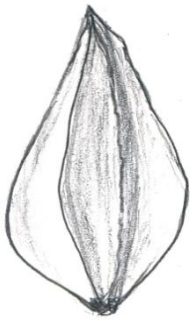
Grey (3)

Brown (5)

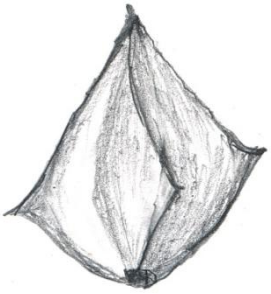
Black (7)

Characteristics 16: Seed Shape

1
Elliptic



2
Ovate



3
Trullate

IX. Working Group details:

These guidelines developed by the National Core Committee in consultation with the Project Coordinator (Underutilized Crops), the Nodal Officer, DUS testing, NBPGR, New Delhi and the Task Force (4-10/12) constituted by the PPV&FR Authority.

The Members of the Task Force:

Dr. Prem N Mathur (Chairman)
Dr. M Dutta (Member)
Dr. J C Rana (Member)
Dr. B S Phogat (Member)
Dipal Roy Chaudhury (Member Secretary)

Dr. Rashmi Yadav
(Nodal Officer)

X. Name of DUS Test Centre(s):

Nodal DUS Centre	**Other DUS Centre(s)**
National Bureau of Plant Genetic Resources, New Delhi-110012	NBPGR, Regional Station, Phagli, Shimla (H.P.)

Grain Amaranth

I. Subject

These test guidelines will be applied to all varieties of Grain Amaranth grown for grain production. Grain amaranth has four majour cultivated species, that are, *Amaranthus hypocondricus, A. cruentus, A caudatus* and *A. edulis.*

II. Seed Material Required

1 The Protection of Plant Variety and Farmers' Right Authority (PPV&FRA) shall decide when, where and in what quantity and quality the seed material required for testing of the variety for registration under PPV&FR Act, 2001. Applicants submitting 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 seed to be supplied by the applicant shall be 50 gram.

2 The seed material should meet the minimum germination percentage (80%), moisture content (not more than 10%), physical purity (98%) and highest genetic purity as prescribed for seed certification in India. 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 have undergone any treatment unless the competent authority allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of tests

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

2. The test should normally be conducted at two test locations. If any essential characteristic of the candidate variety is not expressed for visual observation at one place, the variety may be tested at another test site.

3. The field test shall be carried out under conditions ensuring normal growth. The size of the plot should be such that plants or parts of plant may be removed for measuring and counting without prejudicing of the observations on standing crop plants or parts of plants until the end of the growing period. Each test should include a minimum of 150 plants, which should be divided among 3 replications. Separate plots for observation and for 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

Details of experimental plan	For Hills	For Plain
Number of rows	6	4
Row length	2 m	3m
Plant to plant distance	20 cm	20 cm
Row to Row distance	60 cm	50 cm
Number of replications	3	3

5. Observations should not be recorded on plants in border rows.

6. Observation should be recorded from 10 plants from each replication.

7. 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 shall be used for the testing of varieties for DUS (Section VII).

2. For the assessment of distinctiveness, uniformity and stability, observation should be made on 30 plants or parts of plants, which should be divided among 3 replications (10 plants in each replication).

3. For 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 plant), 30 plants (a population standard of 5% with an acceptance probability of at least 95% should be applied) are considered for observations and any other observations should be made on all plants in the test. In the case of a sample size of 100 plants, five off-types are allowed.

4. For the assessment of colour characteristics, Royal Horticulture Society (RHS) colour chart be used.

V. Grouping of varieties

Grouping characteristics are those, which are known from experience not to vary, or to vary only to lesser extent, within a variety, can be used to divide the candidate varieties for DUS testing into different groups to facilitate the examination of Distinctiveness. The states of expression (even produced at different locations) should be fairly and evenly distributed throughout the collection.

The following will be the useful grouping characteristics for grain amaranth:

(a) Seedling: anthocyanin coloration of hypocotyls (characteristic 1)
(b) Leaf blade: presence of blotch (characteristic 4)
(c) Inflorescence: colour (characteristic 7)
(d) Inflorescence: shape (characteristic 13)
(e) Seed: colour (characteristic 18)

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) should be used.
2. Notes (1 to 9) which are given against the states of the different characteristics at column 4 shall be used to describe the state of each character for the purpose of electronic data processing.
3. Legend

   (*) Characteristics that shall be observed during every growing period for the examination of all the varieties and shall always be included in the description of the variety, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

   (+) See Explanation on the Table of Characteristic in Section VIII B.

   (b)- (f) See Explanations on the Table of Characteristics in Chapter VIII A.

   QL: Qualitative characteristic
   QN: Quantitative characteristic
   PQ: Pseudo-qualitative characteristic

4. The optimum stage of plant growth for assessment of each characteristic is given in the column 6 of Table of Characteristic (Section VII).
5. Example Varieties: Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6. Type of assessment of characteristics indicated in column 7 of Table of Characteristics (Section VII) is as follows:
   MG: Measurement by a single observation on a group of plants or parts of plants
   MS: Measurement on a number of individual plant or parts of plants
   VG: Visual assessment by a single observation on a group of plants or parts of plants
   VS: Visual assessment by observation on individual plant or parts of plants
7. Characteristics containing the following key in the column 6 of the Table of Characteristics should be examined as indicated below:

Code	**Description**
10	Observations on the seedling which should be made 3-6 days after emergence (See Ch. 1)
20	Observations on the young plant on 6 to 8 leaves

30 Observations should be made at full flowering: 50% of the plants (see Ch. 5)

40 Observations should be made at physiological maturity (see Ch. 14)

50 Observations should be made on dry seeds at harvest time (see Ch. 17)

VII. Table of Characteristics

S.N	Characteristics	States	Note	Example variety/ cultivar	State of observation	Type of assessment
1. (*) QL	Seedling: anthocyanin coloration of hypocotyl	Absent	1	Annapurna	10	VG
		Present	9	Suvarna		
2. QN	Leaf blade: length (cm)	Short <18 cm)	3	IC 21795	30	MS
		Medium (18-22 cm)	5	GA 2		
		Long (>22 cm)	7	Annapurna, Suvarna		
3. (+) QN	Leaf blade width (cm)	Narrow (<10 cm)	3	IC 17936	30	MS
		Medium (10-14 cm)	5	Annapurna, GA1		
		Broad (>16 cm)	7	Durga, Suverna		
4. (*) (+) QL	Leaf blade: presence of blotch	Absent	1	Annapurna	30	VG
		Present	9	GA 2		
5. (*) (+) PQ	Leaf blade: Main colour	Green	3	Annapurna, VL101	30	VG
		Purple (*Red purple group 67A*)	7	GA 2, GA 3		
6. (+) PQ	Petiole length (cm)	Short (<14 cm)	3	BGA 2,GA 1	30	VG
		Medium (14 -17 cm)	5	VL102, Annapurna		
		Long (>17 cm)	7	VL44		
7. (*) (+) PQ	Inflorescence colour	Light yellow	1	PRA 1	30	VG
		Yellow (*Yellow group 2C, 10 A*)	2	BGA 2, VL 102, PRA 1		
		Yellowish green (*Yellow green group 145C*)	3	Suverna, GA 1		
		Orange (*Orange group 23A, 24A*)	4	IC 7941, IC 21925		
		Pink (*Red-Purple61B, N66A, 67A*)	5	GA 2, GA 3		
		Pinkish green	6	-		
		Purple	7	-		
		Red (*Red group51B*)	8	EC 169657, IC 38129		
		Reddish green	9	-		
		Green	10	-		
		Others (Mottoling)	99	Durga		
8. (*) (+) QN	Days to 50% flowering (days)	Early (< 70 days)	3	VL Chua 44	30	MG
		Medium (70-80 days)	5	BGA 2		
		Late (>80 days)	7	Annapurna, PRA 1		
9. (+)	Inflorescence: compactness	Lax	3	Durga	30	VG
		Intermediate	5	PRA 1, VL Chua 44		

QN		Dense	7	BGA 2, GA 1		
10. QN	Inflorescence length (cm)	Short (<40 cm)	3	IC 7918, IC 7920	30	VG/MS
		Medium (40-70 cm)	5	Durga, Suverna		
		Long (>70 cm)	7	PRA 1		
11. (+) QL	Inflorescence spininess	Absent	1	Annapurna, Durga	30	VG
		Present	9	PRA 1, GA 1		
12. (+) QN	Lateral spikelet length (cm)	Short (<10 cm)	3	IC 7920	30	VG/MS
		Medium (10-15 cm)	5	Durga, VL 44		
		Long (>15 cm)	7	Suverna,VL 102		
13. (*) (+) QL	Inflorescence: shape	Erect	3	Annapurna, VL Chua 44	40	VG
		Semi erect	5	-		
		Drooping	7	IC 7918		
14. (*) (+) QN	Plant height (cm)	Short (<150 cm)	3	BGA 2, VL Chua 44	40	MG
		Medium (150-200)	5	Suverna, GA 1		
		Tall (>200 cm)	7	Annapurna, PRA 2		
15. (*) (+) QL	Stem colour	Yellowish green (*Yellowish-Green 150C*)	3	VL 101, VL 102	40	VG
		Pink (*Red-Purple 67A)*	5	GA 2, GA 3		
		Red (*Red group 54A)*	7	IC 38129, IC 42371		
16. (*) (+) QL	Stem surface	Smooth	1	Suverna	40	VG
		Ridged	9	GA 3, VL 101		
17. (+) QL	Seed transparency	Translucent	1	IC 95564, EC 150200	50	VG
		Opaque	9	Annapurna		
18. (*) (+) PQ	Seed colour	Creamish (*White group 155D*)	3	VL 101, GA 3	50	VG
		Yellow (*Yellow group 4D*)	5	VL 102, VL 44, GA 1		
		Pink (*Red-Purple 67C, 67D)*	7	IC 7918, IC 7920		
19. (*) (+) QL	Seed Shape	Ellipsoid	2	Suverna	50	VG
		Discoid	5	EC 150200		
20. (*) (+) QN	Seed weight (g/10 ml.)	Low (<7 g)	3	VL 101	50	MG
		Medium (7 - 8 g)	5	Suverna		
		High (>8 g)	7	Annapurna, BGA 2		

VIII. Explanations on the Table of Characteristics

Characteristic 3: Leaf: width

3
Narrow

5
Medium

7
Broad

Narrow (3)

Medium (5)

Broad (7)

Characteristic 4: Leaf blade: presence of blotch

1
Absent

9
Present

Absent (1) **Present (9)**

Characteristic 5: Leaf blade: Main colour

Green (3) **Purple (7)**

Characteristic 6: Petiole length (cm)

Short (3) Medium (5) Long (7)

Characteristic 7: Inflorescence colour

Light Yellow(1)

YellowishGreen(3)

Orange(4)

Pink (5)

Red (8)

Motteling (9)

Characteristic 8: Days to 50% flowering

The time of flowering is when 50 % of the plants have a panicle approximately 5 cm long, showing open flowers in its middle parts with separate stamens and with the stigma completely visible.

Characteristic 9: Inflorescence: compactness

(3)

Lax

(5)

Intermediate

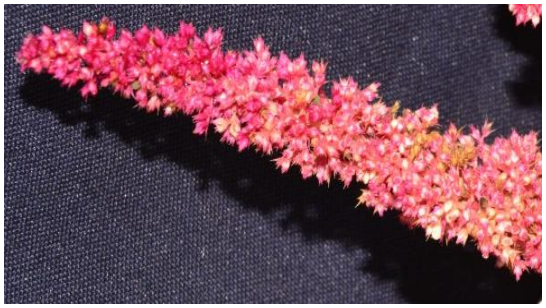
(7)

Dense



Lax (3) **Intermediate (5)** **Dense (7)**

Characteristic 11: Inflorescence spininess




Absent (1) **Present (9)**

Characteristic 12: Lateral spikelet length (cm)



Short (3) **Medium (5)** **Long (7)**

Characteristic 13: Inflorescence: Shape

3
Erect

5
Semi erect

7
dropping

Globose (1)

Semi Drooping (2)

Completely Drooping (3)

Straight (4)

Characteristic 14: Plant height

To be measured from the base of the plant to the tip of the inflorescence.

Characteristic 15: Stem colour

Yellowish Green (3)

Pink (5)

Red (7)

Characteristic 16: Stem: Surface

1
Smooth

9
Ridged

Smooth (1)

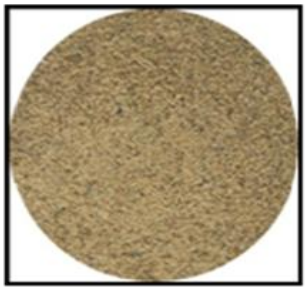
Ridged (9)

Characteristic 17: Seed: Transparency

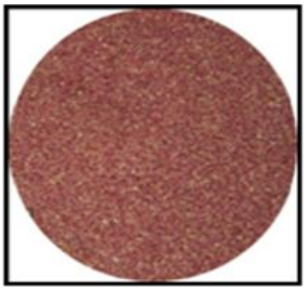
The type of seed should be observed by placing the seed on glass lid: if the light is transmitted through the seed, it is translucent type seed; if the light is not transmitted, it is opaque type seed.

Characteristic 18: Seed colour

Creamish (3)



Yellow (5)



Pink (7)

Characteristic 19: Seed: shape

Ellipsoid (2)

Discoid(5)

Characteristic 20: Seed weight

The seed weight should be measured on volume/weight basis (g/10 ml), at moisture of 10%.

IX. Working Group details:

These guidelines developed by the National Core Committee in consultation with the Project Coordinator (Underutilized Crops), the Nodal Officer, DUS testing, NBPGR, New Delhi and the Task Force (4-10/12) constituted by the PPV&FR Authority.

The Members of the Task Force:

Dr. Prem N Mathur (Chairman)
Dr. M Dutta (Member)
Dr. J C Rana (Member)
Dr. B S Phogat (Member)
Dipal Roy Chaudhury (Member Secretary)

Dr. Rashmi Yadav
(Nodal Officer)

X. Name of DUS Test Centre(s):

Nodal DUS Centre	**Other DUS Centre(s)**
National Bureau of Plant Genetic Resources, New Delhi-110012	NBPGR, Regional Station, Phagli, Shimla (H.P.)

Faba Bean

I. Subject

These test guidelines will be applied to all varieties of faba bean (*Vicia faba* L. var. *major* Harz.) grown for grain production. Faba bean (*Vicia faba* L.) also known as broad bean, fava bean, horse bean, Windsor bean or tick bean is coarse, upright annual herb.

II. Seed Material required

1. The Protection of Plant Variety and Farmers' Right Authority (PPV&FRA) shall decide when, where and in what quantity and quality the seed material required for testing of the variety for registration under PPV&FR Act, 2001. Applicants submitting 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 seed to be supplied by the applicant shall be 150 gram.

2. The seed material should meet the minimum germination percentage (70%), moisture content (not more than 9%), physical purity (98%) and highest genetic purity as prescribed for seed certification in India. 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 have undergone any treatment unless the competent authority allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of tests

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

2. The test should normally be conducted at two test locations. If any essential characteristic of the candidate variety is not expressed for visual observation at one place, the variety may be tested at another test site.

3. The field test shall be carried out under conditions ensuring normal growth. The size of the plot should be such that plants or parts of plant may be removed for measuring and counting without prejudicing of the observations on standing crop plants or parts of plants until the end of the growing period. Each test should include a minimum of 150 plants, which should be divided among 3 replications. Separate plots for observation and for 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	:	6
Row length	:	2 m
Plant to plant distance	:	20 cm
Row to Row distance	:	45 cm
Number of replications	:	3

5. Observations should not be recorded on plants in border rows.
6. Observation should be recorded from 10 plants from each replication.
7. 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 shall be used for the testing of varieties for DUS (Section VII).
2. For the assessment of distinctiveness, uniformity and stability, observation should be made on 30 plants or parts of plants, which should be divided among 3 replications (10 plants in each replication).
3. For 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 plant), 30 plants (a population standard of 0.5% with an acceptance probability of at least 95% should be applied) are considered for observations and any other observations should be made on all plants in the test.
4. For the assessment of colour characteristics, Royal Horticulture Society (RHS) colour chart be used.

V. Grouping of varieties

Grouping characteristics are those, which are known from experience not to vary, or to vary only to lesser extent, within a variety, can be used to divide the candidate varieties for DUS testing into different groups to facilitate the examination of Distinctiveness. The states of expression (even produced at different locations) should be fairly and evenly distributed throughout the collection.

The following will be the useful grouping characteristics for faba bean:

a) Plant: growth type (characteristic 2)
b) Wing: melanin spot (characteristic 6)
c) Dry seed: colour of testa (characteristic 31)
d) Dry seed: pigmentation of hilum (characteristic 32)

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) should be used.
2. Notes (1 to 9) which are given against the states of the different characteristics at column 4 shall be used to describe the state of each character for the purpose of electronic data processing.

3. Legend

   (*) Characteristics that shall be observed during every growing period for the examination of all the varieties and shall always be included in the description of the variety, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

   (10)- (100) See Explanation on the Table of Characteristic in Section VIII A.

   (+) See Explanations on the Table of Characteristics in Chapter VIII B.

   QL: Qualitative characteristic
   QN: Quantitative characteristic
   PQ: Pseudo-qualitative characteristic

4. The optimum stage of plant growth for assessment of each characteristic is given in the column 6 of Table of Characteristic (Section VII).
5. Example Varieties: Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.
6. Type of assessment of characteristics indicated in column 7 of Table of Characteristics (Section VII) is as follows:

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

VII. Table of Characteristics

Table characteristics of Faba bean (*Vicia faba*):

S.N	Characteristics	States	Note	Example variety/ line	State of observation	Type of assessment
1. (+) QN	Seed: tannin	Absent	1	-	100	VG
		Present	9	Vikrant		
2. (*) QL	Plant: growth habit	Determinate	1	-	70	VG
		Semi determinate	2	Vikrant		
		Indeterminate	3	-		
3. (*) (+) QN	Plant height (cm)	Short (<65)	3	IC593709	70	MG
		Medium (65-95)	5	Patna 3		
		Tall (>95)	7	PRT 12		
4. (*) QN	Plant: number of stems (including tillers more than half the length of the main stem)	Few (<8)	3	IC593700	70	MS
		Medium (8-10)	5	Vikrant		
		Many (>10)	7	PRT 12		

5. (*) QN	Stem: number of nodes up to and including first flowering node	Few (<20)	3	IC-593682	70	MS
		Medium (20-30)	5	Vikrant		
		Many (>30)	7	IC593667		
6. (*) QL	Stem: anthocyanin coloration	Absent	1	-	60	VS
		Present	9	Vikrant, PRT 12		
7. (+) QN	Leaflet: length (cm)	Short (<6.5)	3	IC593670	70	VG/MS
		Medium (6.5-9)	5	Vikrant		
		Long (>9)	7	IC593717		
8. (+) QN	Leaflet: width (cm)	Narrow (<2.5)	3	IC593702, IC593670	70	VG/MS
		Medium (2.5-3.5)	5	Patna 6		
		Broad (>3.5)	7	Vikrant		
9. (+) QL	Leaflet shape	Narrow (Elongate)	1	IC593702	70	VG
		Intermediate (Sub eleptic)	2	Vikrant		
		Rounded (Sub orbicular)	3	RFB 2		
10. (*) QN	Raceme: number of flowers	Few (<10)	3	IC593670	70	MG
		Medium (10-20)	5	Patna 3		
		Many (>20)	7	PRT 12		
11. (*) (+) QN	Time of 50% flowering (50% of the plants with at least one flower)	Early (<52 days)	3	RFB2	-	VG
		Medium (52-60 days)	5	Vikrant		
		Late (>60 days)	7	PRT 12		
12. QL	Flower ground colour	White	1	Vikrant	70	VG
		Yellow	2	-		
		Violet	3	-		
		Pink	4	-		
		Red	5	-		
		Brown	6	-		
		Others	99	-		
13. (*) PQ	Wing: melanin spot	Absent	1	-	70	VG
		Present	9	Vikrant		
14. (*)	Wing: colour of melanin spot	Greenish Yellow	1	-	70	VG
		Brown	2	Vikrant		
		Black	3	-		
15. (*) QL	Standard: anthocyanin coloration	Absent	1	-	70	VG
		Present	9	Vikrant		
16. +)	Standard: extent of anthocyanin coloration	Low	3	IC593701	70	MG
		Medium	5	Vikrant		

QN		High	7	PRT 12		
17. (+) QN	Pods: number of pods per nod	Few (<2)	3	IC593697	80	MG
		Medium (2-4)	5	Vikrant		
		Many (>4)	7	-		
18. (*) (+) QN	Pod: length (without beak)	Short (<4.5 cm)	3	IC593697	90	MS
		Medium (4.5- 6 cm)	5	Patna 3		
		Long (>6 cm)	7	RFB 2		
19. (*) QN	Pod: width (from suture to suture)	Narrow (<8mm)	3	IC 593668	90	MG
		Medium (8-10 mm)	5	Patna 2		
		Broad (>10mm)	7	Vikrant		
20. (+) QL	Pod: degree of curvature at green shell stage	Absent or very weak	1	Vikrant	90	VG
		Weak	3	-		
		Medium	5	-		
		Strong	7	-		
21. QL	Pod attitude/angle	Erect	1	Vikrant	90	VG/MG
		Horizontal	2	-		
		Pendent	3	-		
22. QN	Pod: number of ovules (including seeds)	Few (<3)	3	IC593697	90	VG
		Medium (3-4)	5	Vikrant		
		Many (>4)	7	-		
23. (*) QL	Dry seed: color of testa (immediately after harvest)	White	1	-	100	VS
		Yellow	2	-		
		Green	3	-		
		Grey	4	-		
		Light Brown	5	Vikrant		
		Dark brown	6	-		
		Red	7	-		
		Violet	8	-		
		Black	9	-		
24. (*) QN	Time of full development of pod (first fully developed pods)	Early (<150 days)	3	Patna 1	80	MG
		Medium (150-160)	5	Vikrant		
		Late (>160 days)	7	Patna 6		
25. (*) (+) QN	Dry seed: 100 Seed weight (g)	Low (<20)	3	Patna 3	80	MG
		Medium (20-30)	5	Vikrant		
		High (>30)	7	RFB 2		
26. QL	Seed Shape	Flattened	1	Vikrant	100	VG
		Round	2	-		
		Angular	3	-		
27. QL	Dry seed: black pigmentation of hilum	Absent	1	-	100	VS
		Present	9	Vikrant		

VIII. Explanations on the Table of Characteristics

VIII A. *Explanations covering several characteristics*

Characteristics containing the following key in the column 6 of the Table of Characteristics should be examined as indicated below:

Code	Description
10	Germination
20	Leaf development: Young plant with 8-10 leaves
30	Formation of side shoots: 8-10 side shoots detectable
40	Stem elongation: 9 or more visible extended internodes developed
50	Vegetative growth stage
60	Inflorescence emergence: First petal visible, many individual flower buds still closed
70	Flowering: Flower open on 5 racemes per plant
80	Development of fruit: 80% of pods have reached final length (see Ad. 25)
90	Ripening: 80% of pods ripe & dark, seeds dry and hard
100	Senescence: Plant 50% of stem brown or black, dead and dry (see Ad. 25)

VIII B. *Explanations for individual characteristics*

Ad. Characteristic 1: Seed tannin

The tannin content of testa correlates with melanin spot on the flower wing. Maintaining both characteristics is necessary, as observations are made at very different stages and different times. The seed tannin content should be tested by removing a piece of the testa from the seed. 1 or 2 drops of the test reagent place upon testa piece. If tannin is present in testa then a bright pink colour will be developed. (Reagents: A = 50% ethanol; B = 1% vanillin in concentrated (33-37% weight by volume) HCl. Mix reagent A and B in 1:1 ratio for use. Naturally, the seeds that are yellowish in colour turn brown or dark brown immediately after harvest if they contain tannin.

Ad. Characteristic 3: Plant height

To be measured near maturity from the base of the plant to the tip of the plant.

Short (3)

Tall (7)

Ad. Characteristic 7 & 8: Leaflet: length & width (cm)

To be observed on fully expended leaves at intermediate flowering nodes.

Ad. Characteristic 9: Leaflet shape

3
Narrow (Elongate)

5
Intermediate (Sub eleptic)

7
Rounded (Sub orbicular)

(1)
Narrow (Elongate)

(2)
Intermediate (Sub eleptic)

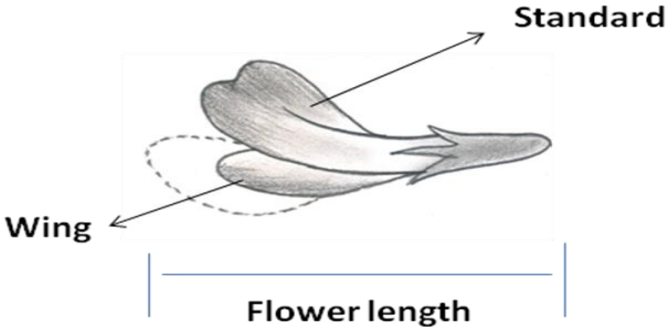
(3)
Rounded (Sub orbicular)

Ad. Characteristic 11: Time of flowering

The time of flowering is when 50 % of the plants have a panicle approximately 5 cm long, showing open flowers in its middle parts with separate stamens and with the stigma completely visible.

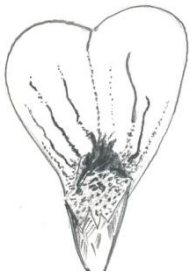
Ad. Characteristic 16: Standard: extent of anthocyanin coloration

The observation should be made on the inner side of the Standard.



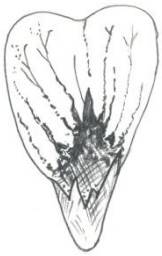
3

Low



5

Medium



7

High

Low (3)

Medium (5)

High (7)

Ad. Characteristic 17: Pods: number of pods per nod

Few(3)

Medium (5)

Many (7)

Ad. Characteristic 18: Pod Length

Short (3) **Medium (5)** **Long (7)**

Ad. Characteristic 20 Pod: degree of curvature at green shell stage

1
Absent

2
Medium

3
Strong

Ad. Characteristic 25: 100 seed weight (g)

The 100 dry seed weight should be measured by weighing the largest seed from the largest pod for each plant sampled, at moisture of 10%.

IX. Working Group details:

These guidelines developed by the National Core Committee in consultation with the Project Coordinator (Underutilized Crops), the Nodal Officer, DUS testing, NBPGR, New Delhi and the Task Force (4-10/12) constituted by the PPV&FR Authority.

The Members of the Task Force:

Dr. Prem N Mathur (Chairman)
Dr. M Dutta (Member)
Dr. J C Rana (Member)
Dr. B S Phogat (Member)
Dipal Roy Chaudhury (Member Secretary)

Dr. Rashmi Yadav
(Nodal Officer)

X. Name of DUS Test Centre(s):

Nodal DUS Centre	Other DUS Centre(s)
National Bureau of Plant Genetic Resources, New Delhi-110012	-

Jatropha (*Jatropha curcas* L.)

I. Subject

These test guidelines shall apply to all clonally propagated varieties of Jatropha (*Jatropha curcas* L.)

II. Materials 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 (PPV & FRA) Act, 2001.
2. 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.
3. Clonally propagated plant materials of 60 cm height from collar to the apical tip are required for DUS testing. The plants must have fully developed root system.
4. The minimum number of planting material to be supplied by the applicant or his nominee during June-July shall be 60 rooted plants.
5. The age of the plants shall be 6 months while submitting for testing.
6. The plant material should be visibly healthy, not lacking in vigour or affected by any important pests or diseases.
7. 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.

III. Conduct of tests

Duration of test

The minimum duration of DUS tests shall normally up to two independent flowering Season.

Testing Place

The tests shall normally be conducted at two 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 expression of interest of the applicant.

Conditions for Conducting the Examination

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.

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.

Test plot design

No. of rows : one

Row to row distance : 3 m

Plant to plant distance : 2 m

No. of plants per replication : 6

No. of replications : 3

The test plot will be surrounded by one guard row. Additional test protocol for special purpose shall be established by the PPV & FR Authority.

On-site DUS testing

a. On-site testing shall be conducted at the places specified by the applicant.
b. The age of the trees at on-site shall be between 3 to 6 years.
c. A trial with minimum of 18 trees in 1-2 blocks planted in uniform spacing shall be considered for on-site testing.
d. The trees must be healthy and free from pest and disease and raised under standard management practices.
e. 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.

IV. Methods and Observations

a. The characteristics described in the Table of characteristics shall be used for testing of varieties for their DUS (Section VII).
b. The assessment of Distinctiveness and Stability of all observations shall be made on 6 plants or parts taken each of 6 plants, which will be equally divided among 3 replications (2 plants per replication).
c. The assessment of Uniformity of characteristics shall be made in 6 plants per replication, with an acceptance probability of at least 95%. The maximum number of off-type allowed would be 1 in 18 plants.
d. All observations of leaf shall be made in mature leaves at middle of the crown in the middle third of the youngest shoots not showing signs of active growth. A sample of 10 leaves per plant (representing all four directions of the plant) shall be taken for morphometric characterization.
e. The branchlet and fruit characteristics should be evaluated from 10 samples each collected from nine plants. Samples should be collected from the longest primary branch in the mid portion of the crown.
f. Observations on mature fruit should be recorded when the fruit is ready for harvesting.

g. Observations on seeds should be made on 10 typical seeds taken from a minimum sample size of 50 fully developed seeds.

h. For the assessment of all colour characteristics, the latest Royal Horticultural Society (RHS) colour chart will be used.

V. Grouping of clones

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 the varieties in the collection are suitable for grouping purpose.

2. The following characteristics shall be used for grouping of Jatropha clones:

a. Growth habit (Characteristics 1.2)
b. Young shoot colour (Characteristics 2.2)
c. Petiole colour (Characteristics 3.5)
d. Juvenile leaf colour (Characteristics 3.6)
e. Fruit shape (Characteristics 4.3)
f. Fruit: Prominence of ridges (Characteristics 4.4)
g. Seed: shape (Characteristics 5.3)
h. Seed carnicle (Characteristics 5.4)

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 to 9) shall be given for each state of expression for different characteristics for the purpose of electronic data processing.
3. Legend:
   i. (*) 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 the environmental conditions of the testing region. Under such exceptional situation, adequate explanation shall be provided.
   ii. (+) 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 in the sixth column of Table of characteristics indicates the stage for the observation of each characteristic during the growth and development of the variety. The relevant growth stages corresponding to the decimal code number are described below.

Code	Examination of Characteristics	Stage of observation
1.	Plant character	a. Observations on the plant height were made on mature plants with a fully developed stem and crown.

		b. Observations on the growth habit were made on mature plants with a fully developed stem and crown with complete foliage of atleast 2 years of age. c. Observations on the stem bulginess/ young shoot colour were made on mature plants with a fully developed trunk and crown.
2.	Leaf character	a. All the observations on leaf were made on fully developed leaves from admist of vigorous current season shoots occupying the peripheral/ circumference of plant crown. b. All observations for length and width on the mature leaf and leaflets were made on the central part of leaf. c. All observations for length of petiole were made on the mature leaf. d. Observation on the petiole colour was made on matured leaf under natural day light condition. e. All observations on the juvenile leaf were made on actively growing spring flush.
3.	Fruit character	a. All fruits for observation were taken from periphery of the plant and fruit misformed as a result of clustering were not sampled. b. Observations on the fruits were made on 10 typical fruits taken from a minimum sample size of 50 fruits at the time of full maturity. c. Observations on the fruit shape were presented as they appear in nature; nevertheless shape is to be observed in direction from the base (stalk end) to the top. d. Observations on the fruit shoulder and fruit segment were made at full maturity stage e. All observations for length and width on the mature fruit were made on the longest and broadest portion of the fruit respectively. f. Observation on Pod: Seed ratio was made on 50 fully matured fruit taken from a minimum sample size of 500 fully developed fruits at harvestable maturity stage.
4.	Seed character	a. All observations on the seeds were made on the fresh seed in pods at full maturity stage. b. Observations on the seed length/width were made on 10 typical seeds taken from a minimum sample size of 50 fully developed seeds. c. Observation on the seed shape and seed carnicle was made on fully mature seeds at harvestable maturity stage. d. Observation on Seed coat: Kernel ratio were made on 50 fully matured fruit taken from a minimum sample size of 500 fully matured pods at harvestable maturity stage.

5. Type of assessment of characteristics indicated in column seven of Table 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 plants

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

VII. Table of characteristics

S.No	Characteristics	States	Note	Example Source	Stage of observation	Type of assessment
1	**Plant character**					
1.1 (+) (PQL)	Plant height (cm)	Short (<130.0)	3	HC 8	1a	MG
		Medium (130.0 - 200.0)	5	HC 20		
		Tall (>200.0)	7	SRM		
1.2 (*) (PQL)	Growth habit	Erect	1	HC 1	1b	VG
		Bushy	2	HC 13		
		Spreading	3	HC 19		
2	**Stem character**					
2.1 (*) (QL)	Stem bulginess	Absent	1	MTP 5	1c	VG
		Present	9	MTP 4		
2.2 (*) (PQL)	Young shoot colour	Green	1	MTP 1	1c	VS
		Pinkish red	2	HC 5		
3	**Leaf character**					
3.1 (+) (QN)	Leaf length (cm)	Short (<8.0)	3	HC 19	2b	MG
		Medium (8.0 - 15.0)	5	HC 13		
		Long (>15.0)	7	SRM		
3.2 (+) (QN)	Leaf width (cm)	Narrow (<7.0)	3	HC 19	2b	MG
		Medium (7.0 - 14.0)	5	HC 23		
		Broad (>14.0)	7	SRM		
3.3 (+) (QN)	Petiole length (cm)	Short (<10.0)	3	HC 19	2c	MG
		Medium (10.0 - 16.0)	5	HC 23		
		Long (>16.0)	7	SRM		
3.4 (*)	Leaf shape **(PQL)**	Cordate	1	HC 20	2a	VG
		Palmate	2	HC 10		
3.5 (*) (QL)	Leaf texture	Smooth	1	HC 1	2a	VG
		Coarse	2	HC 4		
		Rough	3	HC 8		
		Leathery	4	HC 15		
3.6 (*) (PQL)	Petiole colour	Greenish pink	1	HC 8	2d	VS
		Green	2	HC 11		

3.7 (*) (PQL)	Juvenile leaf colour	Dark pink	1	HC 5	2e	VS
		Greenish pink	2	HC 15		
4	**Fruit character**					
4.1 (+) (QN)	Fruit length (cm)	Short (<2.5)	3	HC 19	3b	MG
		Medium (2.5 - 3.5)	5	SRM		
		Long (>3.5 cm)	7	HC 12		
4.2 (+) (QN)	Fruit width (cm)	Narrow (<2.1)	3	HC 19	3b	MG
		Medium (2.1 - 2.9)	5	HC 17		
		Broad (>2.9)	7	HC 12		
4.3 (*) (PQL)	Fruit shape	Oval	1	HC 3	3c	VG
		Spherical	2	HC 4		
		Oblong	3	HC 21		
4.4 (*) (QL)	Fruit: Prominence of ridges	Weak	3	HC 16	3d	VG
		Medium	5	HC 18		
		Strong	7	HC 25		
4.5 (*) (QL)	Fruit: Presence of shoulder	Absent	1	HC 21	3d	VG
		Present	9	HC 4		
4.6 (*) (QL)	Fruit: Presence of segment	Absent	1	HC 22	3d	VG
		Present	9	HC 25		
4.7 (*) (PQL)	Fruit colour	Dark yellow	1	HC 10	3e	VS
		Yellowish orange	2	HC 19		
		Reddish orange	3	HC 25		
5	**Seed character**					
5.1 (+) (QN)	Seed length (cm)	Short (<1.5)	3	HC 19	4b	MG
		Medium (1.5 - 2.0)	5	HC 26		
		Long (>2.0)	7	HC 27		
5.2 (+) (QN)	Seed width (cm)	Narrow (<0.60)	3	HC 19	4b	MG
		Medium (0.60 - 1.10)	5	HC 9		
		Broad (>1.10)	7	HC 27		
5.3 (*) (PQL)	Seed shape	Ellipsoid	1	HC 4	4c	VG
		Ovate	2	HC 15		

5.4 (+)	Seed carnicle	Big	1	HC 2	4c	VG
		Medium	2	HC 5		
		Small	3	HC 4		
5.5 (*)	Seed coat : Kernel ratio	High (> 65 %)	1	HC 6	4d	MG
		Medium (58 – 65 %)	3	HC 2		
		Low (< 58 %)	5	HC 1		

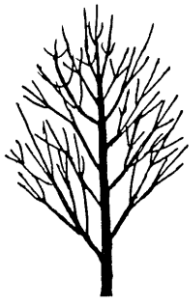
VII. Explanations on the table of characteristics

Characteristic 1.2: Growth habit

Erect

Bushy

Spreading

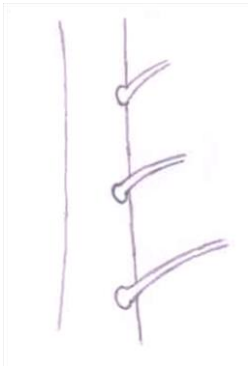


(1)
Erect

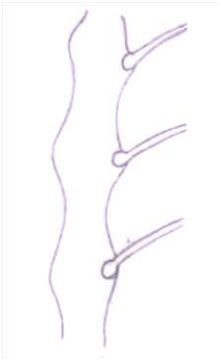
(2)
Bushy

(3)
Spreading

Characteristic 2.1: Stem bulginess



(1)
Absent



(9)
Present

Characteristic 2.2: Young shoot colour

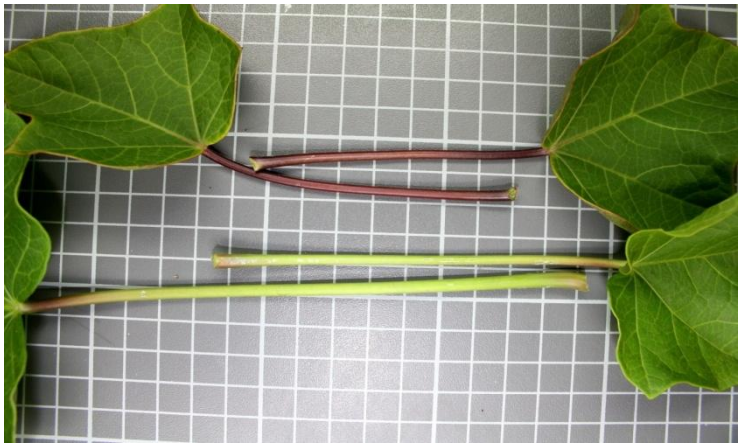
Green (1)

Pinkish red (2)

Characteristic 3.6: Petiole colour

(1)Greenish pink

(2)Green

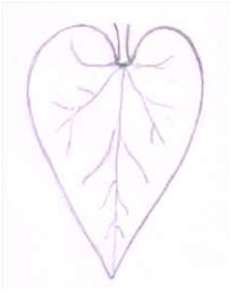


Characteristic 3.7: Juvenile leaf colour

(1)
Dark pink

(2)
Greenish pink

Characteristic 3.4: Leaf shape



(1)
Cordate

(2)
Palmate

Characteristic 4.3: Fruit shape

(1)
Oval

(2)
Spherical

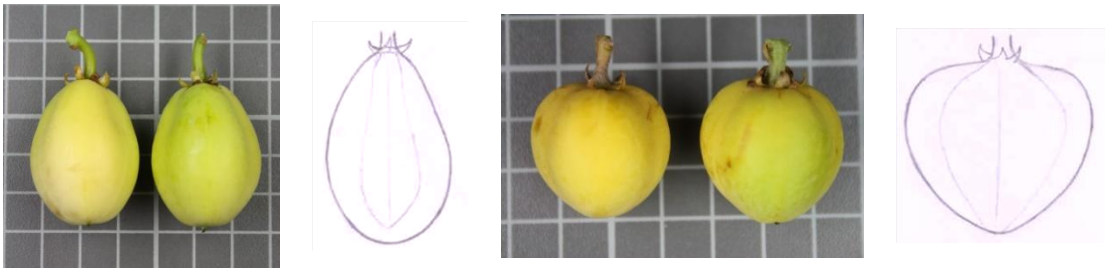
(3)
Oblong

(1)
Oval

(2)
Spherical

(3)
Oblong

Characteristic 4.5: Fruit: Presence of shoulder



(1)
Absent

(9)
Present

Characteristic 4.6: Fruit: Presence of segment

(1)
Absent

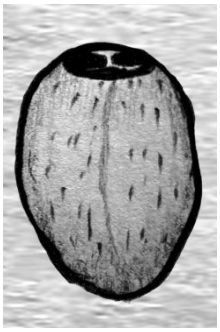
(9)
Present

Characteristic 5.3: Seed shape

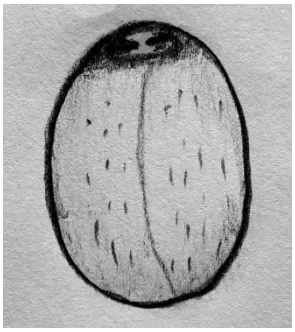
(1)
Ellipsoid

(2)
Ovate

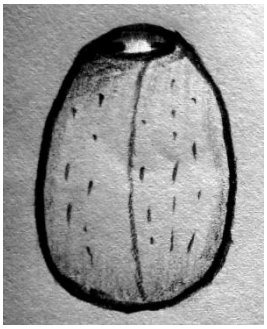
Characteristic 5.4: Seed carnicle



Big
(1)



Medium
(2)



Small
(2)

IX. Working group details

The test guidelines developed by the task force (03/2014) constituted by the PPV & FR Authority for **Jatropha(*Jatropha curcas L.*)** with consultation by FCRI, TNAU, Mettupalayam Technical inputs also provided by the PPV & FR Authority and nodal officer.

The members of the Task Force

1. **Dr. B. Gurudev Singh** — **Chairman**
   Head, Genetics Tree Breeding
   IFGTB, Coimbatore-641002

2. **Prof. Balakrishna Gowda** — **Member**
   Professor,
   Department of Forestry & Environmental Science
   University of Agricultural Sciences, GKVK Campus,
   Bengaluru - 560 065

3. **Dr. Kumaran K.** — **Member**
   Professor of Forestry
   Forestry College, Periakulam, Theni-625601, Tamil Nadu

4. **Dr. A. Balasubramanian, Ph. D.**
   Professor and Head (Forestry)
   Department of Forest Ecology and Environment
   FCRI, TNAU, Mettupalayam-641301

5. **Dr. Ravi Prakash** — **Member**
   Registrar, PPV & FRA, New Delhi — **Secretary**

X. DUS testing centers

Nodal DUS test centre	**Co nodal DUS Test Center**
Forest College and Research Institute, Mettupalayam, Coimbatore, Tamil Nadu.	_____

Proso millet (*Panicum miliaceum* L.)

I Subject:

These test guidelines apply to all the varieties, hybrids and parental lines of Proso millet (*Panicum miliaceum* L.)

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 200 grams. The seed shall be packed and sealed in ten equal weighing packets of 20 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 3 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 Proso millet varieties

1) Days to 50% flowering (Characteristic 3)
2) Plant: Pigmentation at leaf sheath (Characteristic 4)
3) Leaf Sheath: Pubescence (Characteristic 5)
4) Inflorescence : Shape (Characteristic 8)
5) Panicle: Compactness (Characteristic 13)
6) 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

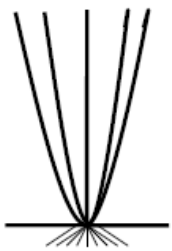
Sl no	Characteristics	States	Score/ Notes	Example varieties	Stage of observation	Type of assesment
1 (+)	Plant: Growth habit	Erect	3	TNAU 202	15	VG
		Decumbent	5	TNAU 151		
		Prostrate	7	-		
2	Basal tillers: Number	Low(<5)	3	TNAU 202	26	MS
		Medium(5-15)	5	TNAU 164		
		High(>15)	7	GPMS 213		
3 (*) (+)	Days to 50 % flowering	Early(<35)	3	GPMS 60	51	MG
		Medium(35-45)	5	TNAU 202		
		Late(>45)	7	GPMS 476		

4 (*)	Plant: Pigmentation at leaf sheath	Absent	1	GPUP 21	59	VG
		Present	9	GPMS 780		
5 (*)	Leaf Sheath: Pubescence	Glabrous	3	GPMS 3	59	VG
		Sparse	5	TNAU 145		
		Strong	7	TNAU 151		
6	Ligule: Pubescence	Absent	1	-	59	VG
		Present	9	TNAU 164		
7 (*)	Leaf Blade: pubescence	Glabrous	1	GPMS 131	59	VG
		Sparse	5	TNAU 151		
		Strong	7	TNAU 164		
8 (*) (+)	Inflorescence: shape	Arched	3	TNAU 145	59	VG
		Globose-elliptic	5	GPUP 21		
		Diffused	7	CO 5		
9 (+)	Peduncle: Length (cm)	Very short(<10)	1	GPMS 220	59	MS
		Short (10.0-20.0)	3	TNAU 164		
		Medium(20.1-30.0)	5	PRC 1		
		Long(30.1-40.0)	7	GPMS 591		
		Very long (>40.0)	9	-		
10 (+)	Flag leaf blade: Length (cm)	Short(<20)	3	TNAU 202	59	MS
		Medium(20-35)	5	TNAU 164		
		Long(>35)	7	GPMS 892		
11 (+)	Flag leaf blade: Width(cm)	Narrow(<1.5)	3	TNAU 202	59	MS
		Medium(1.5-2.5)	5	GPMS 840		
		Wide(>2.5)	7	-		
12	Culm: Branching	Absent	1	-	67	VS
		Present	9	TNAU 164		
13	Panicle: Compactness	Compact	3	TNAU 151	67	VG

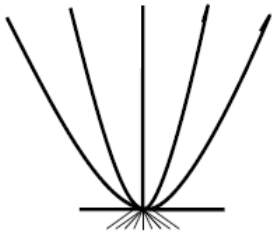
(*) (+)		Intermediate	5	TNAU 202		
		Open	7	GPMS 131		
14 (+)	Panicle: Length(cm)	Very Short (<10.0)	1	-	67	MS
		Short (10.0-20.0)	3	GPMS 541		
		Medium (20.1-30.0)	4	TNAU 151		
		Long (30.1-40.0)	5	GPMS 219		
		Very long (>40.0)	7	-		
15	Lodging	Absent	1	TNAU 145	83	VG
		Present	9	TNAU 151		
16 (*) (+)	Plant: Height (cm)	Dwarf (<60.0)	3	GPMS 491	83	MS
		Semi dwarf (60.1-90.0)	5	GPUP 21		
		Tall (90.1-120.0)	7	TNAU 151		
		Very Tall (>120)	9	-		
17	Seed: Shattering	Absent	1	-	83	VG
		Present	9	TNAU 145		
18 (*)	Grain: Colour	Straw white/cream RHS No 159C	2	GPMS 31	83	VG
		Golden yellow RHS No 13A	3	GPUP 21		
		Grey RHS No N199D	5	TNAU 151		
		Dark Grey RHS No N199C	7	GPMS 795		
19	Grain: Shape	Elliptical	2	TNAU 151	95	VG
		Oval	4	TNAU 164		
20 (*)	1000 grain weight (g)	Low (<4.0)	3	-	95	MG
		Medium (4.0-6.0)	5	TNAU 151		
		High (>6.0)	7	GPMS 834		

VIII. Explanations for Table of Characteristics

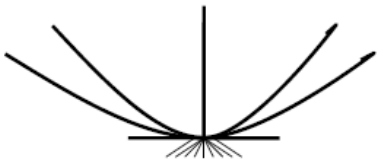
Characteristic 1 Plant: Growth habit



1
Erect



5
Decumbent

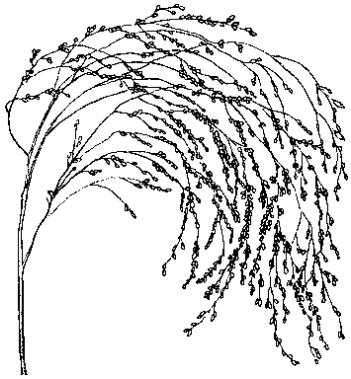


7
Prostrate

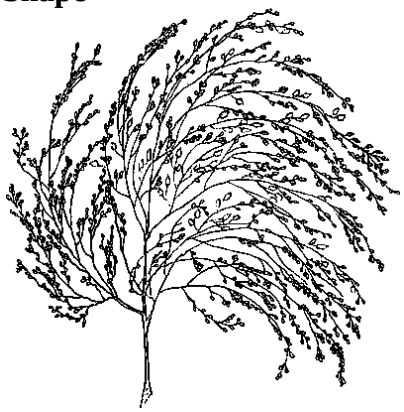
Characteristic 3 Days to 50 % flowering

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

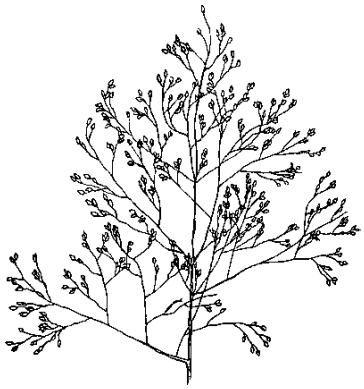
Characteristic 8 Inflorescence: Shape



3
Arched



5
Globose – Elliptic



7
Diffused

Characteristic 9 Peduncle: Length (cm)

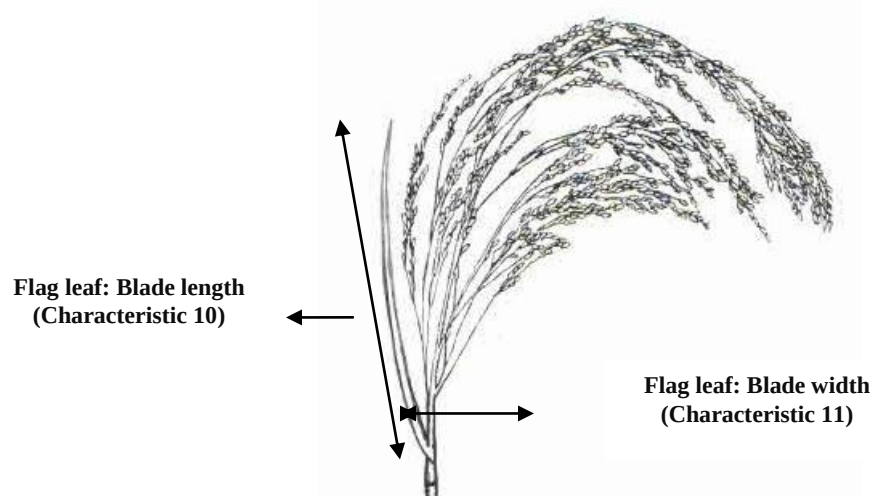
Peduncle length is measured from earhead base to the top most node on main tiller.

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

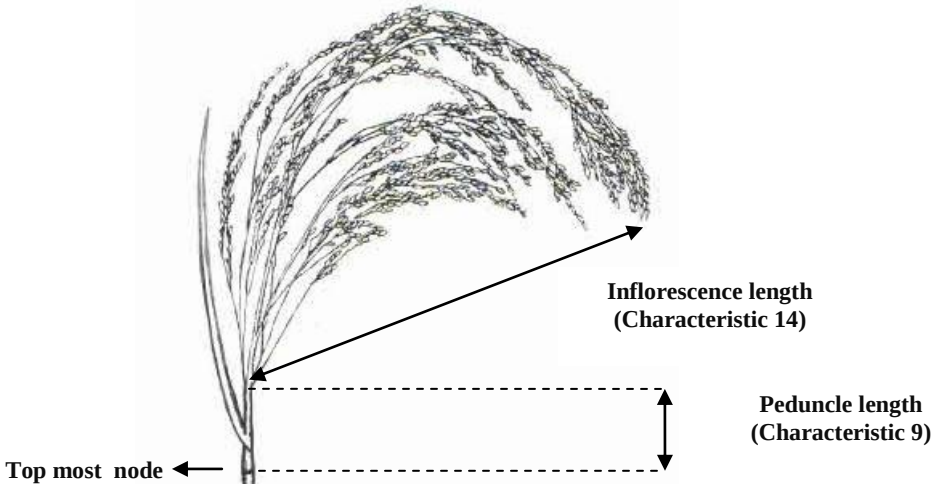


Characteristic 13 Panicle: Compactness

3	5	7
Compact	**Intermediate**	**Open**

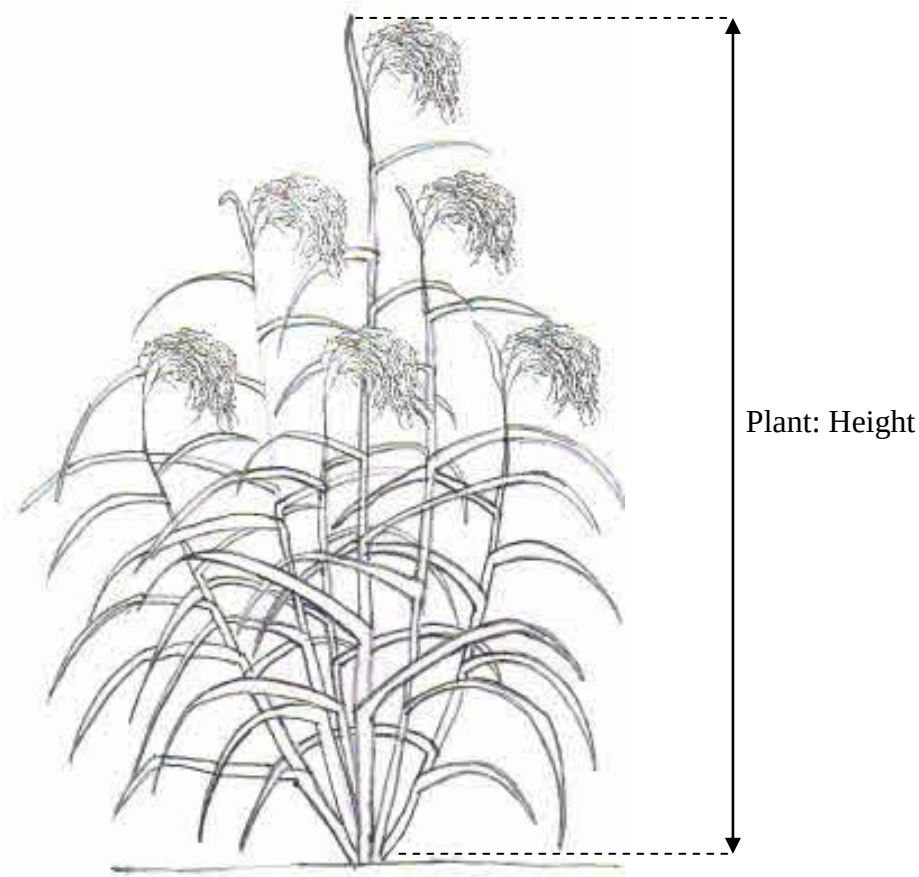
Characteristic 14 Panicle: Length (cm)

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

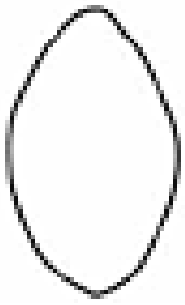


Characteristic 16 Plant: Height (cm)

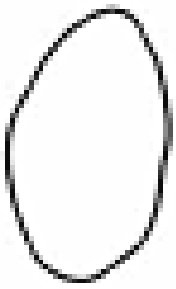
Plant height is measured from ground level to the tip of the earhead of main tiller.



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.

The members of the Task Force

Dr. K. Narayana Gowda, Former VC UAS, Bengaluru	- Chairman
Dr. A. Seetharam, Former PC(AICPMIP), UAS, Bengaluru	- Member
Prof. B.T. Shankare Gowda, Former Prof. UAS, Bengaluru	- Member
Dr. T.G. Nagehwara Rao, PC(Small millets), UAS, Bengaluru	- Member
Dr. K.T. Krishne Gowda, Former PC(AICSMIP), UAS Bengaluru	-Special Invitee
Sh. Dipal Roy Choudhury, PPV&FRA, New Delhi	-Member Secretary

Nodal Person(s) for development of the DUS Guideline

Dr. T G Nagehwara Rao, Project Co-ordinator (Small millets), UAS, GKVK

Dr. P. Ravishankar, PC unit, Small millets UAS, GKVK

Dr. Hemavathi, Jr. Breeder, TNAU, Coimbatore

X. DUS Test Centers

Nodal DUS centre	**Other Test Centre(s)**
All India Coordinated Research Project on Small millets, UAS, GKVK, Bangalore-560065, Karnataka	Centre of Excellence in Small millets, Athiyandal-606603, Thiruvannamalai, Tamil Nadu

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:
   e. Germination : 80% (Minimum)
   f. Moisture content : 12% (Maximum)
   g. Physical purity : 97% (Minimum)
   h. 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

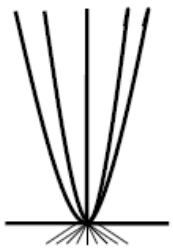
Sl no	Characteristics	States	Score/Notes	Example varieties	Stage of observation	Type of assesment
1 (+)	Plant: Growth habit	Erect	3	Co 4	15	VG
		Decumbent	5	OLM 217		
		Prostrate	7	GPMR 18		
2	Basal tillers: Number	Low(<10)	3	GPMR 26	26	MS
		Medium (10.0-20.0)	5	OLM 208		
		High(> 20)	7	GPMR 94		
3 (*) (+)	Days to 50% flowering	Early(<40)	3	OLM 20	51	MG
		Medium(40-50)	5	CO 4		
		Late(> 50)	7	OLM 217		
4	Plant :	Absent	1	JK 36	59	VG

(*)	Pigmentation at leaf sheath	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		

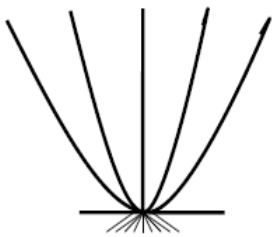
16 (*) (+)	Plant : Height (cm)	Dwarf (<80.0)	3	GPMR 1	83	MS
		Semi dwarf (80.0-120.0)	5	OLM 36		
		Tall (120.1-160.0)	7	OLM 217		
		Very Tall (>160)	9	-		
17	Seed: Shattering	Absent	1	-	83	VG
		Present	9	JK 36		
18 (*)	Grain: Colour	Straw white/cream RHS NO 159C	1	OLM 203	83	VG
		Golden yellow RHS NO 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

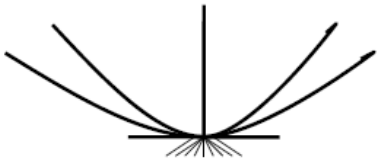
Characteristic 1 Plant: Growth habit



3
Erect



5
Decumbent

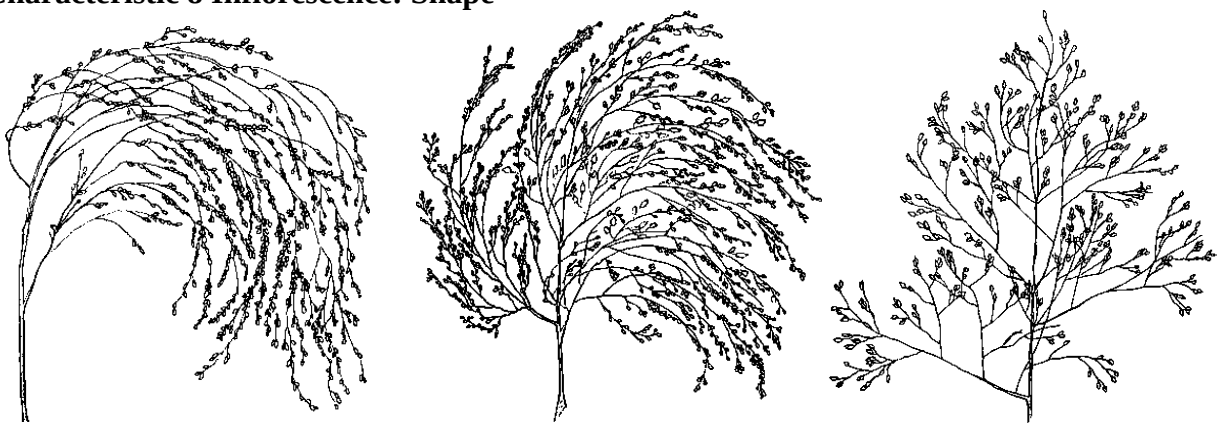


7
Prostrate

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

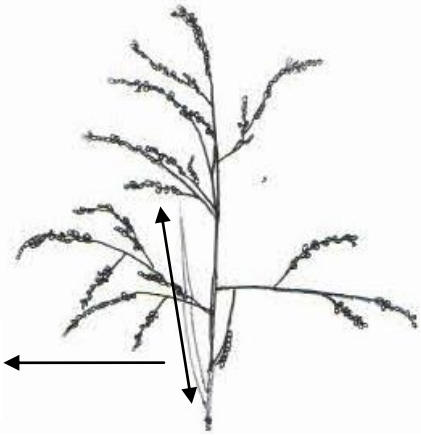
5
Globose – Elliptic

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.



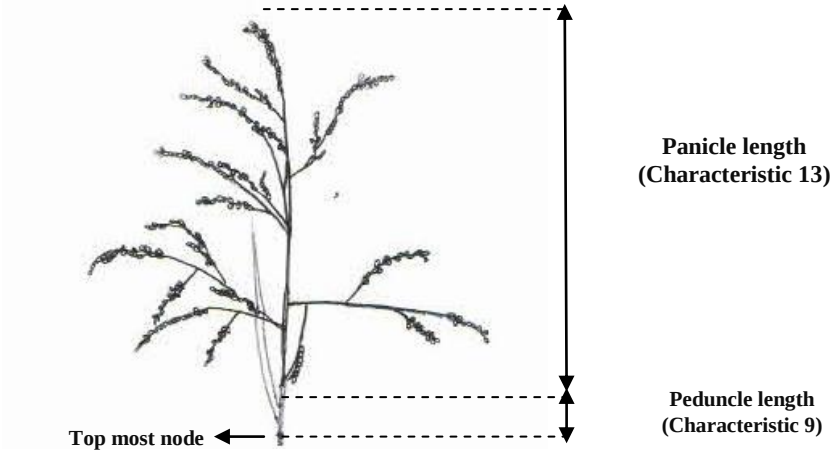
Flag leaf: Blade length (Characteristic 10)

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

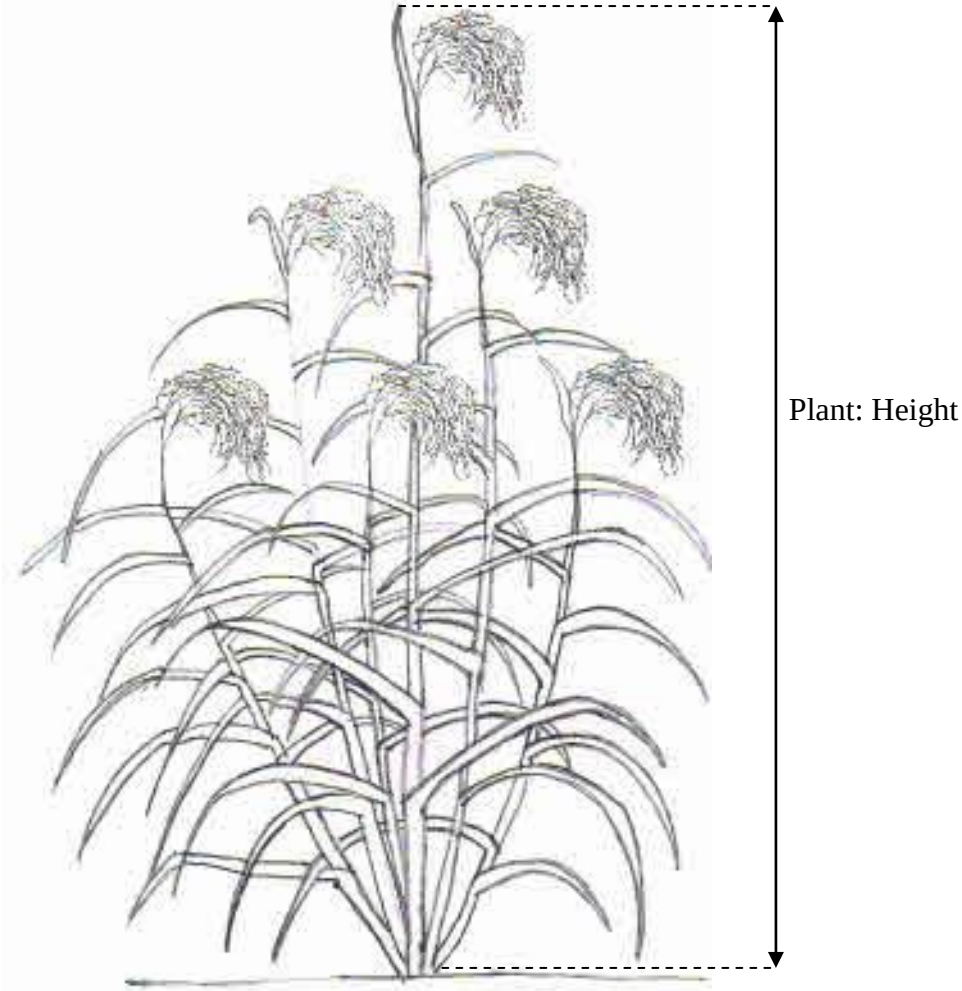
3
Compact

5
Intermediate

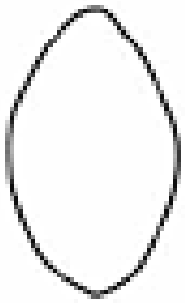
7
Open

Characteristic 16 Plant: Height (cm)

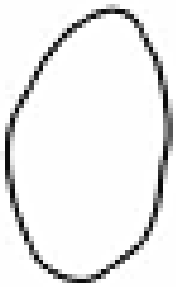
Plant height is measured from ground level to the tip of the earhead of main tiller.



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.

The members of the Task Force

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Dr. A. Seetharam, Former PC(AICPMIP), UAS, Bengaluru	- Member
Prof. B.T. Shankare Gowda, Former Prof. UAS, Bengaluru	- Member
Dr. T.G. Nagehwara Rao, PC(Small millets), UAS, Bengaluru	- Member
Dr. K.T. Krishne Gowda, Former PC(AICSMIP), UAS Bengaluru	-Special Invitee
Sh. Dipal Roy Choudhury, PPV&FRA, New Delhi	-Member Secretary

Nodal Person(s) for development of the DUS Guideline

Dr. T G Nagehwara Rao, Project Co-ordinator (Small millets), UAS, GKVK

Dr. P. Ravishankar, PC unit, Small millets UAS, GKVK

Dr. Hemavathi, Jr. Breeder, TNAU, Coimbatore

X. DUS Test Centers

Nodal DUS centre	**Other Test Centre(s)**
All India Coordinated Research Project on Small millets, UAS, GKVK, Bangalore-560065, Karnataka	OUA&T Regional Research station, Berhampur, Ganjam-761001, Odisha

Kodo millet (*Paspalum scorbiculatum* L.)

I Subject:

These test guidelines apply to all the varieties, hybrids and parental lines of Kodo millet (*Paspalum scorbiculatum* L.)

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 500 grams. The seed shall be packed and sealed in ten equal weighing packets of 50 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 of seed germination:

    i. Germination : 80% (Minimum)
    j. Moisture content : 12% (Maximum)
    k. Physical purity : 97% (Minimum)
    l. 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) under extant category.
2. The test shall normally be conducted at least at two test locations.
3. The field test 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 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: 3.0 m
    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 3 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 Kodo millet varieties

    1. Leaf juncture pigmentation (Characteristic 6)
    2. Panicle appearance (Characteristic 12)
    3. Spikelet arrangement on rachis (Characteristic 14)
    4. Spikelet irregular rows: Intensity (Characteristic 15)
    5. Glume: Nerves on glumes (Characteristic 24)

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	2-4 Leaf stage
26	Vegetative
51	50 %Flowering
59	Complete flowering
67	Dough stage
77	Seed filling
83	Maturity
95	After 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 observations	Type of assessment
1 (+)	Plant: Growth habit	Erect	3	JK 155	15	VG
		Decumbent	5	JK 439		
		Prostrate	7	GPLM 302		
2	Basal tillers: Number	Very low (<10)	2	GPLM 16	26	MS

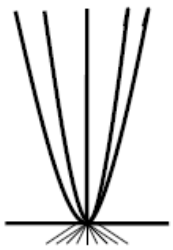
		Low (10-20)	3	RK 390-25		
		Medium (20.1-30.0)	5	GPLM 12		
		High (>30)	7	GPLM 5		
3 (*) (+)	Leaf : Attitude	Erect	3	JK 48	26	VG
		Droopy	5	JK 155		
4 (*) (+)	Days to 50%flowering	Early(<65)	3	GPLM 8	51	MG
		Medium (65-75)	5	JK 65		
		Late(75-85)	7	TNAU 86		
		Very late(>85)	9	GPLM 328		
5 (*)	Leaf Sheath: Pigmentation	Absent	1	JK 48	59	VS
		Present	9	JK 155		
6 (*)	Leaf juncture: Pigmentation	Absent	1	RK 390-25	59	VS
		Present	9	JK 48		
7 (*)	Internode: Pigmentation	Absent	1	GPLM 23	59	VS
		Present	9	JK 155		
8	Leaf blade: Pigmentation	Absent	1	DPS 9-1	59	VG
		Present	9	-		
9 (+)	Flag leaf blade: Length (cm)	Short(<20.0)	3	RK 390-25	59	MS
		Medium (20.0-30.0)	5	DPS 9-1		
		Long(>30.0)	7	-		
10 (+)	Flag leaf blade: width(cm)	Narrow(<0.5)	3	-	59	MS
		Medium (0.5-1.0)	5	JK 98		
		Wide(>1.0)	7	JK 48		
11 (+)	Peduncle: Length (cm)	Short(<5.0)	3	-	59	MS
		Medium (5.0-10.0)	5	JK 48		
		Long(> 10.0)	7	RK 390-25		
12 (*) (+)	Panicle: Appearance	Compact	3	RK 390-25	67	VG
		Semi compact	5	JK 155		
		Open	7	Indira kodo 1		
13 (+)	Panicle: Exertion	Partial	1	RK 390-25	67	VS
		Complete	9	JK 13		
14 (*) (+)	Spikelet: Arrangement on rachis	Regular	2	TNAU 86	67	VG
		Irregular	8	RK 390-25		
15	Spikelet:	Two-three	3	JK 48	67	VG

(+)	irregular rows number	Two -four	5	-		
		Lower half (regular at upper half)	7	RK 390-25		
16 (+)	Spike: Branching	Absent	1	DPS 9-1	67	VG
		Present	9	RK 390-25		
17 (+)	Spike: Curvature	Straight	2	TNAU 86	67	VG
		Curved	4	RK 390-25		
18	Spikelet: Density	Lax	4	JK 48	67	VG
		Dense	6	RK 390-25		
19 (+)	Culm: Branching	Low (<3)	3	GPLM 37	67	MG
		Medium(3-7)	5	JK 48		
		High (>7)	7	TNAU 86		
20 (+)	Panicle: Length (cm)	Short (<6.0)	3	GPLM 610	77	MS
		Medium (6.0-9.0)	5	JK 13		
		Long (>9.0)	7	JK 48		
21 (+)	Thumb raceme: Length (cm)	Short (< 5)	3	-	77	MS
		Medium (5-7)	5	JK 62		
		Long (>7)	7	JK 48		
22 (+)	Raceme: Length (cm)	Short(< 5.0)	3	GPLM 6	77	MS
		Medium (5.0-10.0)	5	JK 48		
		Long (10.1-15.0)	7	GPLM 54		
		Very long (>15.0)	9	-		
23 (*)	Raceme: Number (Above thumb)	Low (<2)	3	GPLM 101	77	MS
		Medium (2-4)	5	GPLM 1		
		High (4-6)	7	DPS 9-1		
		Very high (>6.0)	9	-		
24 (*) (+)	Glume: Space between Nerves	Narrow (7 nerves)	3	JK 48	83	VG
		Broad (5 nerves)	5	DPS 9-1		
25 (*) (+)	Plant: Height (cm)	Dwarf (<30.0)	3	GPLM 196	83	MS
		Semi dwarf (30.0-50.0)	5	GPLM 193		
		Tall	7	JK 13		

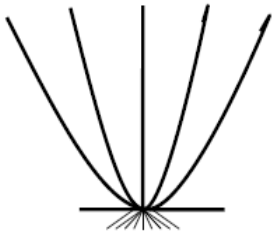
		(50.1-70.0)				
		Very Tall (>70.0)	9	JK 65		
26	Lodging	Absent	1	TNAU 86	83	VG
		Present	9	DPS 9-12		
27	Seed: Shattering	Absent	1	GPLM 2	83	VG
		Present	9	TNAU 86		
28 (*)	Grain: Colour	Light brown RHS NO 177D	3	-	83	VG
		Brown RHS NO177C	4	GPLM 68		
		Dark brown RHS NO 177B	5	JK 155		
29	Grain: Shape	Elliptical	2	JK 439	95	VG
		Oval	4	RK 390-25		
30 (*)	1000- grain weight (g) at 12% moisture content	Low (<5.0)	3	GPLM 129	95	MG
		Medium (5.0-6.0)	5	RK 390-25		
		High (>6.0)	7	GPLM 54		

II Explanations for Table of Characteristics

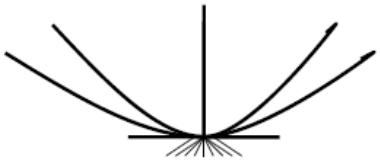
Characteristic 1 Plant: Growth habit



1
Erect

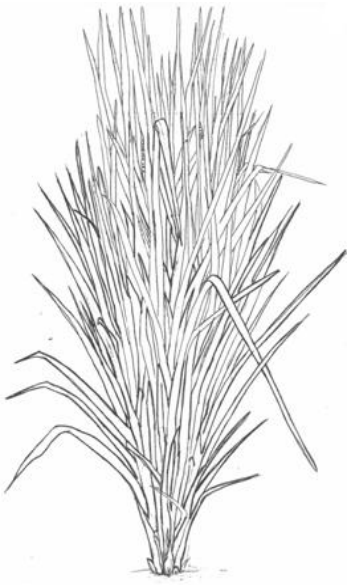


5
Decumbent



7
Prostrate

Characteristic 3 Leaf: Attitude



3
Erect

5
Droopy

Characteristic 4 Days to 50 % flowering

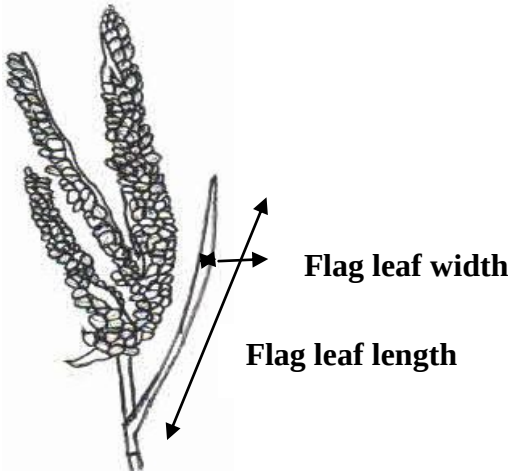
Days to 50% flowering is from sowing to the stage when ears have emerged from main tiller in 50 percent population.

Characteristic 9 Flag leaf blade: Length (cm)

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

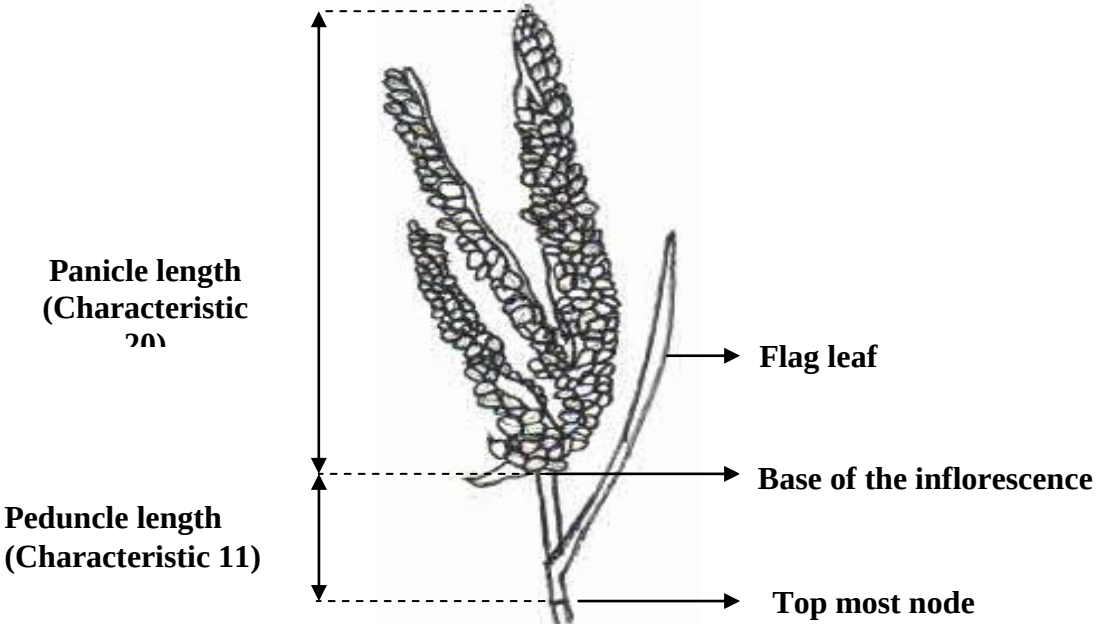
Characteristic 10 Flag leaf blade: Width (cm)

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

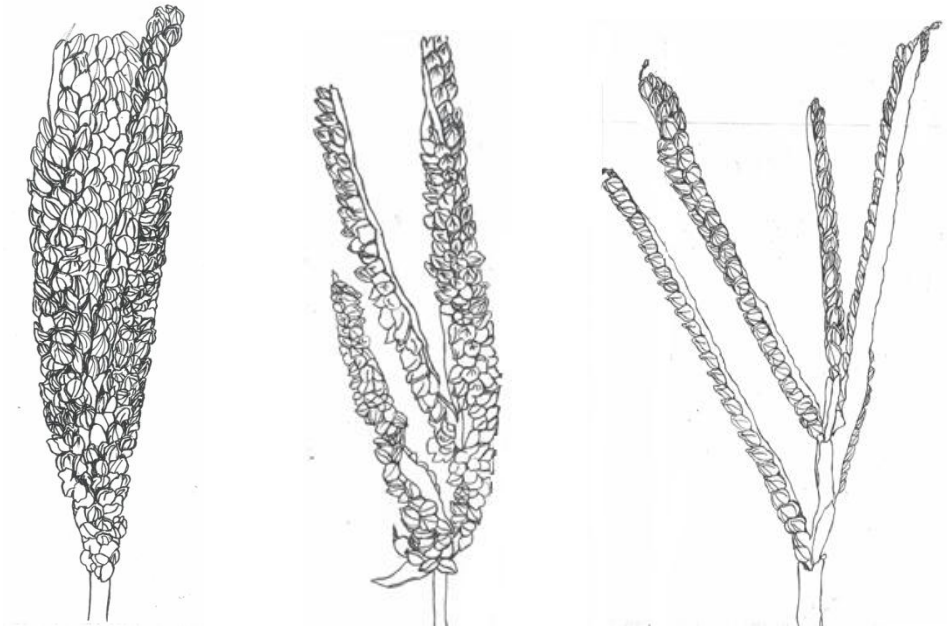


Characteristic 11 Peduncle: Length (cm)

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



Characteristic 12 Panicle: Appearance

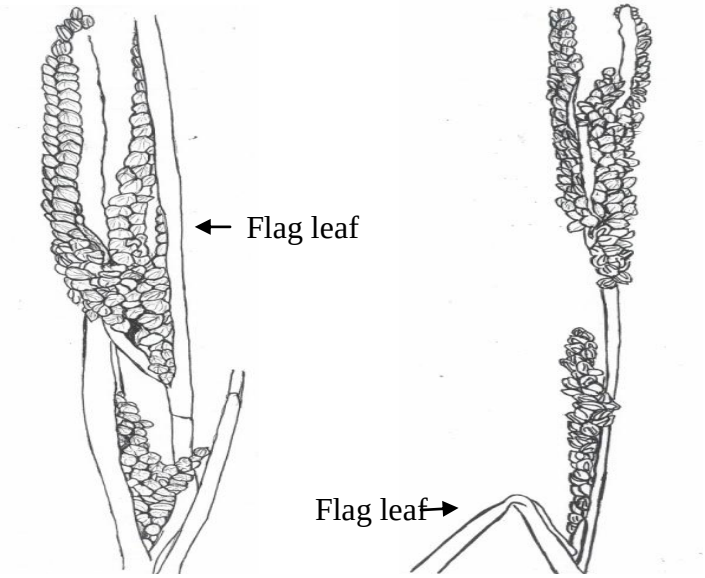


3
Compact

5
Semi-compact

7
Open

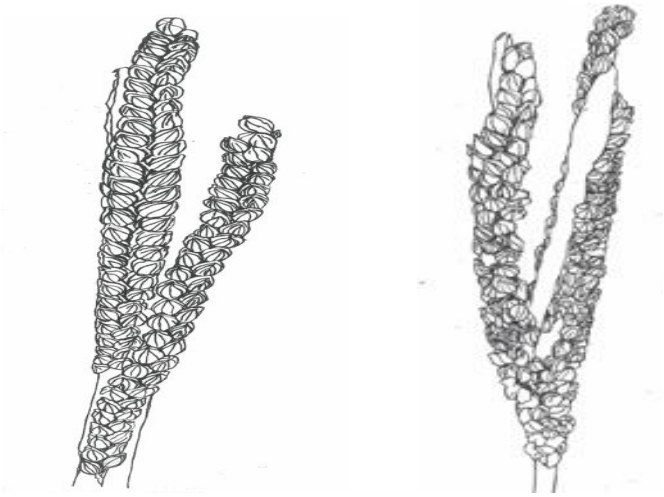
Characteristic 13 Panicle: Exertion



1
Partial

7
Complete

Characteristic 14 Spikelet: Arrangement on rachis



2
Regular

8
Irregular

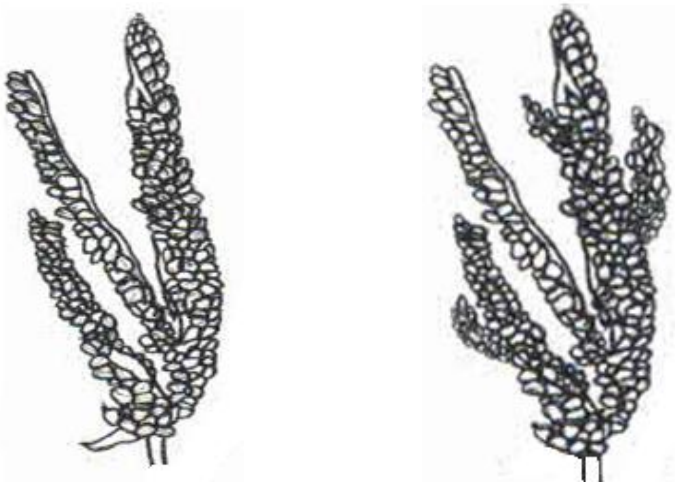
Characteristic 15 Spikelet: Irregular rows number

3
Two-three

5
Two-Four

7
Lower half

Characteristic 16 Spike: Branching



1
Absent

9
Present

Characteristic 17 Spike: Curvature

2
Straight

4
Curved

Characteristic 19 Culm: Branching

- Low - Upper nodes rarely produce branches
- Medium -Upper 2 – 4 nodes produce branches
- High- Most nodes produce branches

Characteristic 20 Panicle: Length (cm)

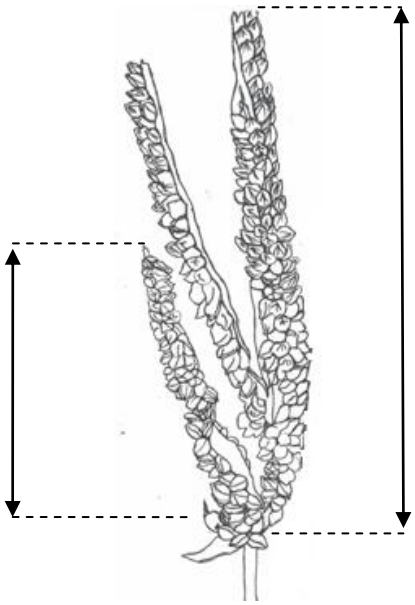
Panicle length is measured from base of the panicle to the tip of the panicle.

Characteristic 21 Thumb raceme: Length (cm)

Thumb raceme length is measured from base to the tip of the thumb raceme

Characteristic 22 Raceme: Length (cm)

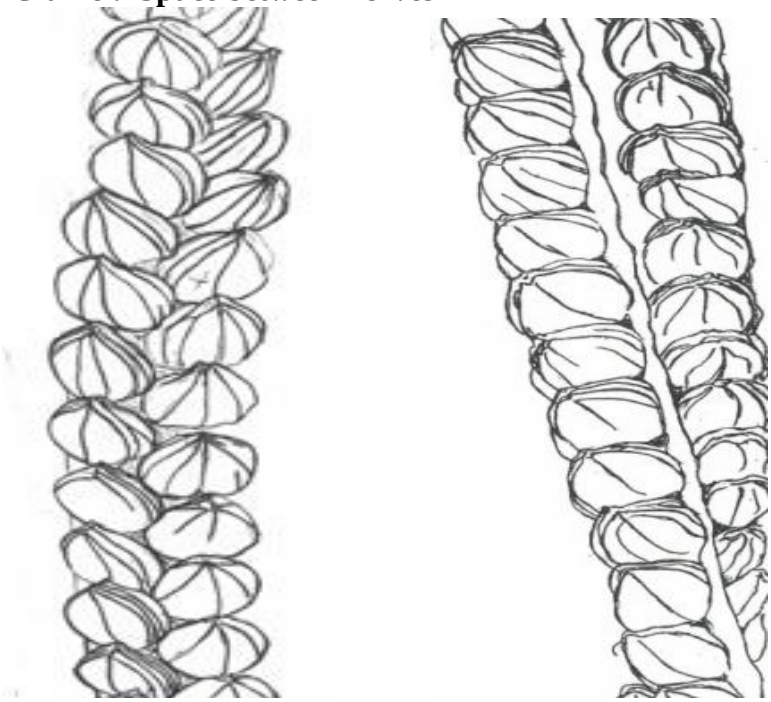
Raceme length is measured from base of the longest raceme in the inflorescence to the tip of the raceme.



Thumb raceme: Length (Characteristic 21)

Raceme: Length (Characteristic 22)

Characteristic 24 Glume : Space between nerves

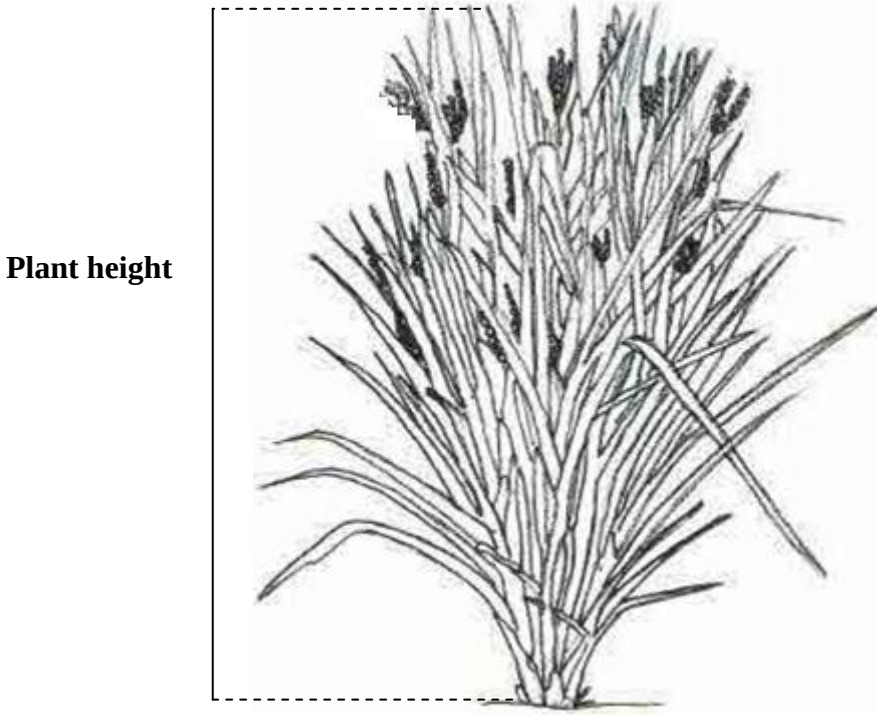


3
Narrow

5
Broad

Characteristic 25 Plant: Height (cm)

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



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.

The members of the Task Force

Dr. K. Narayana Gowda, Former VC UAS, Bengaluru	- Chairman
Dr. A. Seetharam, Former PC(AICPMIP), UAS, Bengaluru	- Member
Prof. B.T. Shankare Gowda, Former Prof. UAS, Bengaluru	- Member
Dr. T.G. Nagehwara Rao, PC(Small millets), UAS, Bengaluru	- Member
Dr. K.T. Krishne Gowda, Former PC(AICSMIP), UAS Bengaluru	-Special Invitee
Sh. Dipal Roy Choudhury, PPV&FRA, New Delhi	-Member Secretary

Nodal Person(s) for development of the DUS Guideline

Dr. T G Nagehwara Rao, Project Co-ordinator (Small millets), UAS, GKVK

Dr. P. Ravishankar, PC unit, Small millets UAS, GKVK

Dr. S. Geethanjali, Jr. Breeder, TNAU, Coimbatore

Dr. Pratibha Das, Breeder, AICRP on Millets, Dindori

X. DUS Test Centers

DUS centre (1)	**Test Centre(2)**
AICRP on Small Millets, Zonal Agril. Research Station, Jagdalpur-494005, Chhattisgarh	All India Coordinated Research Project on Small millets, College of Agriculture, REWA-486001, Jabalpur, Madhya Pradesh

Barnyard millet (*Echinocloa frumentaceae* (Roxb.) Link)

I Subject:

These test guidelines apply to all the varieties, hybrids and parental lines of Barnyard millet (*Echinocloa frumentaceae* (Roxb.) Link)

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 250 grams. The seed shall be packed and sealed in ten equal weighing packets of 25 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:
   m. Germination : 80% (Minimum)
   n. Moisture content : 12% (Maximum)
   o. Physical purity : 97% (Minimum)
   p. 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) under extant category.

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: 3.0 m
    - 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 3 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 Barnyard millet varieties

    1. Plant :Pigmentation at internodes and leaf sheath (Characteristic 4)
    2. Inflorescence: Shape (Characteristic 8)
    3. Spikelet: Arrangement on the rachis (Characteristic 11)
    4. Lower racemes: Shape (Characteristic 12)
    5. Grain: Colour (Characteristic 20)

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

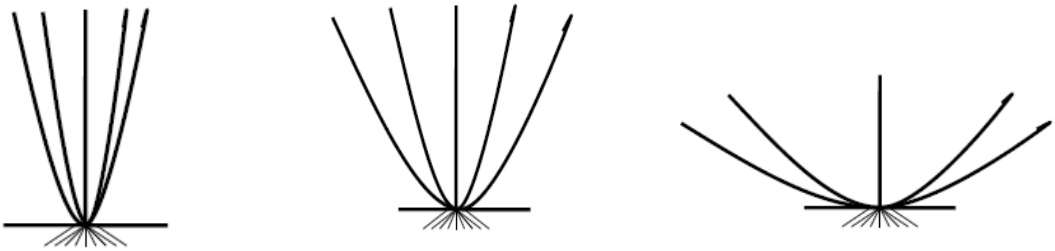
Sl no	Characteristics	States	Score/ Notes	Example Varieties	Stage of observation	Type of assessment
1 (+)	Plant: Growth habit	Erect	**1**	VL 207	15	VG
		Decumbent	**5**	VL 181		
		Prostrate	**7**	-		
2	Basal tillers: Number	Low (<4)	**3**	-	26	MS
		Medium(4-7)	**5**	VL 29		
		High(>7)	**7**	GECH 574		
3 (*) (+)	Days to 50% flowering	Early(< 40)	**3**	PRJ 1	51	MG
		Medium (40-50)	**5**	RAU 11		
		Late (>50)	**7**	CO 2		
4 (*)	Plant: Pigmentation (at internodes and leaf sheath)	Absent	1	RAU 11	59	VG
		Present	9	VL 207		
5 (+)	Flag leaf blade: Length (cm)	Short (<15)	3	-	59	MS
		Medium(15.0-30.0)	5	VL 181		
		Long(30.1-45.0)	7	GECH 86		
		Very long(>45.0)	9	GECH 22		
6 (+)	Flag leaf blade: width(cm)	Narrow (<2.0)	3	GECH 3	59	MS
		Medium (2.0-3.0)	5	VL 21		
		Wide (>3.0)	7	GECH 133		
7 (+)	Peduncle: Length (cm)	Short (<10.0)	1	-	59	MS
		Medium (10.0-20.0)	3	Co 2		
		Long (>20.0)	5	GECH 217		
8 (*) (+)	Inflorescence: shape	Cylindrical	**3**	VL 207	59	VG
		Pyramidical	**5**	VL 29		
		Globose- Elliptic	**7**	IC 404404		
9 (*)	Inflorescence: Colour	Green RHS NO 149 B	**1**	Co 2	59	VG
		Light purple RHS NO 58 B	**5**	IC 473117		
		Dark purple	**7**	IC 404404		

		RHS NO 59 B				
10 (+)	Panicle: Compactness	Open	**3**	IC404446	67	VG
		Intermediate	**5**	VL 172		
		Compact	**7**	VL 29		
11 (*) (+)	Spikelet: Arrangement on the rachis	Unidirectional	**3**	IC404449	67	VS
		Surrounded	**7**	VL 207		
12 (*) (+)	Lower racemes: Shape	Straight	**3**	IC404498	67	VS
		Curved	**7**	VL 207		
13	Lower raceme: Thickness	Slender	**3**	IC404455	67	VS
		Thick	**7**	PRJ 1		
14 (*) (+)	Lower raceme: Branching	Absent	**1**	VL 172	67	VS
		Present	**9**	GECH 6		
15	Culm: Branching	Absent	**1**	GECH 1	67	VG
		Present	**9**	VL 207		
16	Lower raceme: Length (cm)	Short(< 3)	**3**	GECH 2	67	MS
		Medium (3.0-5.0)	**5**	VL 172		
		Long (> 5.0)	**7**	GECH 9		
17 (*) (+)	Panicle: Length (cm)	Short (<15.0)	3	GECH 570	67	MS
		Medium (15.0-25.0)	5	VL 172		
		Long (>25.0)	7	GECH 308		
18 (*) (+)	Plant: Height (cm)	Dwarf (<40)	3	-	83	MS
		Semi dwarf (40.0-80.0)	5	GECH 102		
		Tall (80.1-120.0)	7	VL 21		
		Very Tall (>120.0)	9	RAU 3		
19	Seed Shattering	Absent	1	GECH 18	83	VG
		Present	9	PRJ 1		
20	Lodging	Absent	**1**	CO 2	83	VS
		Present	**9**	PRJ 1		
21 (*)	Grain: Colour	Straw white RHS NO 163D	**2**	GECH 337	83	VG
		Light Grey RHS NO 156B	**4**	VL 207		

		Grey RHS NO 156A	**5**	PRJ 1		
22	Grain: Shape	Concave	**1**	VL 207	95	VG
		Oval	**2**	-		
23	1000 seed weight (g) at 12% seed moisture content	Low(< 2.0)	**3**	-	95	MG
		Medium (2.0-3.0)	**5**	VL 172		
		High (3.1- 4.0)	**7**	VL 207		
		Very high (>4.0)	9	-		

VIII. Explanations for the Table of Characteristics

Characteristic 1 Plant: Growth habit



1
Erect

5
Decumbent

7
Prostrate

Characteristic 3 Days to 50 % flowering

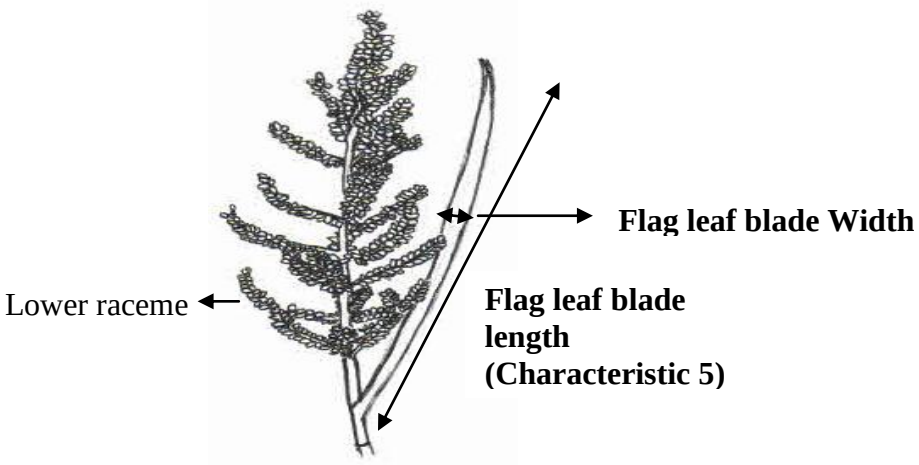
Days to 50% flowering is from sowing to the stage when ears have emerged from main tiller in 50 percent population.

Characteristic 5 Flag Leaf blade: Length (Cm)

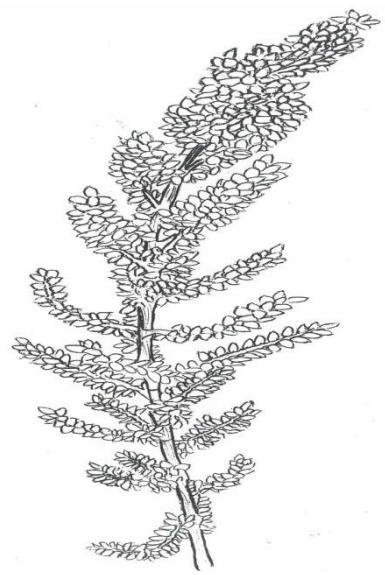
Flag leaf blade length is measured from ligule to flag leaf blade tip.

Characteristic 6 Flag Leaf blade: Width (Cm)

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



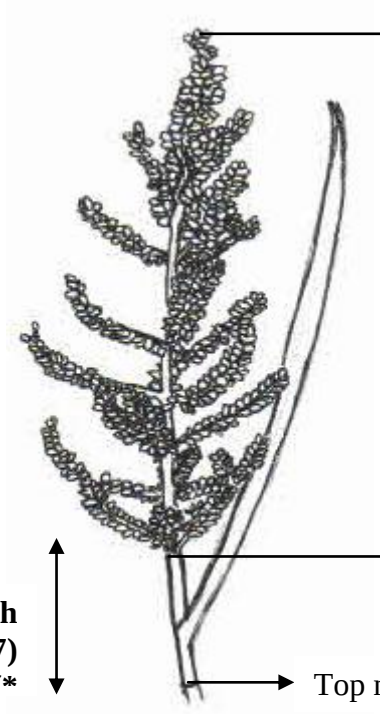
Characteristic 7 Peduncle: Length (Cm)
Peduncle length is measured from earhead base to the topmost node of main tiller.
Characteristic 8 Inflorescence: shape



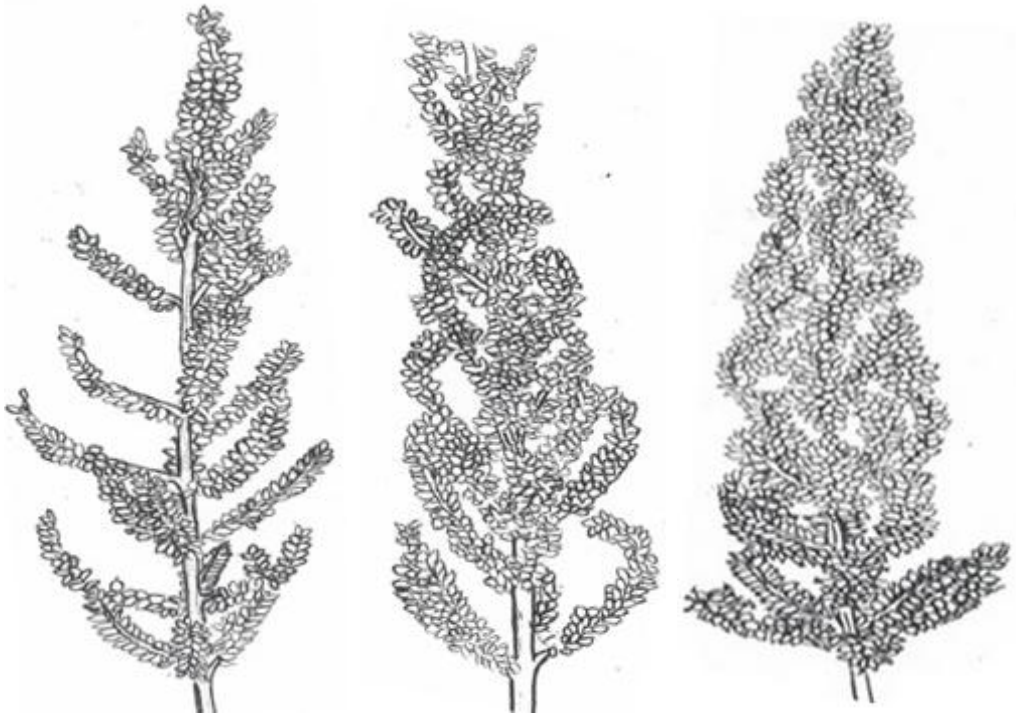
3
Cylindrical

5
Pyramidical

7
Globose-Elliptic



Characteristic 10 Panicle: Compactness

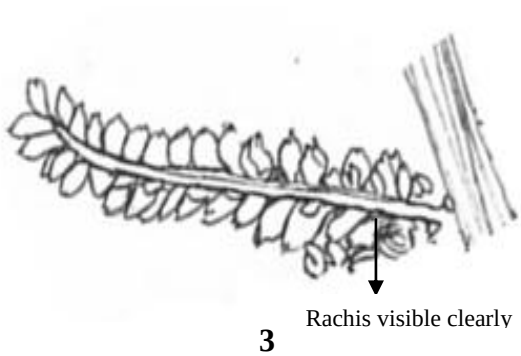


3
Open

5
Intermediate

7
Compact

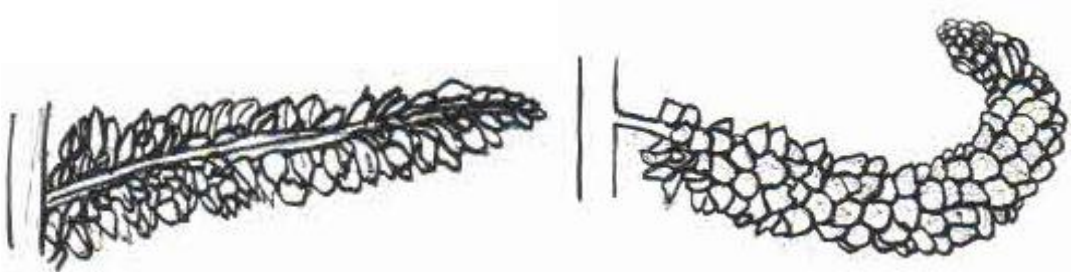
Characteristic 11 Spikelet: Arrangement on rachis



3
Unidirectional

5
Surrounded

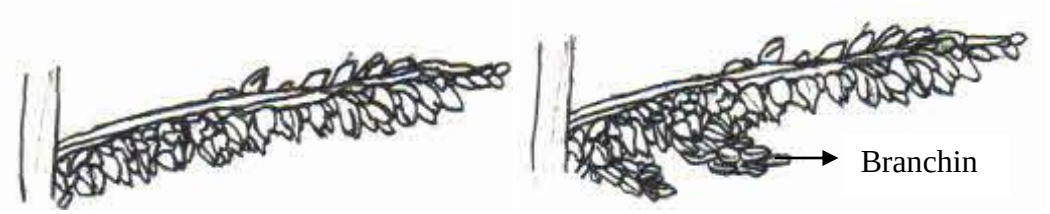
Characteristic 12 Lower raceme: Shape



3
Straight

5
Curved

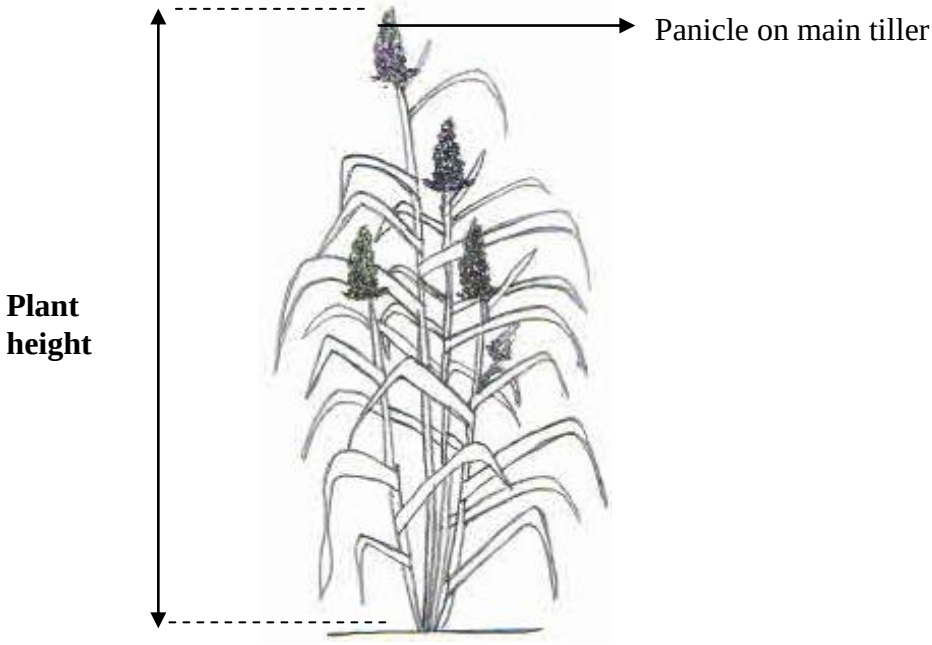
Characteristic 14 Lower raceme: Branching



1
Absent

9
Present

Characteristic 17 Panicle: Length (Cm)
Panicle length is measured from base of the panicle to the tip of the panicle.
Characteristic 18 Plant: Height (Cm)
Plant height is measured from ground level to the tip of the earhead of the main tiller.



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Dr. A. Seetharam, Former PC(AICPMIP), UAS, Bengaluru	- Member
Prof. B.T. Shankare Gowda, Former Prof. UAS, Bengaluru	- Member
Dr. T.G. Nagehwara Rao, PC(Small millets), UAS, Bengaluru	- Member
Dr. K.T. Krishne Gowda, Former PC(AICSMIP), UAS Bengaluru	-Special Invitee
Sh. Dipal Roy Choudhury, PPV&FRA, New Delhi	-Member Secretary

Nodal Person(s) for development of the DUS Guideline

Dr. T G Nagehwara Rao, Project Co-ordinator (Small millets), UAS, GKVK

Dr. P. Ravishankar, PC unit, Small millets UAS, GKVK

Dr. S. Geethanjali, Jr. Breeder, TNAU, Coimbatore

X. DUS Test Centers

Nodal DUS centre	Other Test Centre(s)
All India Coordinated Research Project on Small millets, UAS, GKVK, Bangalore-560065, Karnataka	**South:** 1. Centre of Excellence in Small millets, Athiyandal-606603, Thiruvannamalai, Tamil Nadu **North:** 1. Vivekananda Parvathiya Krishi Anusandhan Sansthan (VPKAS), Almora-263601, Uttarakhand 2. AICRP on Small millets Uttarakhand University of Hort. & Forestry, Hill Campus, Ranichauri-249199

I. Subject

These test guidelines shall apply to all varieties, hybrids and parental lines of elephant foot yam (*Amorphophallus paeoniifolius*).

II. Planting material required

1. The Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) shall decide when and in what quantity and quality the seed material is required for testing the variety denomination applied for registration under the Protection of Plant Varieties and Farmers' Rights (PPV & FR) Act, 2001. Applicants submitting such planting 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 minimum quantity of plant material, to be supplied by the applicant, should be 36 tubers 200-400g each immediately after harvest (not later than 20days).
3. The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.
4. The plant material should not have undergone any chemical or bio-physical 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.
5. Storage of tubers: Tuber can be stored in thatched house in single layer for 4-5 months.

III. Conduct of tests

1. The minimum duration of DUS tests shall normally be at least two independent similar growing seasons with two consecutive plantings, the second being a replanting with same plant material or with reference to the agro climatic conditions of candidate variety.

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 for which additional quantity of planting material shall be required.

3. The field tests shall be carried out under conditions favoring normal growth and expression of all test characteristics**.** The size of plot 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 36 plants in the plot size of (4.5x 4.5m) with planting space of (75 x 75cm) as specified schematically in figure of field layout. Separate plots for observation and for measurement can only be used, if they have been subjected to similar environmental conditions. 2-3 replications may be designed. All the replications shall be sharing similar environmental conditions of the test location.

4. **Test plot design**

Bed size	: 4.5m x 4.5m
Number of rows	: 6
Row to row distance	: 75 cm
Plant to plant distance	: 75 cm
Number of replications	: 3
Expected number of plants	: 36

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

IV. Methods and observations

1. The characteristics described in the Table of characters (see section VII) shall be used for the testing of varieties for their DUS test.
2. For the assessment of Distinctiveness and Stability, observations shall be made on at least 36 plants or parts of 36 plants, which shall be equally divided among three replications (12 plants per replication) and any other observations made on all plants in the test, disregarding any off-type plants.
3. For the assessment of Uniformity, of characteristics on the plot as a whole (visual assessment by a single observation on group of plants or parts of plants), a population standard of 1% and an acceptance probability of at least 95 % shall be applied.
4. For the assessment of all colour characteristics, the latest Royal Horticultural Society (RHS) colour chart shall be used.
5. Unless otherwise indicated, all observation on the plant, observations on leaf and the pseudostem should be made before the end of the growing phase, during the full expression time preferably at about 120-150 days after planting or 30 days before harvest in early maturing cultivars. Unless otherwise indicated, all observations on the shoot should be made at least for 10 plants per replication/replications.
6. Stem and leaf characters should be recorded as the average expression of the character observed in a group of 10 plants during maximum growing phase (120-150 days).
7. All observations on the tubers /corm should be made at the time of harvest (180-220days after planting).

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 the varieties in the collection are suitable for grouping purposes.
2. The following characteristics shall be used for grouping of elephant foot yam varieties:
   a) **Plant growth habit** (Height, Plant type) [characteristics 1 & 2]
   b) **Leaf type** (Total number of leaves/rachis, Leaflet shape, Leaflet color, Leaflet vein colour, Leaf waxiness) [characteristics 4,5,7,8 & 9]
   c) **Petiole/Culm type** (Size of speckles, Distribution of speckles, Rachis colour, Rachis pattern) [characteristics 12,15,18 & 20]
   d) **Corm characteristics** (Shape, No.of corm wrinkle, Epidermal colour, flesh color, Skin texture, No. Of Cormlet, Cormlet shape, Bract colour of main bud) [characteristics 21,22,23,24,25, 27,28 & 31]

VI. Characteristics with rank of measurement

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 (1-5) shall be used to describe the state of each character for the purpose of digital data processing and these shall be given against the states of each characteristic. In the case of qualitative and pseudo-qualitative characteristics, all relevant states of expression are presented in the characteristic.

3. Legend / Expression of characters
   - Expression of characters is the most important aspects of whole guidelines. Following points need to be adhered carefully for permanent records.

   - 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 Explanations on the Table of characteristics in sections 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) and sketches for clarity and also for the colour variation.

4. The optimum stage of plant growth for assessment of each characteristic is given in the 6th column of the Table of characteristics as explained below.

Growth stages for observation	**Code**	**Code No.**
a. Leafing (25-45 days after planting)	25-45	(a)
b. Full foliage growth (120-150 days after planting)	120-150	(b)
c. Foliage (150-200 days after planting)	150-200	(c)
d. Harvest maturity (180-220 days after planting)	180-220	(d)
e. Budding (225-260 days after harvest)	225-260	(e)

5. Type of assessment of characteristics indicated in column 7th 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 observations of individual plants or parts of plants .

6. Type of assessment for post harvest palatability, softness etc.

   To assess post harvest palatability, softness, mealiness etc. organoleptic evaluation shall be used.

VII. Table of characteristics

Sl. No.	Character	Characters with expression rank or measurement unit (State)	Note	Example of varieties	Stage of observa-tion	Type of Assess-ment
1	**2**	**3**	**4**	**5**	**6**	**7**
1. (*) (+)	Plant height	Short (<50cm)	1	BCA-5, NDA-4	(b)	MS
		Medium (50-100 cm)	3	BCA-1, BCA-3, BCA-4, IGAM-1, Sree Padma, NDA-5		
		Tall (>100)	5	BCA-2, Kovvur, NDA-9		
2. (*) (+)	Plant type	Upright	1	Sree Padma, BCA-5	(b)	VG
		Semi upright	3	BCA-3, IGAM-2		
		Horizontal	5	Gajendra, Kovvur		
3.	Number of leaflet branch/ rachis	Low (10-15)	1	BCA-2	(b)	MS
		Medium (15-20)	3	BCA-3, BCA-4, IGAM-1, Sree Padma, NDA-5, BCA-5, NDA-4		
		High (>20)	5	NDA-9, Kovvur		
4. (*) (+)	Total number of leaves per rachis	Lower (100-200)	1	BCA-3, BCA-5	(b)	MS
		Medium (200-250)	3	BCA-2, BCA-4, Kovvur, NDA-5, NDA-4		
		Higher (>250)	5	Sree Padma, NDA-9		
5. (*) (+)	Leaflet shape	Round	1	Gajendra, Sree Padma	(b)	VS
		Intermediate	3	BCA-4, Sree athira		
		Long	5	BCA-3		
6.	Leaflet size	Small (<30 cm)	1	NDA-5	(b)	MS
		Intermediate (30-50 cm)	3	Appakudal, IGAM-1, BCA-2		
		Large (>50 cm)	5	Bidhan kusum, Kovvur		
7. (*) (+)	Leaflet colour	Yellowish green	1	Gajnedra, IGAM-1, NDA-5	(b)	VS
		Light green	2	(None)		
		Green	3	(None)		
		Dark green	4	(None)		
8. (*) (+)	Leaflet vein colour	Yellowish	1	IGAM-1, BCA-2	(b)	VG
		Pale green	3	Kovvur, NDA-4, BCA-4		
		Light green	5	Sree Padma, NDA-5, BCA-5, BCA-3, BCA-1		
		Deep green	4	NDA-9		
9.	Leaf waxiness	Low	1	IGAM-2, BCA-5, NDA-9	(b)	VG

(*) (+)		Medium	3	Gajendra, NDA-4, BCA-3		
10.	Leaflet blade petiole ratio	low (0.6-0.7)	1	BCA-4, NDA-5	(b)	MG
		Medium (0.8-0.9)	3	Bidhan kusum, NDA-9		
		High (0.96 and more)	5	Appakudal, AC-28		

11.	Ground color of petiole	Light green	1	BCA-2, NDA-9	(b)	VG
		Light pink	3	Bidhan kusum, AC-28,		
		Pink	5	Gajendra, Kovvur		
12. (*) (+)	Size of petiole speckles (Patches)	Small	1	BCA-3, BCA-5	(b)	MS
		Intermediate	3	Appakudal, TRC BADMA, AC-14		
		Large	5	IGAM-1		
13.	Color of petiole speckles	Light	1	Bidhan kusum, BCA-2, NDA-5, IGAM-2	(b)	VS
		Intermediate	3	Appakudal, AC-28		
		Dark	5	Sree Padma, BCA-4		
14.	White speckles (Patches) on petiole	Absent	1	(None)	(b)	VG
		Few	2	BCA-3, Sree Athira Sree Padma,Gajendra,		
		Intermediate	3	BCA-4, IGAM-2, NDA-4		
		Many	4	BCA-2,TRC BADMA		
15. (*) (+)	Distribution of speckles	Absent	1	(None)	(b)	VG
		Spotty	3	BCA-3, BCA-5, AC-14		
		Contiguous	5	(None)		
16.	Petiole Texture	Lightly Rough	1	Kovvur, IGAM-1, BCA-5, BCA-3	(b)	VG
		Moderately Rough	2	NDA-5, NDA-4, BCA-5		
		Rough	3	NDA-9,Sree Padma		
		Smooth	4	Gajendra, BCA-1, BCA-2		
17.	Petiole colour	Dark green with white patches	1	IGAM-2	(b)	VG
		Green with white patches	5	NDA-9, BCA-1		
18. (*)	Rachis colour	Green with white patches and purple spots	1	NDA-5	(b)	VG
		Green with white patches	5	Gajendra, BCA-2		

19.	Rachis /Leaflet branch junction colour	With white spot	1	BCA-1, BCA-2, BCA-4, BCA-5, NDA-4, Sree Padma	(b)	VG
		Without white spot	2	NDA-9, IGAM-1, Kovvur		
		With violet stripe	3	BCA-3		
		With purple spot	4	NDA-5		
20. (*) (+)	Rachis Pattern	V-type	1	Kovvur , Sree Padma	(b)	VG
		Y-type	3	NDA-5, IGAM-1		

21. (*) (+)	Corm shape	Round	1	Gajendra,NDA-9, BCA-2, IGAM-1, NDA-4	(d)	VG
		Round to Elliptical	3	NDA-5, NDA-9, Sree Padma, BCA-1		
		Oval	5	BCA-4		
22. (*) (+)	No. of corm wrinkle	Few (1-2)	1	Gajendra, BCA-5	(d)	MS
		Intermediate (2-5)	3	IGAM-1		
		Many (>5)	5	(None)		
23. (*) (+)	Epidermal colour of corm	Light brown	1	Gajendra, BCA-5, Sree athira	(d)	VS
		Brown	3	NDA-9, AC-14		
		Dark brown	5	BCA-3, AC-28		
24. (*) (+)	Corm flesh colour	Pinkish yellow	1	Gajendra, NDA-9, Sree Padma, BCA-2	(d)	VG
		Yellow	2	NDA-5. NDA-9, BCA-1		
		Deep yellow	3	IGAM-1		
		Saffron	4	BCA-4, NDA-5, Kovvur		
		Orange	5	BCA-3		
25. (*) (+)	Skin texture	Rough	1	IGAM-1, BCA-2, BCA-3, BCA-4, NDA-4, BCA-1	(d)	VG
		Smooth	3	Gajendra, Kovvur, BCA-5		
26.	Skin thickness	Very thick	1	BCA-2, NDA-4	(d)	VG
		Thick	3	NDA-9, BCA-3, BCA-4, NDA-5, Sree Padma, BCA-1		
		Medium	5	Kovvur, IGAM-1, BCA-5		

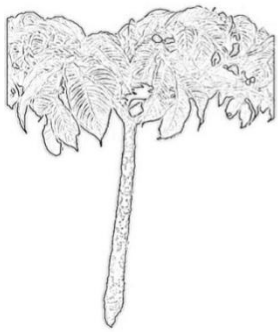
27. (*) (+)	No. of Cormlets	Absent to few	1	Gajendra, Kovvur	(d)	MG
		More	3	AC-28, OL-5/80		
28. (*)	Cormlet shape	Globular	1	BCA-3, IGAM-1, Gajendra	(d)	MS
		Clubbed	5	IGAM-2		
29.	No. of cormlet wrinklet	Few	1	BCA-3, Gajendra, TRC BADMA	(d)	MS
		Intermediate	5	Bidhan kusum, BCA-4		
30.	Epidermal color of cormlet	Light brown	1	IGAM-1	(d)	VS
		Brown	2	NDA-9, AC-14		
		Dark brown	3	AC-28, BCA-5		
31. (*) (+)	Bract color of main bud	Light pink	1	BCA-3, Bidhan kusum,AC-28	(e)	VS
		Pink	3	Gajendra, Appakudal, TRC BADMA, NDA-4		
		Purplish pink	5	Sree Athira		
32.	Abscission layer in cormlet	Absent	1	IGAM-2	(d)	VG
		Present	5	NDA-5, BCA-5, Sree Padma		

33.	Leafing date	Within 30 days	1	BCA-3, Sree Padma	(a)	VG
		More than 30 days	5	Gajendra, Bidhan kusum, AC14, NDA-4		
34.	Maturing date	Early (150-160 days)	1	TRC BADMA, Gajendra	(c)	MG
		Medium (170-180 days)	3	BCA-3, Sree athira		
		Late (More than 180 days)	5	BCA-5, AC-14		
35.	Date of emergence	Early (within 30 days after planting)	1	Appakudal, IGAM-2	(a)	MG
		Late (more than 30 days)	5	Gajendra, Bidhan kusum, NDA-9,AC-14		
36.	Corm weight	Low (500-750 gm)	1	BCA-5, IGAM-1, Appakudal	(d)	MS
		Medium (750gm -1 kg)	3	NDA-4, NDA-5, Kovvur, BCA-4, BCA-3, BCA-2,		
		High (>1 kg)	5	Gajendra, Sree padma, NDA-9		
37.	Softiness	Very soft	1	Gajendra, BCA-2, NDA-4	(d)	Organole-ptic
		Soft	2	BCA-1, NDA-5, NDA-9, IGAM-1		
		Medium soft	3	BCA-4, BCA-5		
		Hard	4	Kovvur, BCA-3		
		Very hard	5	Sree Padma		
38.	Palatability	Highly palatable	1	Gajendra, BCA-1, BCA-2,	(d)	Organole-

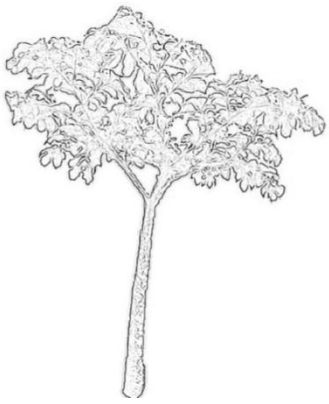
				NDA-4, NDA-5, NDA-9		ptic
		Moderately palatable	5	BCA-3, BCA-4, BCA-5, Sree Padma, Kovvur, IGAM-1		
39.	Mealiness	Highly coarse	1	Sree Padma	(d)	Organole-ptic
		Medium coarse	2	BCA-4, BCA-5		
		Low coarse	3	Gajendra, BCA-1, NDA-5, NDA-9,		
		Very low coarse	4	BCA-2, NDA-4		
40.	Taste	Sweet	1	BCA-1, BCA-2, NDA-4, NDA-9	(d)	Organole-ptic
		Tasteless	5	Gajendra, BCA-3, BCA-5, NDA-5, IGAM-1, Kovvur, Sree Padma		
41.	Acridity	Very low	1	BCA-1, BCA-2, NDA-9, IGAM-1	(d)	Organole-Ptic
		Low	3	BCA-3, BCA-4, BCA-5, NDA-4, Sree Padma, Kovvur		
		No acridity	5	Gajendra		

VIII. Explanation for the Table of characteristics

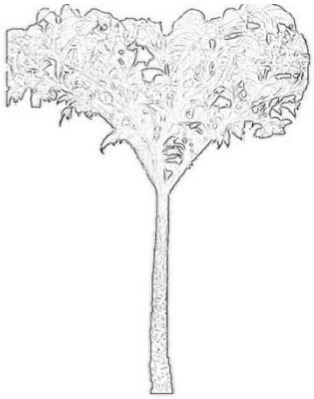
Characteristic 1: Plant height (cm)



1
Short (<50cm)



3
Medium (50-100 cm)

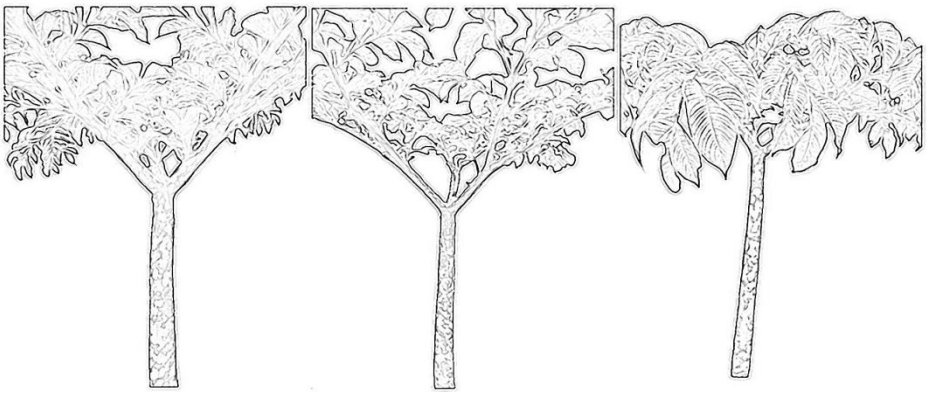


5
Tall (>100 cm)

1 **3** **5**

Short (<50cm) **Medium (50-100 cm)** **Tall (>100 cm)**

Characteristic 2: Plant Type



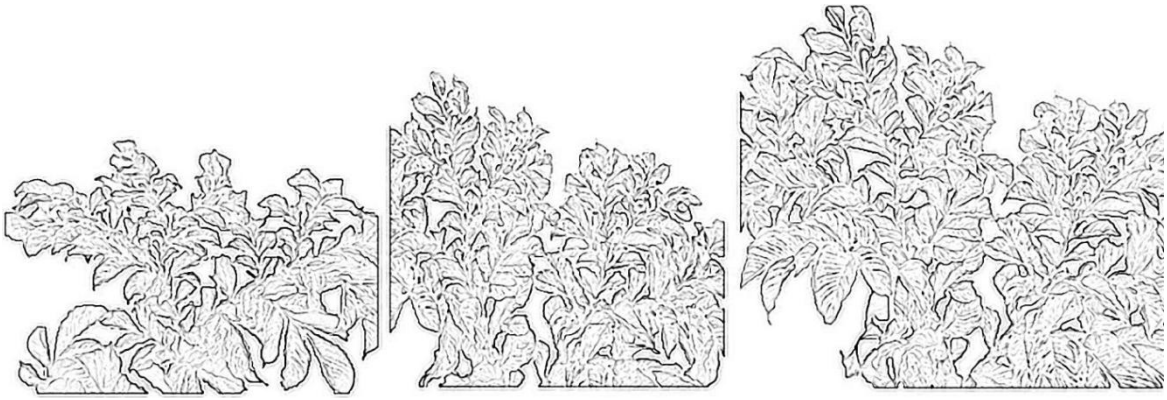
1 **3** **5**

Upright **Semi upright** **Horizontal**

1 **3** **5**

Upright **Semi upright** **Horizontal**

Characteristic 4: Total Number of Leaves Per Rachis



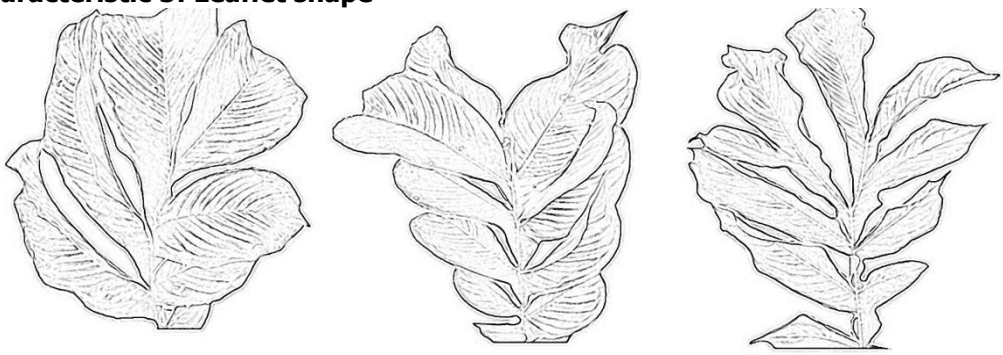
1 **3** **5**

Lower (100-200) **Medium (200-250)** **Higher (>250)**

1 **3** **5**

Lower (100-200) **Medium (200-250)** **Higher (>250)**

Characteristic 5: Leaflet shape



1 **3** **5**

Round **Intermediate** **Long**

1

Round

3

Intermediate

5

Long

Characteristic 7: Leaflet colour

1

Yellowish green

4

Dark green

Characteristic 8: Leaflet vein colour

1

Yellowish

3

Pale green

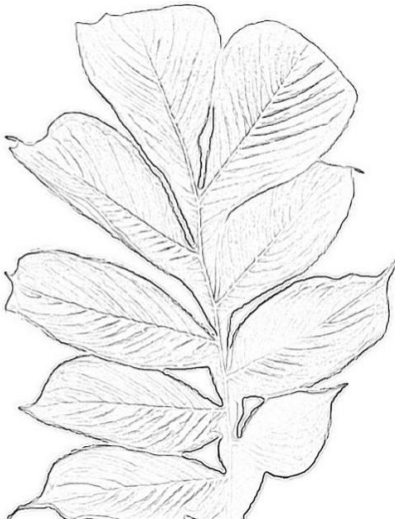
5

Light green

Characteristic 9: Leaf waxiness

1

Low



3

Medium

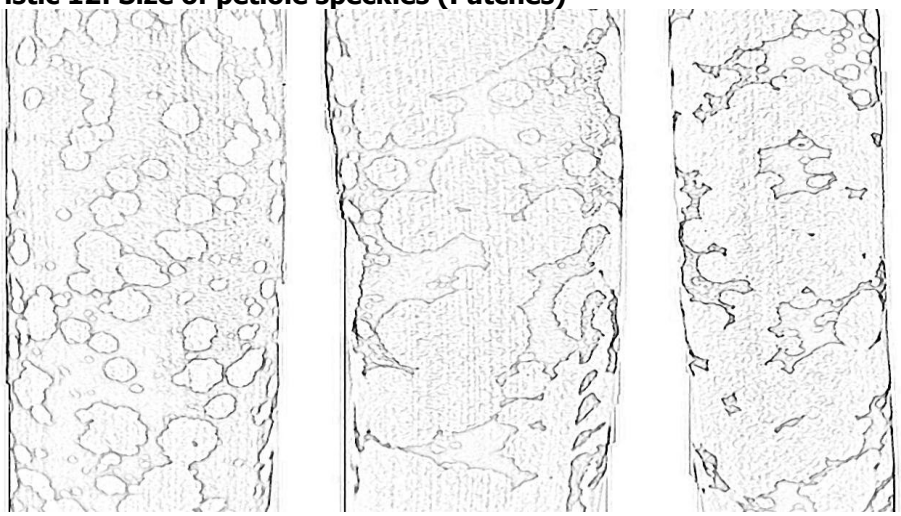
1

Low

3

Medium

Characteristic 12: Size of petiole speckles (Patches)



1
Small

3
Intermediate

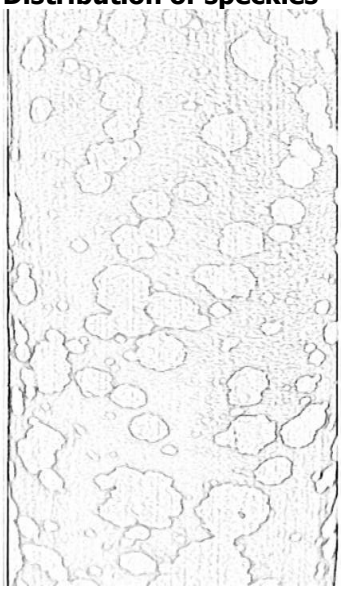
5
Large

1
Small

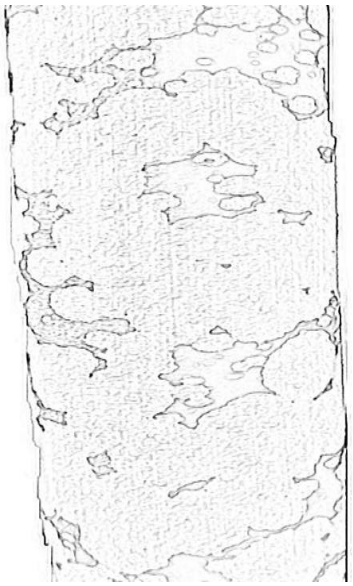
3
Intermediate

5
Large

Characteristic 15: Distribution of speckles



3
Spotty

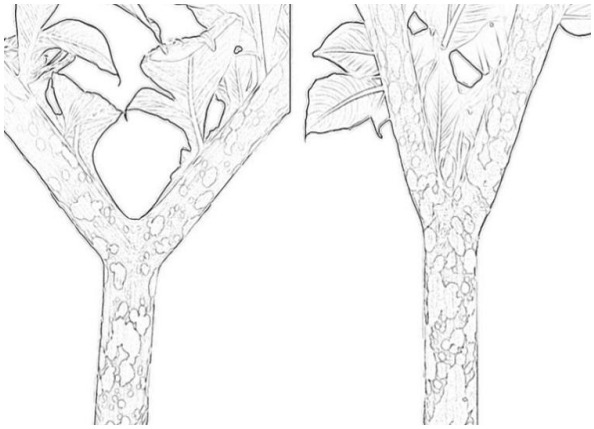


5
Contiguous

1
Spotty

5
Contiguous

Characteristic 20: Rachis pattern



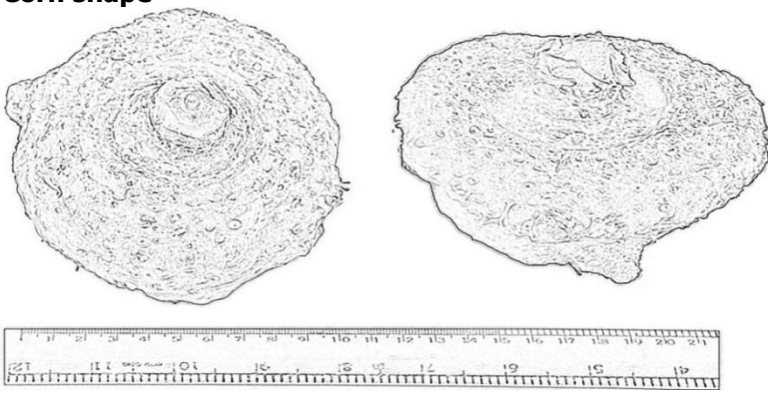
1 **3**

V-type **Y-type**

1 **3**

V-type **Y-type**

Characteristic 21: Corn shape



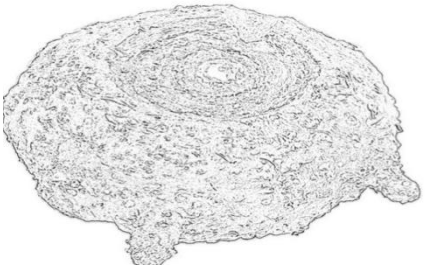
1 **3**

Round **Round to elliptical**

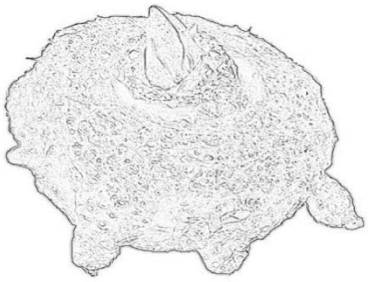
1 **3**

Round **Round to elliptical**

Characteristic 22: Corm wrinkle



1
Few



3
Intermediate

1
Few

3

Intermediate

Characteristic 23: Epidermal colour of corm

1
Light brown

3
Brown

5

Dark brown

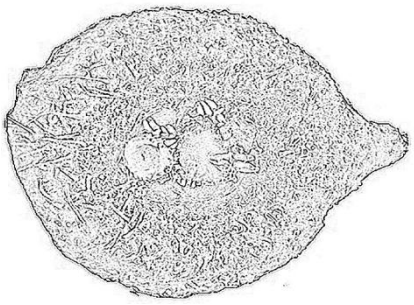
Characteristic 24: Corm flesh colour

1
Pinkish Yellow

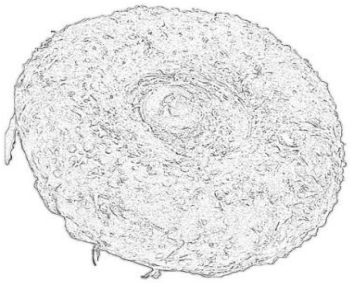
5

Orange

Characteristic 25: Skin texture



1
Rough

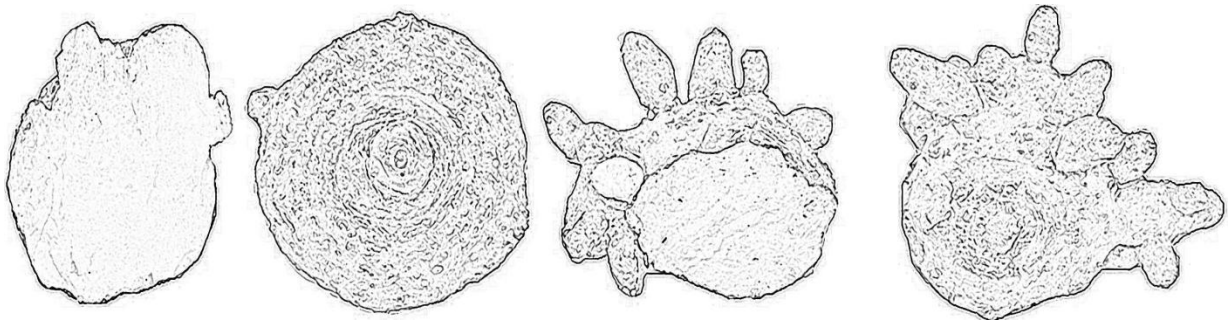


3
Smooth

1
Rough

3
Smooth

Characteristic 27: No. of Cormlet



1
Few or absent

3
More

1
Few or absent

3
More

Characteristic 31: Bract color of main bud

3
Pink

5
Purplish pink

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IX. Working group details

The test guidelines developed by the task force (**12/2014**) constituted by the PPV & FR Authority for **Elephant Foot Yam** with consultation by Nodal officer, ICAR-CTCRI & Co-Nodal officer BCKV, Kalyani. Technical inputs also provided by the PPV & FR Authority.

The members of the Task Force

1. Dr. S. Edision — **Chairman**
   Former Director, CTCRI, Resi:- Srinidhi, T. C. No. 13/550
   Kesavadasapuram, Pattom P.O. Thiruvanathapuram-695004

2. Dr. R. K. Tyagi, — **Member**
   Principal Scientist & Head
   Crop Genetic Resources, NBPGR, Pusa Campus, New Delhi-110012

3. Dr. M. Unnikrishnan — **Member**
   Former Principal Scientist, CTCRI (Plant Breeding)
   5,1785, Sreevisakh Cheruvickal, P.O., Sreekaryam,
   Thiruvananthapura-695017 (Kerala)

4. Dr. B. Vimala, — **Member**
   Former Principal Scientist, Plant Breeding CTCRI
   Tushara, House No. 7/1387(3), VRA-111, Vettamukku Junction
   PO-Tirumala, Trivandrum-695006

5. Dr. Archana Mukherjee — **Member**
   Project Investigator
   Nodal Centre-Central Tuber Crops Research Institute
   Regional Centre, ICAR, Dumduma Housing Board, Bhubaneswar,
   Odisha- 751019

6. Dr. Jayanta Tarafdar — **Member**
   Associate Professors & Project Investigator
   Co- Nodal Centre- Directorate of Research, AICRP on Tuber Crops,
   Bidhan Chandra Krishi (BCKV),Kalyani, West Bengal – 741235

7. Dr. Ravi Prakash — **Member Secretary**
   Registrar(Farmers' Rights), PPV & FRA, New Delhi

X. DUS testing centers

Nodal DUS test centre	Co nodal DUS Test Center
Central Tuber Crops Research Institute Regional Centre, ICAR, Dumduma Housing Board, Bhubaneswar, Odisha- 751019	Directorate of Research, AICRP on Tuber Crops, Bidhan Chandra Krishi (BCKV),Kalyani, West Bengal – 741235

I. Subject

These test guidelines shall apply to all varieties, hybrids and parental lines of taro (*Colocasia esculenta var. esculenta, Colocasia esculenta var. antiquorum, Colocasia esculenta var. stoloniferum*, *Cyrtosperma chamissonis/ C. merkusii*).

II. Planting Material required

1. The Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) shall decide when and in what quantity and quality the seed material is required for testing the variety denomination applied for registration under the Protection of Plant Varieties and Farmers' Rights (PPV & FRA) Act, 2001. Applicants submitting such planting 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 minimum quantity of plant material, to be supplied by the applicant, should be 36 tubers 30-40g each immediately after harvest (not later than 20days).
3. The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.
4. The plant material should not have undergone any chemical or bio-physical 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.
5. Storage of tubers: Tuber can be stored in thatched house in single layer for 4-5 months.

b) Conduct of tests

1. The minimum duration of DUS tests shall normally be at least two independent similar growing seasons with two consecutive plantings, the second being a replanting with same plant material or with reference to the agro climatic conditions of candidate variety.

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, for which additional quantity of planting material shall be required.
3. The field tests shall be carried out under conditions favoring normal growth and expression of all test characteristics. **Each test shall include about 36 plants in the plot size with planting space of (60 x 30cm) as specified schematically in figure of field layout.** Separate plots for observation and for measurement can only be used, if they have been subjected to similar environmental conditions. 2-3 replications may be designed. All the replications shall be sharing similar environmental conditions of the test location. 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.

5. **Test plot design**

    a. Shown in figure of field layout.
    b. Bed size : 4.8m x 3m
    c. Number of rows : 6
    d. Row to row distance : 60cm
    e. Plant to plant distance : 30cm
    f. Expected number of plants : 36

6. Observations should be avoided on the plants in border rows as indicated in field layout.
7. Additional test protocols for special tests shall be established by the PPV & FR Authority

c) Methods and observations

1. The characteristics described in the Table of characters (see section X) shall be used for the testing of varieties for their DUS test.

2. For the assessment of Distinctiveness and Stability, observations shall be made on at least 36 plants or parts of 36 plants, which shall be equally divided among three replications (12 plants per replication) and any other observations made on all plants in the test, disregarding any off-type plants.

3. For the assessment of Uniformity, of characteristics on the plot as a whole (visual assessment by a single observation on group of plants or parts of plants),a population standard of 1% and an acceptance probability of at least 95 % shall be applied.

4. For the assessment of all colour characteristics, the latest Royal Horticultural Society (RHS) colour chart shall be used.

5. Unless otherwise indicated, all observation on the plant, observations on leaf, sucker, petiole, sheath should be made before the end of the growing phase, during the full expression time preferably at about (a)days after planting or 30 days before harvest in early maturing cultivars. Unless otherwise indicated, all observations on the shoot should be made on at least 5 plants per replication / replications.

6. Stem and leaf characters should be recorded as the average expression of the character observed in a group of 5 plants during maximum growing phase ((a)days after planting).

7. All observations on the tubers should be made at the time of harvest ((b)days after planting).

d) 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 the varieties in the collection are suitable for grouping purposes.

2. The following characteristics shall be used for grouping of elephant foot yam varieties:

I. **Plant growth habit** (height, growth habit) [characteristics 1,2 & 3]
II. **Leaf type** (shape of leaf tips, position, leaf blade margin) [characteristics 4,14 & 15]
III. **Petiole type** (colour, bending at lamina junction, petiole junction colour) [characteristics 18,19 & 22]
IV. **Corm characteristics** (shape, skin surface, skin colour, degree of fibrousness, branching, no. of secondary corms, flesh colour, no. of cormels) [characteristics 37,40,41,42,43,44, 48 & 50]

e) Characteristics with rank of measurement

1. To assess Distinctiveness, Uniformity and Stability, the characteristics (2nd col.) and their states as given in the Table of characteristics and its explanations (Section VII) shall be used.
2. Notes (1-11) of 4th col. shall be used to describe the state of each character for the purpose of digital data processing and these shall be given against the states of each characteristic. In the case of qualitative and pseudo-qualitative characteristics, all relevant states of expression are presented in the characteristic.
3. Legend / Expression of characters
    - Expression of characters is the most important aspects of whole guidelines. Following points need to be adhered carefully for permanent records.
    - 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 Explanations on the Table of characteristics in sections 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) and sketches for clarity and also for the colour variation with colour figures (VIII).
4. The optimum stage of plant growth for assessment of each characteristic is given in the 6th column of the Table of characteristics as explained below.

Growth stages for observation	**Code**	**Code No.**
a. Full foliage growth days after planting)	90-120	(a)
b. Harvest maturity days after planting) (Corm characters)	150-200	(b)

5. Type of assessment of characteristics indicated in column 7th 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 observations of individual plants or parts of plants .

6. Type of assessment for post harvest palatability, softness etc.

To assess post harvest palatability, softness, mealiness etc. organoleptic evaluation shall be used.

f) Table of characteristics

Sl. No	Characteristics	Characters expression with rank or measurement unit (States)	Note	Example Of varieties	Stage of obser-vation	Type of Asses-ment
1	**2**	**3**	**4**	**5**	**6**	**7**
1. (*) (+)	Plant height	Dwarf (<50cm)	1	Sonajuli, Jhankri	(a)	MS
		Medium (<50-100cm)	3	Muktakeshi, CA/JP/02, CA/JP/04		
		Tall (>100cm)	5	BL/SM/151, BL/SM/115, Narendra Bunda-1		
2. (*) (+)	Growth habit	Non-fasciate	1	Jhankri, BCC-35, Sonajuli	(a)	VG
		Fasciate	3	Muktakeshi, Telia		
3. (*) (+)	Plant type	Erect	1	Muktakeshi, Telia, Narendra Bunda-1	(a)	VG
		Intermediate	3	Jhankri, BCC-35		
		Spreading	5	(none)		
4. (*) (+)	Position of leaf	Cup shaped	1	Jhankri, BCC-35	(a)	VS
		Erect-apex down	3	Muktakeshi, Telia, BL/SM/114, Narendra Bunda-1		
5. (*) (+)	Leaf number	None	1	(none)	(a)	MS
		Few (5-10)	3	BCC-39, KCS-3, BL/SM/149		
		Many (>10)	5	BCC-22, IGCOL-8, CE/THA/09		
6. (*) (+)	Leaf length	Small (12-14cm)	1	Panisaru-1, Sonajuli	(a)	MS
		Medium (14-18cm)	3	BCC-22, Sree Reshmi		
		Large (>18cm)	5	Telia, Sree Kiran, BL/SM/158		
7. (*) (+)	Leaf width	Small (8-10cm)	1	BCC-1, BCC-47	(a)	MS
		Medium (10-12cm)	3	AAVCOL-46, KSS-2		
		Large (>12cm)	5	Sree Kiran, BL/PNG/09		
8. (*) (+)	Cross section area	Small	1	Telia,BCC-22,BCC-38,Sonajuli	(a)	VS
		Medium	3	Muktakeshi,BCC-47		
		Large	5	BCC-35, BL/SM/135		
		Extra large	7	BCC-39,BCC-1, CE/THA/10		
9. (*) (+)	Leaf colour	Light green	1	(none)	(a)	VG
		Green	3	BCC-35, Muktakeshi		
		Dark green	5	Telia, BCC-38, CE/IND/10		
10. (*) (+)	Leaf main vein colour	White	1	None	(a)	VG
		Yellow	2	AAVCOL-46, BL/PNG/10, Darga		
		Orange	3	None		

		Green	4	Panisaru-1, Panisaru-2, BL/HW/26, Tadura, Houpan, Normal		
		Pink	5	BL/SM/158		
		Red	6	None		
		Brownish	7	None		
		Purple	8	Telia,Hanphya,Tungyak, Dabat		
		Other (Green with purple streaks)	9	CE/THA/03, Narendra Bunda-1		
11. (*) (+)	Leaf vein pattern	V type	1	KCS-3, IGCOL-8, Telia, CE/THA/03	(a)	VG
		Y type	3	BCC-47, KSS-2, CE/IND/24		
12. (*) (+)	Leaf blade colour	Whitish	1	(none)		VG
		Yellow or yellow green	2	Tasarang, Balsan, Saikang		
		Green	3	Marakajatong, Takiltom, CE/THA/10		
		Dark green	4	Telia		
		Pink	5	Nil		
		Red	6	Nil		
		Purple	7	BL/SM/132		
		Blackish (violet-blue)	8	Nil		
		Other	9	Nil		
13. (*)	Leaf blade & margin colour	Whitish	1	Nil	(a)	VG
		Yellow	2	Tamarong Bol, Takiltom, Sonajuli		
		Orange	3	BL/SM/120		
		Green	4	Tasarang, Ganching, Ziishow		
		Pink	5	Angatakang, Tefiziinuo		
		Red	6	Nil		
		Purple	7	Tadura,Tasobok,Khungupan, Telia,BL/SM/116		
14. (*) (+)	Leaf blade margin pattern	Sinuate	1	Jhankri, BL/SM/147, Mukhipan, Panukhabi	(a)	VG
		Undulate	3	Sree Reshmi, KCS-2, BL/HW/26, Tasarang		
		Entire	5	CE/MAL/06, Local, Tungsho,		
15. (*) (+)	Shape of leaf tip	Pointed	1	Sree Kiran, Sree Pallavi	(a)	VS
		Slightly pointed	3	Panisaru-2, KSS-2		
		Intermediate	5	(none)		
		Slightly round	7	BCC-38, BCC-22, Panisaru-1		
		Round	9	BCC-39, IGCOL-8		
16.	Sap colour of leaf blade tip	Deep green	1	BCC-47,BCC-38	(a)	VG
		Green	3	BCC-39,Sonajuli,BCC-35,BCC-22		
		Yellowish green	5	Muktakeshi,BCC-1		
		Blackish yellow	7	Telia		
		Pink	9	BCC-47		
17.	Presence of anthocyanin pigmentation in leaf vein	Absent	1	BCC-22, KCS-3	(a)	VG
		Present	3	BCC-39, Telia, CE/IND/12		
18. (*) (+)	Petiole colour	Green	1	BCC-22, Muktakeshi, BL/SM/120	(a)	VS
		Light green	2	BL/SM/111, CE/IND/06		
		Deep Green	3	BL/SM/151		
		Purple	4	CE/THA/10, BL/HW/08, BL/SM/80		
		Blackish purple	5	BL/SM/132		

		Dark umber	6	(none)		
		Reddish purple	7	BL/HW/26		
		Other	8	(none)		
19. (*) (+)	Petiole junction colour	Yellow	1	BCC-39, KCS-3	(a)	VG
		Purple	3	BCC-22, Sree Kiran, Marakajatong, Ringdubi, BL/SM/80		
		Green	5	CE/THA/24, Tamarong Bol,Tasarang, Ziishow		
		Other (Green with light Purple) (Green with Purple stripe) (Outside purple inside green) (Light purple with green) (Light purple) (Purple & green) (Green with light purple dot)	9	BL/IND/32, Tamachongkam, Azangangzii Obi (Red), Obi (White), Dziicha BL/SM/116, Takiltom, Tajekjak, Barker CA/JP/08, Mukhi pan CE/THA/10, Yarumpan CE/THA/03, Nyisheliibe Dzurinuo		
20.	Petiole junction pattern	Absent	1	Tamarong Bol, Takiltom, Tararang	(a)	VG
		Small	3	Marakajatong, Tajekjak, Pangong pan		
		Medium	5	Tadura, Ringdubi, Naghi		
		Large	7	None		
21	Anthocyanin pigmentation of petiole junction	Absent	1	Sonajuli, CE/THA/24	(a)	VS
		Present	3	BCC-22, BL/SM/80		
22. (*) (+)	Petiole bent at lamina junction	Almost none	1	(none)	(a)	VS
		Low	3	Satamukhi, Sree Rashmi, IGCOL-8, KCS-2		
		Intermediate	5	Muktakeshi, BCC-38, Panisaru-1		
		High	7	Telia, Jhankri, BCC-35		
		Extremely high	9	(none)		
23. (*) (+)	Petiole length	Small (<16cm)	1	AAVCOL-46, BCC-47	(a)	MS
		Medium (16-30cm)	3	Sree Reshmi, Muktakeshi		
		Large (>30cm)	5	BL/SM/151, BL/SM/115		
24.	Coloration of petiole edge	Absent	1	CE/IND/20, CE/MAL/12	(a)	VS
		Present	3	Telia, BL/SM/132		
25.	Degree of color on petiole edge	Light	1	Sree Kiran, BCC-1, Panisaru-2, Sree Pallavi	(a)	VS
		Intermediate	3	KCS-2, AAVCOL-46		
		Dark	5	BCC-39, Telia		
26.	Stripe on petiole	Absent	1	BL/SM/80	(a)	VS
		Present	3	Telia,CE/THA/24		
27. (*) (+)	Petiole basal ring colour	White	1	Taring	(a)	VG
		Green	2	CE/THA/24, Tamachongkam, Tasarang, Houpan		
		Pink	3	BL/SM/80		
		Red	4	None		
		Purple	5	Telia, BCC-39, BL/SM/132, Marakajatong, Ringdubi, Tasobok		

		Other (Green & purple) (Light green) (Yellow green) (Purple with green) (Green with purple stripe)	6	BL/IND/32, Tadura, Tararang, Naghi BL/HW/37, Pangong pan, Bar, Barker BL/PNG/09, Beutei, Tungsho CE/THA/03, Baldosan Normal		
28.	Cross section of lower part of petiole	Open	1	BCC-45, KSS-2, BL/PNG/12, Tamarong Bol, TamachongKam	(a)	VS
		Closed	2	Muktakeshi, Satamukhi, BL/SM/135, Marakajatong, Tasarang, Tamitdim		
29. (*) (+) (+)	Sheath Length	Low (< 10 cm)	1	None	(a)	MS
		Medium (10-20 cm)	2	Muktakeshi, Telia		
		High (>20 cm)	3	BL/SM/111, BL/SM/151		
30.	Stolon	Rare	1	Muktakeshi, BCC-47	(a)	VS
		Commonly observed	2	BL/SM/158, BL/SM/151		
31.	Number of stolons	Absent	1	Muktakeshi, Jhankri	(a)	MS
		Few (1 – 5)	2	BCC-1, BCC-38		
		Intermedite (6 – 10)	3	BL/SM/158		
		Many (> 10)	4	BL/SM/151		
32.	Number of suckers	Absent	1	None	(a)	MS
		Low	2	BCC-47,BCC-22,BCC-35		
		Medium	3	BCC-38,Telia		
		Higher	4	Sonajuli,BCC-1,Muktakeshi,BCC-39		
33.	Bud colour	Whitish	1	BCC-1, BCC-47	(a)	VS
		Reddish	2	AAVCOL-46, Tasarang, Tadura		
		White	3	BCC-22,BCC-47,Telia, TamachongKam, Takiltom, Tasarang		
		Yellow green	4	Jhankri, BL/SM/158, Marakajatong, Tamitdim, Houpan		
		Pink/red	5	Tasarang, Tadura, Tararang		
		Purple	6	Ringdubi, Aalo Local Nyita		
		Cream	7	BCC-1,BCC-38,Muktakeshi		
		Light green	8	BCC-35,BCC-39		
		Other (Green) (White and purple)	9	Mukhi pan, Azangangzii, Ziipum Madras Kochu, Dabat		
34.	Flowering	Absent	1	CA/JP/04, Marakajatong, Tamitdim, Tasobok	(a)	VS
		Rarely flowering	2	BCC-22,KCS-3, Tamarong Bol, Takiltom, Ringdubi		
		Flowering	3	Jhankri, Panisaru-2, BL/SM/158		
35.	Rhizome	Absent	1	All	(a)	VS
		Present	2	(None)		
36.	Harvesting time	Early (within 5 months)	1	Telia, CA/JP/04	(b)	VS
		Intermediate (5-6 months)	2	Jhankri, Muktakeshi, BL/SM/151		
		Late (more than 6 months)	3	BL/SM/157		
37. (*)	Corm shape	Conical	1	CE/THA/10, Tamarong Bol, Tadura, Tasobok	(b)	VG

(+)						
		Round	2	BL/SM/147, Tamachong Kam, Takiltom, Tasarang, KCS-3, AAVCOL-46		
		Cylindrical	3	BL/SM/151, Marakajatong, Tamitdim, Tararang, Narendra Bunda-1		
		Elliptical	4	BL/SM/120, Tasarang, Ringdubi, Mukhi pan,		
		Dumb-bell	5	BL/SM/116, Libo Local		
		Elongated	6	Semia, Madras Kochu		
		Flat and multifaced	7	Ziiphat, Saikang, Phila		
		Clustered	8	Cherimeh, Mbeijukwak, Dzuse, Jhankri, Muktakeshi		
		Hammer-shaped	9	Nil		
		Spindle	10	Sonajuli, BCC-1		
		Other	11	Abzii, Mishmeh, Tenyibe		
38.	Corm length	Short (< 8 cm)	1	Sonajuli,BCC-22,BCC-38	(b)	MS
		Intermediate (9-12 cm)	2	BCC-1,BCC-35,BCC-39,BCC-47, Muktakeshi,Telia		
		Long (>12 cm)	3	BL/SM/120		
39.	Color of corm surface	Pale umber,	1	(none)	(b)	VG
		Umber	2	BCC-39, IGCOL-8		
		Dark umber	3	AAVCOL-46, BCC-1		
40. (*) (+)	Corm skin surface	Smooth	1	Nil	(b)	VG
		Fibrous	2	BL/SM/143, Takiltom, Mukhi pan, Houpan		
		Scales present	3	Tadura, Tsophiju, Phila		
		Fibrous and scales present	4	BL/SM/158, Tasarang, Tamitdim, Raingdubi		
		Other	5			
41. (*) (+)	Corm skin colour	Brown	1	BCC-22,BCC-38,BCC-35,BCC-47	(b)	VG
		Light brown	2	Sonjuli, BL/SM/158		
		Dark brown	3	Telia, BCC-39, CE/THA/03		
42. (*) (+)	Degree of fibrousness	Absent	1	Tadura, Beutei	(b)	VS
		Sparse	2	BCC-35, Tararang, Takiltom		
		Intermediate	3	Jhankri, Telia		
		Dense	4	Panisaru-2, BCC-39		
		Other	5	(None)		
43. (*)	Corm branching	Clustered	1	Muktakeshi, Panisaru-2	(b)	VS
		Dispersed	2	Telia, Sonajuli		
		Branched	3	Tamarong Bol, Tasobok Ganching		
		Un branched	4	BCC-39, KCS-3		
		Other	5	(None)		
44.	Number of secondary corms	Few	1	CE/THA/05	(b)	MS
		Intermediate	2	Sree Kiran, Sree Pallavi		
		Many	3	KCS-3		
45.	Sprouting from side corms	Abundant	1	BCC-22, IGCOL-8, BCC-39, KCS-3	(b)	VS
		Intermediate	2	BL/SM/158		
		Rare	3	CE/IND/10		
46.	Corm weight	Low (<100gm)	1	BCC-38,BCC-22	(b)	MS
		Medium (100- 250gm)	2	BCC-39,Sonajuli, CE/MAL/06		
		High (>250gms)	3	BCC-1,Telia,Muktakeshi, BL/HW/08		
47.	Corm cortex colour	White	1	Sonajuli, BL/SM/158, Tadura, Tajekjak,	(b)	VG

				Houpan		
		Yellow or yellow- orange	2	Nil		
		Red	3	Nil		
		Pink	4	CE/THA/10, Tararang, Dzurinuo, Phila		
		Brown	5	Nil		
		Purple	6	BL/SM/132, Ringdubi, Tasobok, Nymar		
		Blackish	7	Nil		
		Other (Green) (Purplish white) (Cream) (Dark purple) (Light pink) (Light green & white)	8	Telia, CE/THA/05, Mukhi pan BL/SM/80 CE/IND/10 Semia BL/SM/116, Beugie, Baikhi, Nyata Taing BL/SM/151, Balloupi		
48. (*) (+)	Corm flesh colour	White	1	BCC-22,BCC-35,BCC-38, BCC-39, BCC-47, Muktakeshi,Telia, BL/SM/116	(b)	VG
		Yellow	2	CE/MAL/06		
		Cream	3	BCC-1, BL/SM/120, BL/SM/151		
		Orange	4			
		Pink	5			
		Red	6			
		Red-purple	7			
		Purple	8	IC 363398		
		Other (Light purple)	9	CE/THA/10		
49.	Corm flesh fibre colour	Yellow	1	BCC-39,BCC-47,Sonajuli,BCC-35, BL/SM/158	(b)	VG
		Light yellow	2	BCC-1,BCC-22, BL/SM/151		
		Cream	3	BCC-38		
		Yellowish green	4	Muktakeshi		
		White	5	Telia		
50. (*) (+)	Number of Cormels	Low (5-10)	1	BCC-35,BCC-47, CE/THA/10	(b)	MS
		Medium (10-15)	2	BCC-38,BCC-22,BCC-39,Sonajuli		
		High (>15)	3	BCC-1,Telia,Muktakeshi		
51.	Weight of cormels	Less than 100 gm	1	BCC-38,BCC-22,BCC-35,BCC-47, BL/SM/158	(b)	MS

VII.1. Optional characters

Sl. No	Characteristics	Characters expression with rank or measurement unit (States)	Note	Example Of varieties	Stage of obser-vation	Type of Asses-sment
1	**2**	**3**	**4**	**5**	**6**	**7**
1.	Flesh color of side corm	White		All	(b)	VG
2.	Corm storability	Low	1	(none)	**200-300**	VG
		Intermediate	2	KCS-2, BCC-47		
		High	3	Jhankri, Sonajuli,		

3.	Edibility of petiole			All edible	(a)	Organo-leptic
4.	Edibility of leaves			All edible	(a)	Organo-leptic
5.	Edibility of cooked corms			All edible	(b)	Organo-leptic
6.	Edibility of cooked cormels			All edible	(b)	Organo-leptic
7.	Corm acridity	Low	1	Sree Pallvi, Sree Kiran, BCC-47	(b)	Organo-leptic
		Intermediate	2	BCC-1		
8.	Palatability	Highly palatable	1	Sonajuli,Telia	(b)	Organo-leptic
		Moderately palatable	2	BCC-39,Muktakeshi		
		Palatable	3	BCC-22,BCC-35,BCC-39,BCC-47		
9.	Taste	Sweet	1	BCC-1,Sonajuli,Telia	(b)	Organo-leptic
		Light salty	2	BCC-35,BCC-39,BCC-47,Muktakeshi		
		Tasteless	3	BCC-22,BCC-38		
10.	Mealiness	Highly coarse	1	BCC-22,BCC-38, Muktakeshi	(b)	Organo-leptic
		Medium coarse	2	BCC-35, Sonajuli		
		Fine coarse	3	BCC-47, Telia		
		Very fine coarse	4	BCC-1, BCC-39		
11.	Softness	Vey soft	1	BCC-1	(b)	Organo-leptic
		Soft	2	BCC-39, BCC-47, Telia		
		Medium hard	3	Sonajuli, BCC-35		
		Hard	4	BCC-22		
		Very hard	5	BCC-38, Muktakeshi		
12.	Cold tolerance	Low,	1	BCC-22	(a)	VG
		Intermediate	2	Sonajuli, Sree Kiran		
		High	3	Muktakeshi, Telia, BL/SM/116, BL/SM/158		
13.	Drought tolerance	Low	1	BCC-22, Sree Reshmi, Satamukhi, KCS-2	(a)	VG
		Intermediate	2	Panisaru-1, Sonajuli		
		High	3	Jhankri, Muktakeshi, Telia		
14.	Virus resistance	Low	1	BCC-22, BCC-35, KCS-3,	(a)	VG
		Intermediate	2	BCC-39, Sree Reshmi		
		High	3	Sonajuli, Jhankri, Muktakeshi		

VII.2. Group distinct characters of dasheen taro including exotics (ICAR-CTCRI)

Table 1. Morphological traits of exotic dasheen taro grouped according to plant type

Sl. No	Characteristics	Characters expression with rank or measurement unit (States)	Note	Example Of varieties	Stage of observation	Type of Asses-sment
1	2	3	4	5	6	7
1.	Plant type	Tall (>100 cm)	1	BL/HW/08, BL/IND/14, BL/SM/116, BL/PNG/11, BL/SM/111, BL/SM/152, CE/IND/10, BL/PNG/12, BL/SM/134, BL/SM/143, CE/MAL/12, CE/MAL/14, BL/PNG/10, BL/SM/158, BL/SM/151	(a)	MG
		Intermediate (50-100 cm)	2	CE/IND/12, CE/IND/07, BL/SM/120, BL/SM/80		
		Medium (<50 cm)	3	BL/IND/32, CE/IND/06, CE/MAL/06		

Table-2. Morphological traits of exotic dasheen taro grouped according to the colour of petiole

Sl. No	Characteristics	Characters expression with rank or measurement unit (States)	Note	Example Of varieties	Stage of obser-vation	Type of Asses-sment
1	2	3	4	5	6	7
1.	Petiole colour	Purple petiole	1	BL/HW/08, BL/IND/14, BL/SM/80	(a)	VS
		Dark/Light green petiole with purple	2	BL/SM/116		
		Dark/Light green petiole with purple tip	3	BL/IND/32, CE/IND/06, CE/IND/07, CE/IND/12, BL/PNG/11, BL/SM/111, BL/SM/151, BL/SM/152		
		Dark/Light Purplish green petiole	4	CE/MAL/06, CE/IND/10, BL/PNG/12, BL/SM/158, BL/SM/143, Narendra		
		Cream colour petiole	5	CE/MAL/12		
		Dark/ light green petiole	6	CE/MAL/14, BL/PNG/10, BL/SM/134		

Table-3. Morphological traits of exotic dasheen taro grouped according to edibility

Sl. No	Characteristics	Characters expression with rank or measurement unit (States)	Note	Example Of varieties	Stage of obser-vation	Type of Asses-sment
1	2	3	4	5	6	7
1.	Edibility	All parts edible	1	BL/HW/08, BL/IND/14, BL/SM/80, CE/IND/06, BL/PNG/11, BL/SM/152, BL/SM/120, CE/MAL/06, CE/IND/10, BL/PNG/12, BL/SM/158	(b)	Organo - leptic
		Tuber	2	BL/SM/116, BL/SM/111, BL/SM/151, BL/SM/143		
		Leaf	3	CE/IND/07		
		Non-edible	4	BL/IND/32, CE/IND/12, BL/PNG/10		

VII.3. Specific Characters of Swamp taro (*Colocasia esculenta var. stoloniferum*)

Sl. No.	Characteristics	Characters Expression
1.	Plant type	Erect
2.	Plant height	Medium (100-125cm)
3.	Leaf colour	Deep green leaf and purple margin
4.	Leaf orientation	Anticlockwise
5.	Basal girth	25-30cm
6.	Stolon length	125cm with 205cm girth
7.	Individual stolon weight	>50gm
8.	No. of stolon per plant	35-45
9.	Reaction to stress	Grows in low land and swampy land in parts of West Bengal, Assam
10.	Quality of produce (Stolon)	• Very good and palatable taste • Excellent cooking type • Non irritant type
11.	Shelf life of stolon	Very low as used as leafy vegetable

Stolons

Swamp taro (*Colocasia esculenta var. stoloniferum* (L.) Schott) Marketable stolon

VII.4. Specific Characters of Giant Swamp taro (*Cyrtosperma chamissonis*)
(Also known as *Cyrtosperma merkusii*)

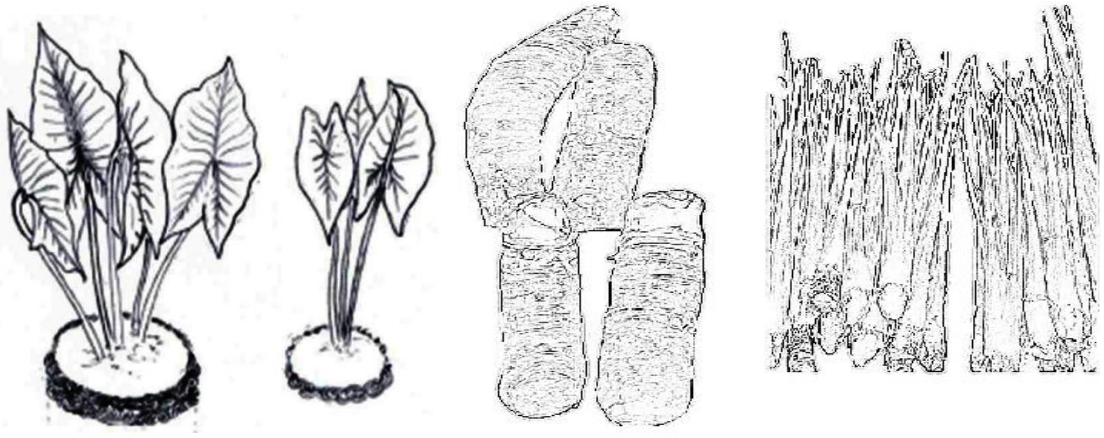
Family : Araceae

Subfamily : Lasioideae

Genus : *Cyrtosperma*

Species : *C. merkusii/ chamissonis*

Sl. No.	Characteristics	Characters Expression
1.	Plant height	1.8-2.4mt
2.	Leaf shape	Arrow shaped sharply pointed basal node
3.	Leaf length	1-1.5mt
4.	Petiole	Long thick with short leaf sheath
5.	Petiole arrangement	Spiral
6.	Petiole diameter	About 10cm
7.	Corm	• Developed thickening of basal stem and cylindrical shape • Externally looks like banana sucker

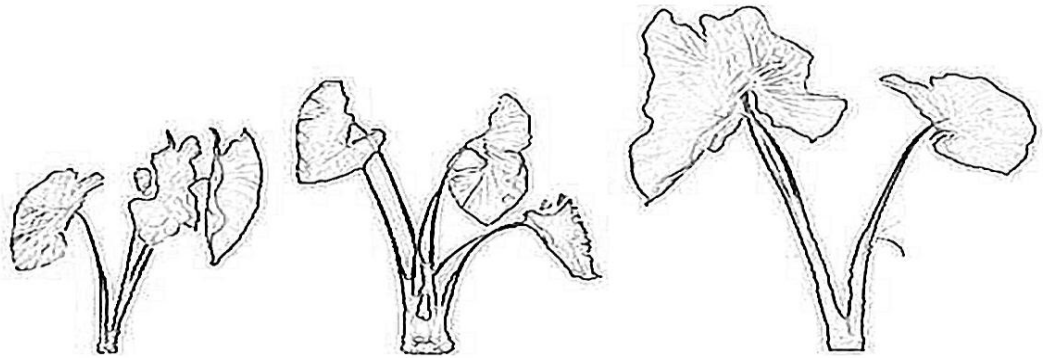


1. Plant type 2.Corm 3.Petiole

Giant Swamp taro (*Cyrtosperma chamissonis*/*C. merkusii*.)

VIII. Explanation for the Table of characteristics

Characteristics 1 : Plant height (cm)



1
Dwarf (<50 cm)
(eddoe)

3
Medium (>50-80cm)
(eddoe & dasheen)

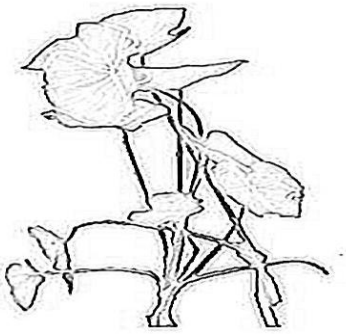
5
Tall (>100cm)
(dasheen)

1
Dwarf (<50 cm)
(eddoe)

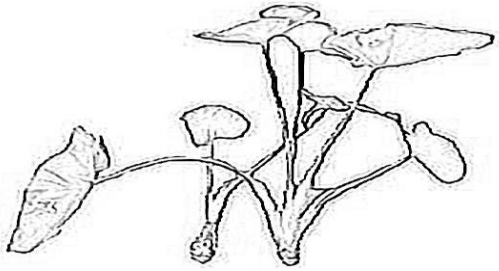
3
Medium (>50-80cm)
(eddoe & dasheen)

5
Tall (>100cm)
(dasheen)

Characteristics 2 : Growth habit



1
Non-fasciate

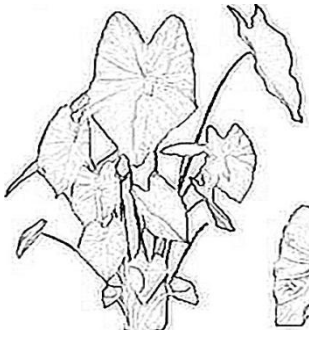


3
Fasciate

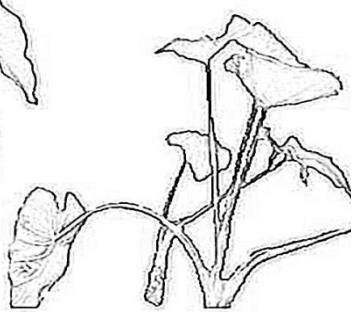
1
Non-fasciate

3
Fasciate

Characteristics 3 : Plant type



1
Erect

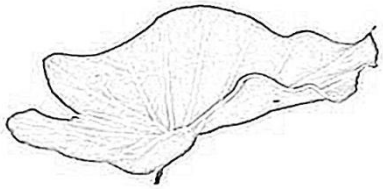


3
Spreading

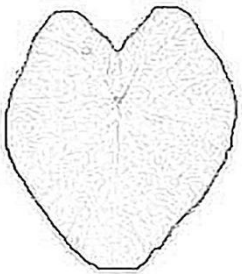
1
Erect

3
Spreading

Characteristics- 4: Position of Leaf



1
Cup shaped

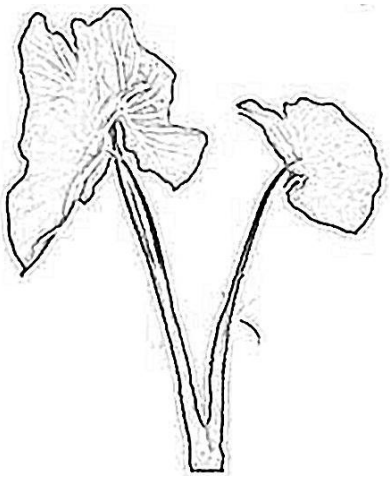


3
Erect-apex down

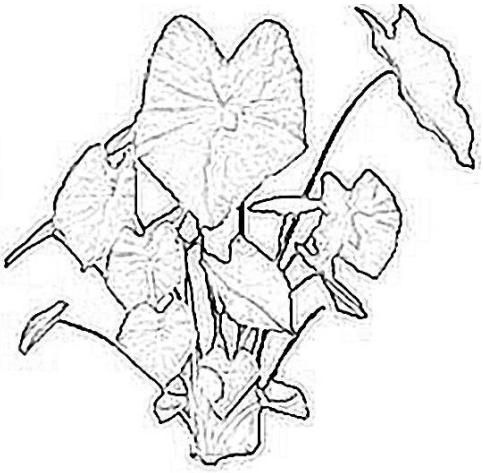
1
Cup shaped

3
Erect-apex down

Characteristics- 5: Leaf Number



1
Few (5-10)

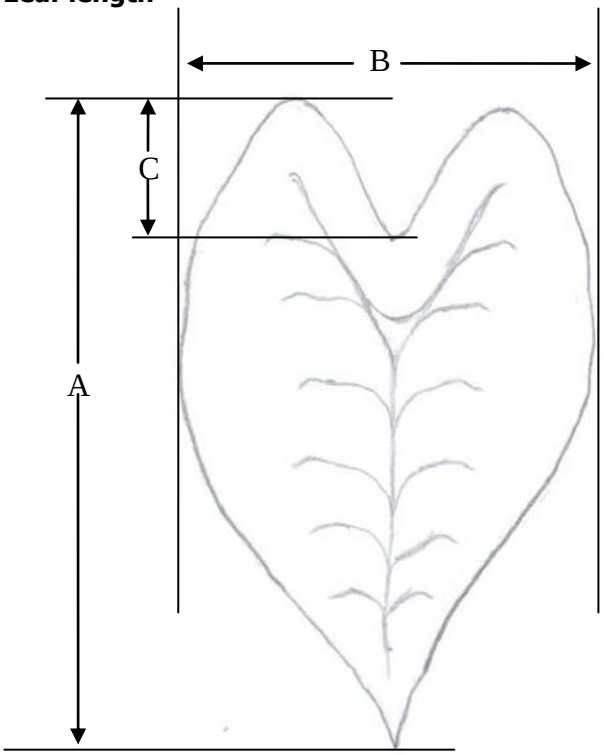


3
Many (>10)

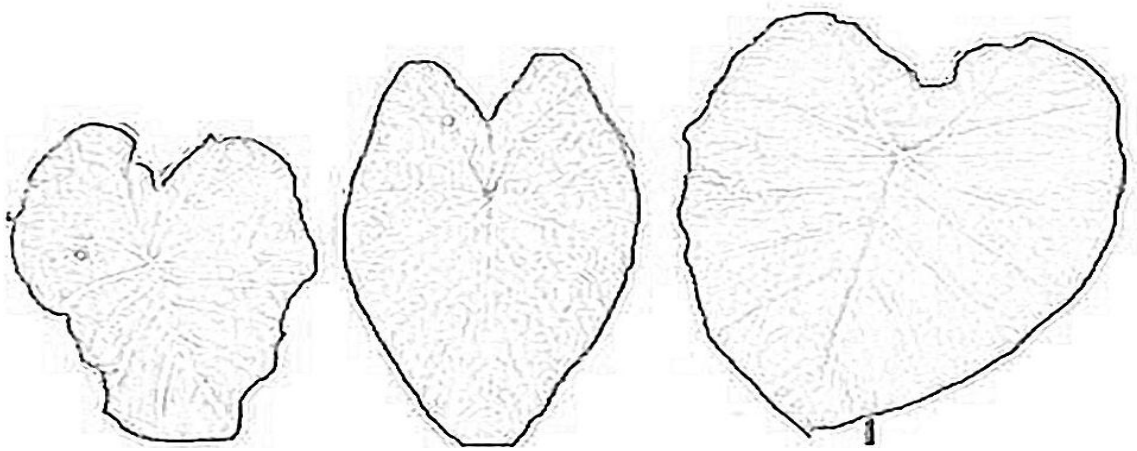
1
Few (5-10)

3
Many (>10)

Characteristics-6: Leaf length



A: length
B: width
C: depth of sinus



1
Small (12-14cm)

3
Medium (14-18cm)

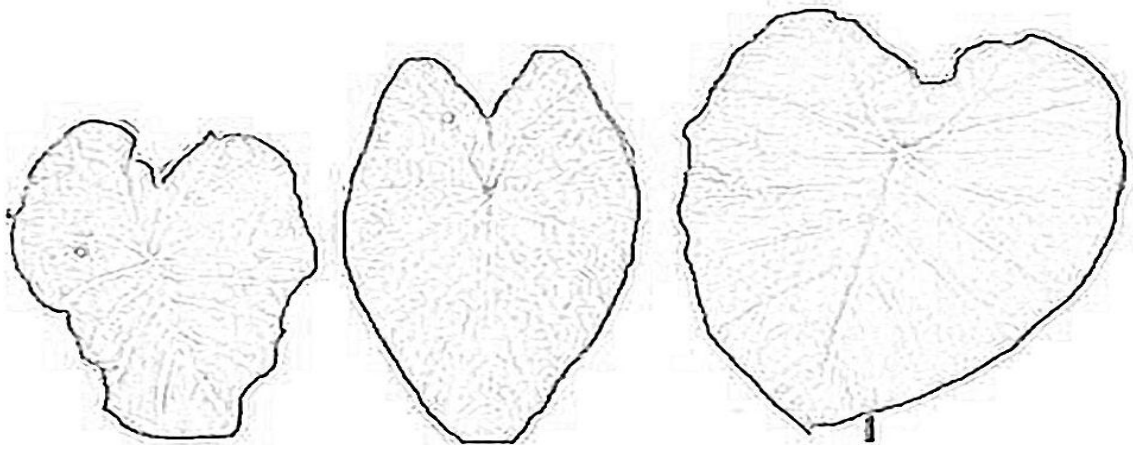
5
Large (>18cm)

1
Small (12-14cm)

3
Medium (14-18cm)

5
Large (>18cm)

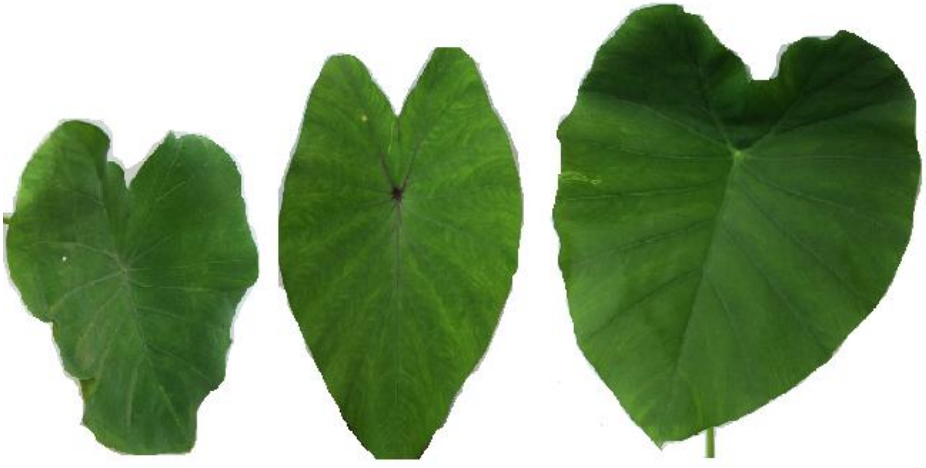
Characteristics-7: Leaf width



1
Small (8-10cm)

3
Medium (10-12cm)

5
Large (>12cm)

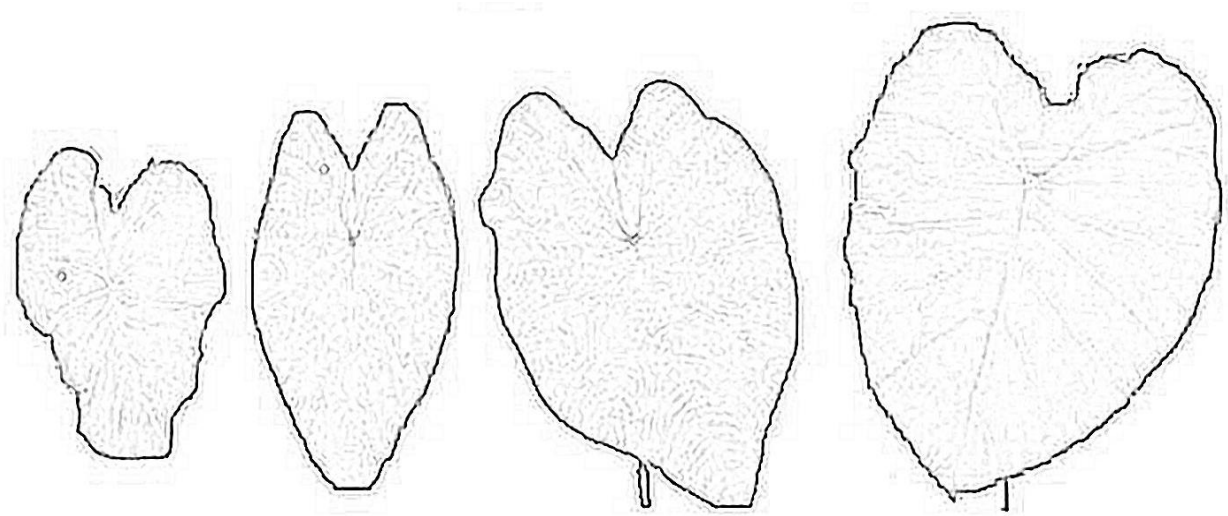


1
Small (8-10cm)

3
Medium (10-12cm)

5
Large (>12cm)

Characteristics- 8: Cross section area

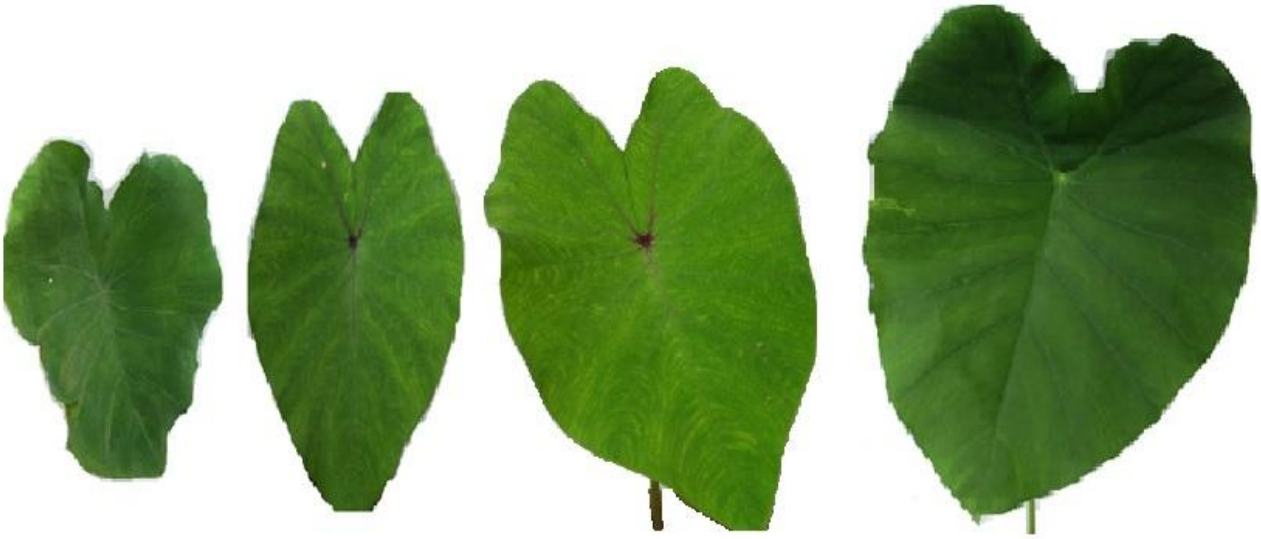


1
Small

3
Medium

5
Large

7
Extra large



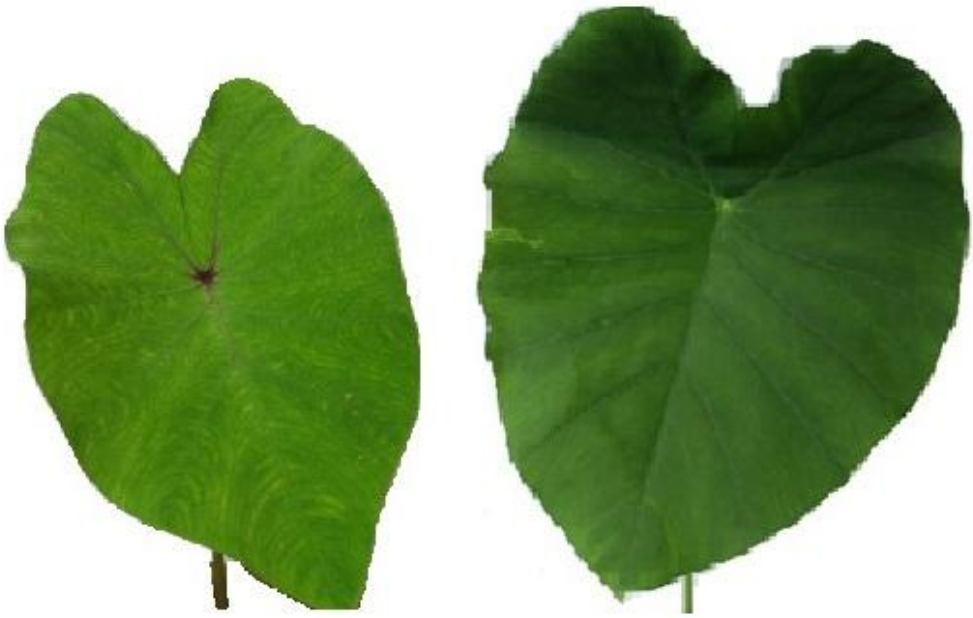
1
Small

3
Medium

5
Large

7
Extra large

Characteristics- 9 : Leaf colour



3
Green

5
Dark Green

Characteristics-10 : Leaf main vein colour

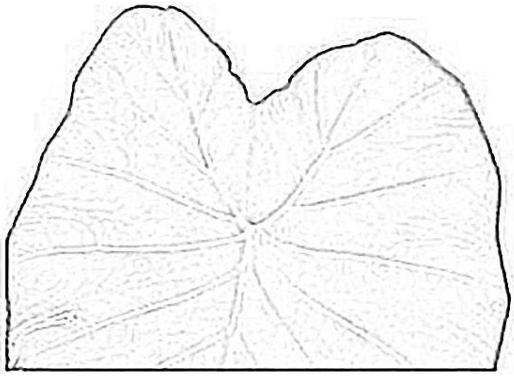
2
Yellow

4
Green

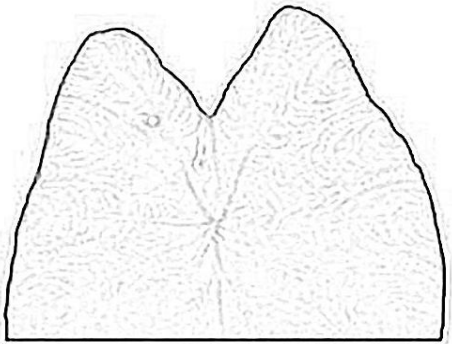
5
Pink

8
Purple

Characteristics-11 : Leaf vein pattern

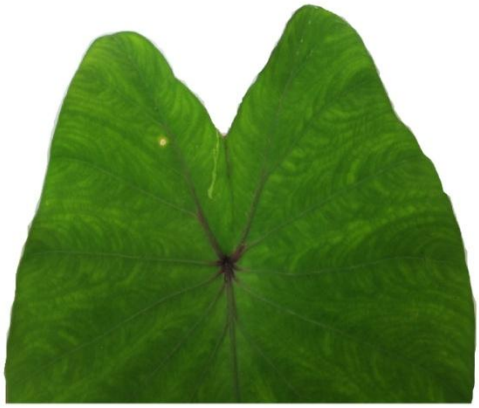


1
V type



3
Y type

1
V type



3
Y type

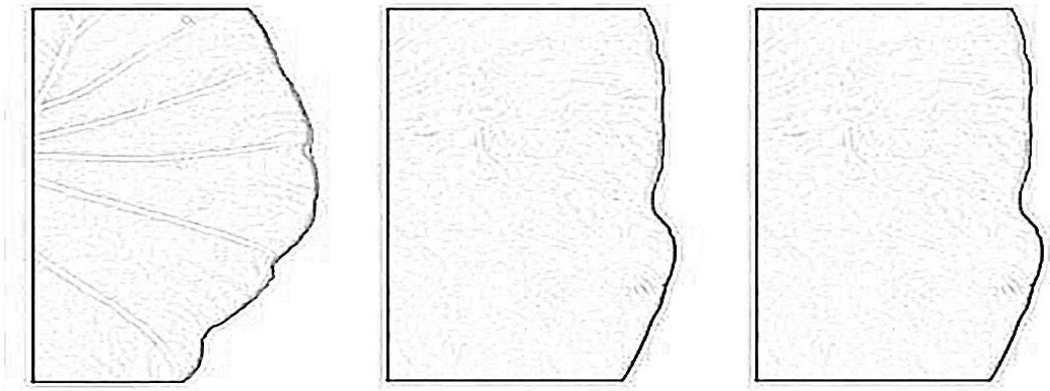
Characteristics-12 : Leaf blade colour

3
Green

4
Dark green

7
Purple

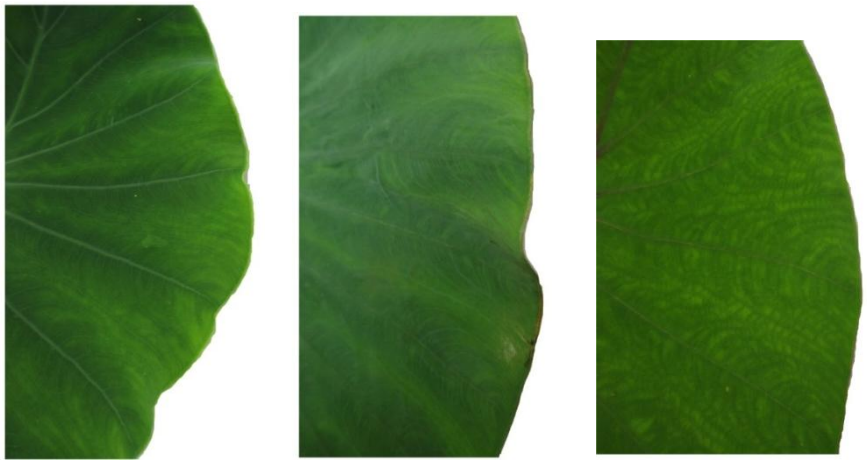
Characteristics-14: Leaf blade margin pattern



1
Sinuate

3
Undulate

5
Entire

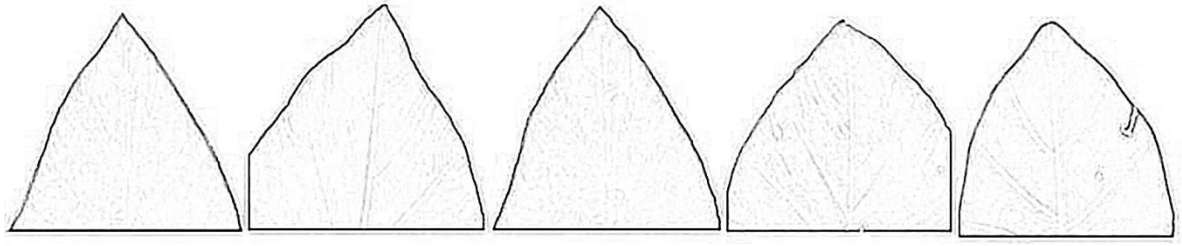


1
Sinuate

3
Undulate

5
Entire

Characteristics-15: Shape of leaf tip



1
Pointed

3
Slightly pointed

5
Intermediate

7
Slightly round

9
Round

1
Pointed

3
Slightly pointed

5
Intermediate

7
Slightly round

9
Round

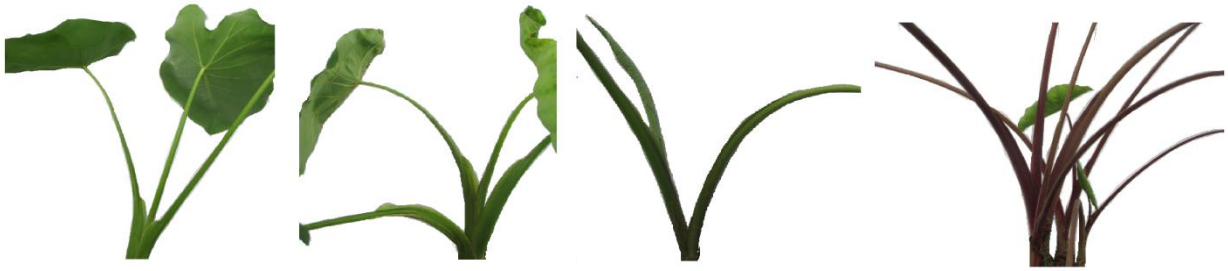
Characteristics-18: Petiole colour

1 Green | **2** Light green | **3** Deep Green | **4** Purple | **5** Blackish purple | **7** Reddish purple

Characteristics-19: Petiole junction colour

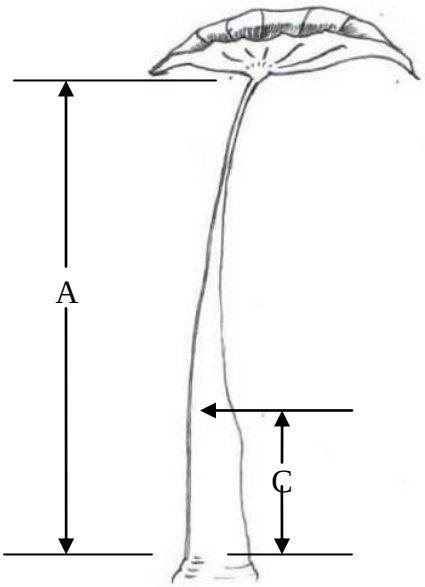
1 Yellow | **3** Purple | **5** Green

Characteristics-22: Petiole bent at lamina junction



(3) Low | **(5)** Intermediate | **(7)** High | **(9)** Extremely high

Characteristics-23: Petiole length



A: length
B: thickness
C: length of sheath

(1)
Small (<16cm)

(3)
Medium (16-30cm)

(5)
Large (>30cm)

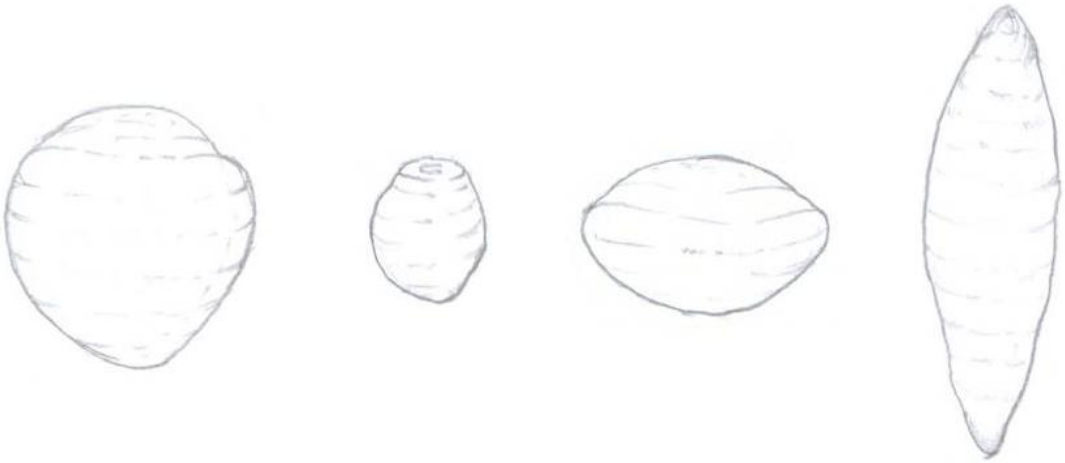
Characteristics-27: Petiole basal ring colour

(1) White **(2) Green** **(3) Pink** **(5) Purple**

Characteristics-29: Sheath Length

(1) Low (< 10 cm) **(2) Medium (10-20 cm)** **(3) High (>20 cm)**

Corm characteristics- 37: Corm shape



(1)
Conical

(3)
cylindrical

(4)
Elliptical

(10)
Spindle

(1)
Conical

(3)
cylindrical

Corm characteristics- 40: Corm skin surface

(1)
Smooth

(2)
Fibrous

Corm characteristics- 41: Corm skin colour

(1)
Brown

(2)
Light brown

(3)
Dark brown

Corm characteristics- 42: Degree of fibrousness

(1)
Absent

(4)
Dense

Corm characteristics- 48 : Corm flesh colour

(1)
White

(3)
Cream

(9)
Light Purple

Corm characteristics- 50: Number of Cormels

(1)
Low

(3)
High

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- Archana Mukherjee, B.Vimala, Bala Nambisan, S.K. Chakrabarti, James George and H.Gowda (2015). Underutilized Tropical Tuber Crops with Hidden Treasure of Food, Nutrition and Medicine. International Journal of Tropical Agriculture, 33(4):1-13
- Archana Mukherjee, S.K. Chakrabarti and James George (2015), Climate change vs. Tropical Tuber Crops : The best alternative for food security. IJTA, Vol.33, No.2, April-June 2015, pp381-388.
- Poddar A. and Mukherjee A., (2015) Evaluation of Elephant foot yam (Amorphophallus paeoniifolius) germplasm: polymorphism among morphological traits IJTA Vol.33, No. 2, April-June 2015, pp373-376.

- Poddar A., Mukherjee A., Sreekumar J., Abraham K., Naskar S.K., Unnikrishnan M & Mukherjee Arup (2015) Phenotypic Variability among the Germplasm lines of Elephant foot yam (Amorphophallus paeoniifolius) and Taro (Colocasia esculenta) IJTA, Vol.33,No.2, April-June 2015, pp377-380.

IX. Working group details

The test guidelines developed by the task force (**12/2014**) constituted by the PPV & FR Authority for **Taro** with consultation by Nodal officer, ICAR-CTCRI & Co-Nodal officer BCKV, Kalyani. Technical inputs also provided by the PPV & FR Authority.

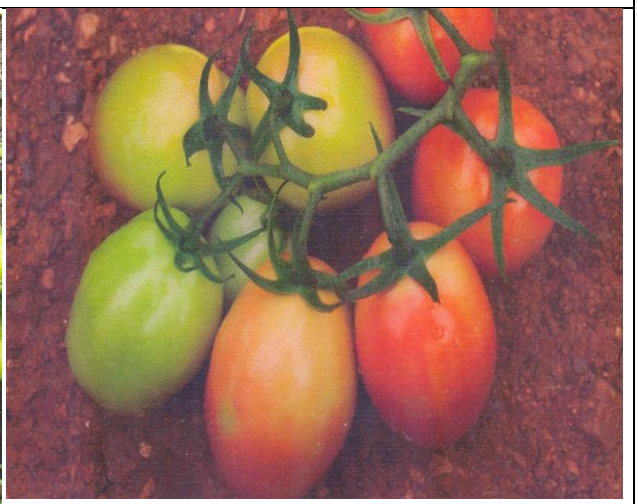
The members of the Task Force

Dr. S. Edision Former Director, CTCRI, Resi:- Srinidhi, T. C. No. 13/550	**Chairman**
Dr. R. K. Tyagi, Principal Scientist & Head Crop Genetic Resources, NBPGR, Pusa Campus, New Delhi-110012	**Member**
Dr. M. Unnikrishnan Former Principal Scientist, CTCRI (Plant Breeding) 5,1785, Sreevisakh Cheruvickal, P.O., Sreekaryam,	**Member**
Dr. B. Vimala, Former Principal Scientist, Plant Breeding CTCRI Tushara, House No. 7/1387(3), VRA-111, Vettamukku Junction	**Member**
Dr. Archana Mukherjee Project Investigator Nodal Centre-Central Tuber Crops Research Institute Regional Centre, ICAR, Dumduma Housing Board, Bhubaneswar, Odisha- 751019	**Member**
Dr. Jayanta Tarafdar Associate Professors & Project Investigator Co- Nodal Centre- Directorate of Research, AICRP on Tuber Crops, Bidhan Chandra Krishi (BCKV),Kalyani, West Bengal – 741235	**Member**
Dr. Ravi Prakash Registrar(Farmers' Rights), PPV & FRA, New Delhi	**Member Secretary**

X. DUS testing centers

Nodal DUS test centre	**Co nodal DUS Test Center**
Central Tuber Crops Research Institute Regional Centre, ICAR, Dumduma Housing Board, Bhubaneswar, Odisha- 751019	1. Directorate of Research, AICRP on Tuber Crops, Bidhan Chandra Krishi (BCKV),Kalyani, West Bengal – 741235 2. ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapani, Medziphema - 797 106, Nagaland

Photographs of candidate varieties notified in Plant Variety Journal of India, Vol.-10, No.-11, November 07, 2016

COTTON / JKCH0109 (JKCH 0109 Double Bt)	**Okra / JKOH 6166**
	
Figure-1. Flower Pollen Colour: Cream	Figure -2. Fruit colour: Green
Tomato/ JK AKSHAY	Tomato/ STH-7008
	
Figure-3 Fruit size: Obovoid	Figure-4 Fruit size: Large

Maize/ M 15-1	
	
Figure-5 colour of top of grain: orange	