

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

Taro

*(Colocasia esculenta var. esculenta
Colocasia esculenta var. antiquorum
Colocasia esculenta var. stoloniferum
Cyrtoesperma chamissonis/C. merkusii*



Protection of Plant varieties and Farmer's Rights Authority

**(PPV & FRA)
Government of India**

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Taro (*Colocasia esculenta*)

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.

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 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.

4. Test plot design

Shown in figure of field layout.

Bed size	: 4.8m x 3m
Number of rows	: 6
Row to row distance	: 60cm
Plant to plant distance	: 30cm
Expected number of plants	: 36

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

IV. 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).

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:
 - 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]

VI. 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.

VII. Table of characteristics

Sl. No	Characteristics	Characters expression with rank or measurement unit (States)	Note	Example Of varieties	Stage of observation	Type of Assessment
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, Azanganzii Obi (Red), Obi (White), Dziicha BL/SM/116, Takiltom, Tajekjak, Barker CA/JP/08, Mukhi pan CE/THA/10, Yarumpun 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, Tasarang, 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, Houpan	(b)	VG
		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 observation	Type of Assessment
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 acidity	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 Assessment
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 observation	Type of Assessment
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,		
		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 observation	Type of Assessment
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,	(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,		

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)	<ul style="list-style-type: none"> • 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*

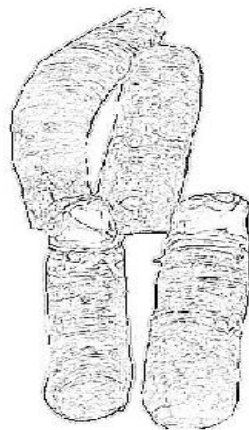
Sl. No.	Characteristics	Characters Expression
1.	Plant height	1.8-2.4mt
2.	Leaf shape	Arrow shaped sharply pointed basal node
3.	Leaf length	1-1.5mt
4.	Petiole	Long thick with short leaf sheath
5.	Petiole arrangement	Spiral
6.	Petiole diameter	About 10cm
7.	Corm	<ul style="list-style-type: none"> Developed thickening of basal stem and cylindrical shape Externally looks like banana sucker



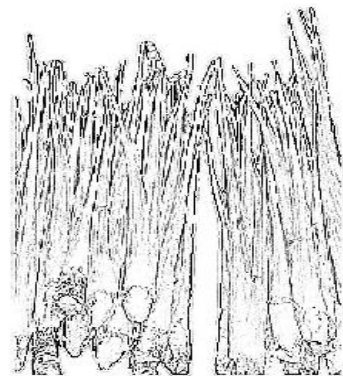
1. Plant type



2.Corm



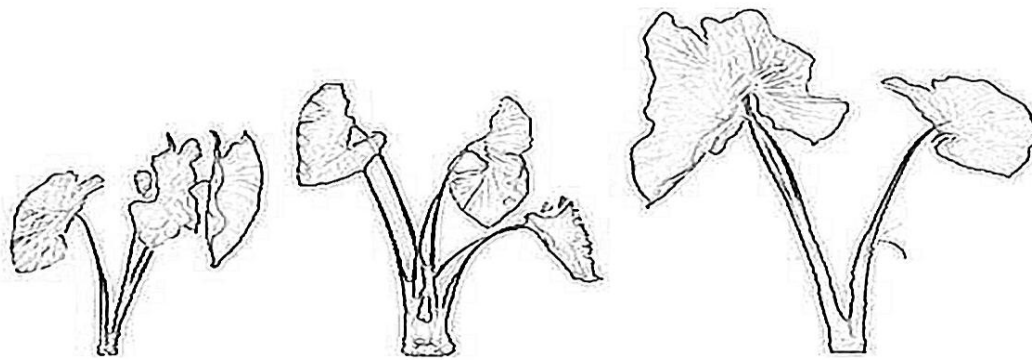
3.Petiole



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)

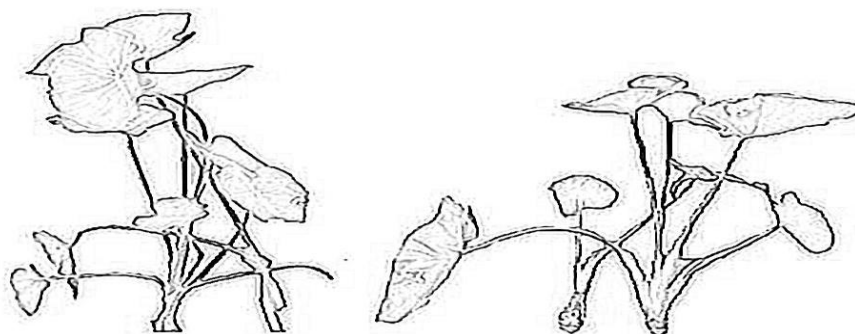


1
Dwarf (<50 cm)
(eddoe)

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

5
Tall (>100cm)
(dasheen)

Characteristics 2 : Growth habit



1
Non-fasciate

3
Fasciate

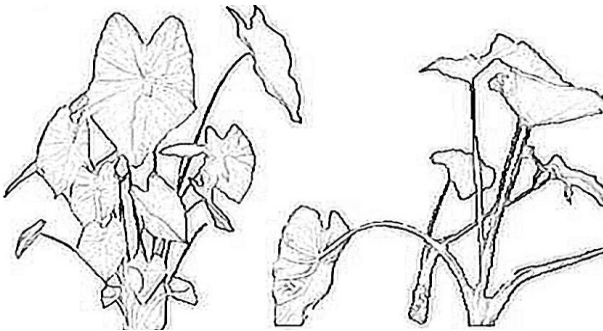


1
Non-fasciate



3
Fasciate

Characteristics 3 : Plant type



1
Erect

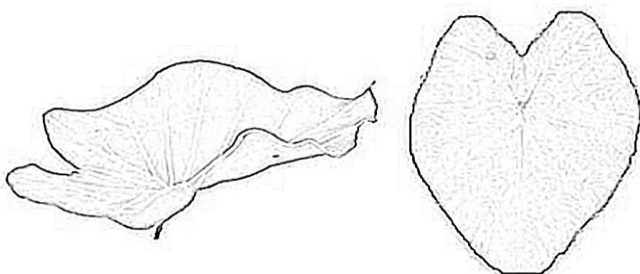
3
Spreading



1
Erect

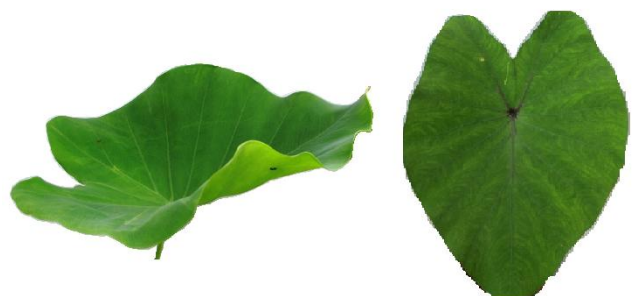
3
Spreading

Characteristics- 4: Position of Leaf



1
Cup shaped

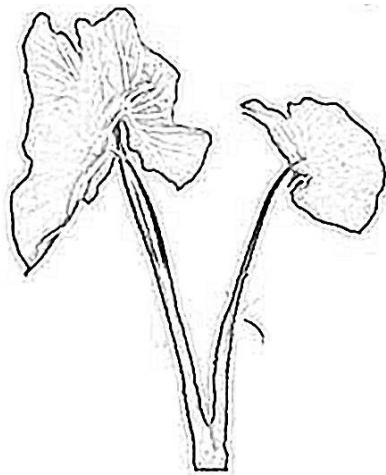
3
Erect-apex down



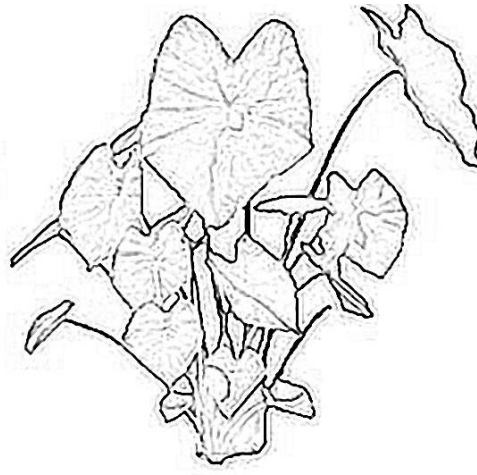
1
Cup shaped

3
Erect-apex down

Characteristics- 5: Leaf Number



1
Few (5-10)



3
Many (>10)

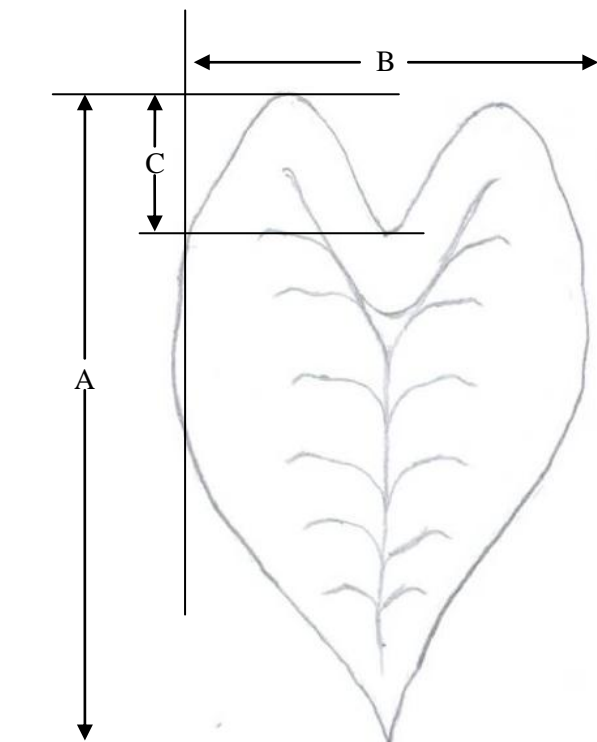


1
Few (5-10)

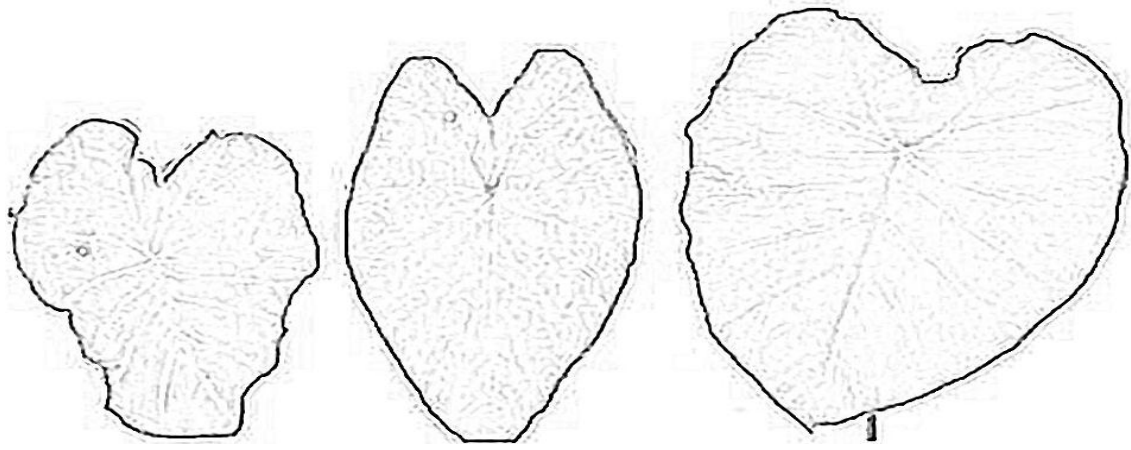


3
Many (>10)

Characteristics-6: Leaf length



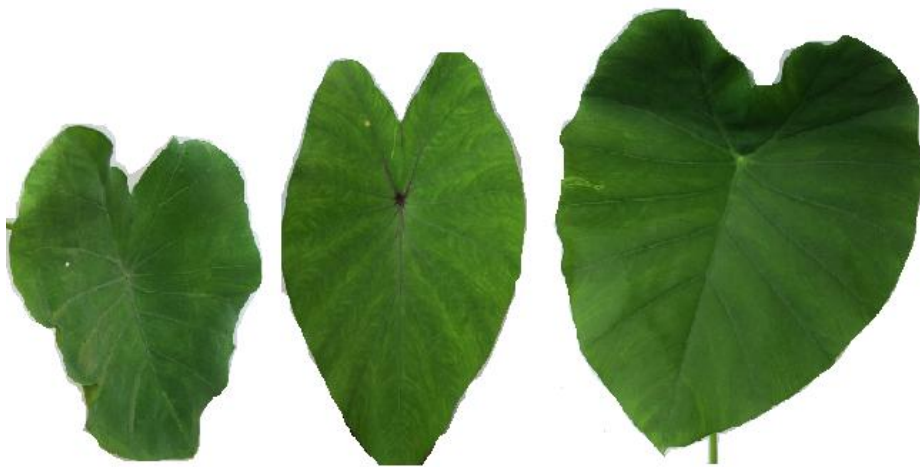
- A: length
- B: width
- C: depth of sinus



1
Small (12-14cm)

3
Medium (14-18cm)

5
Large (>18cm)

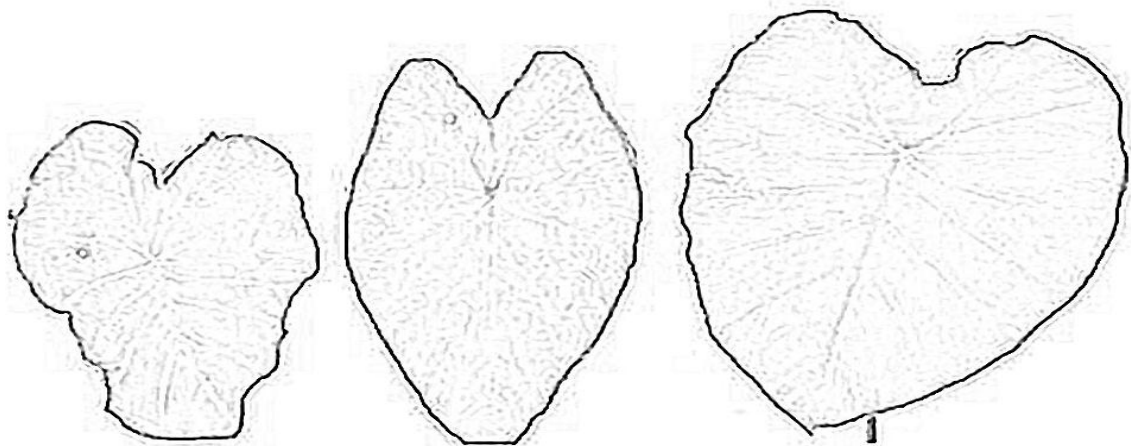


1
Small (12-14cm)

3
Medium (14-18cm)

5
Large (>18cm)

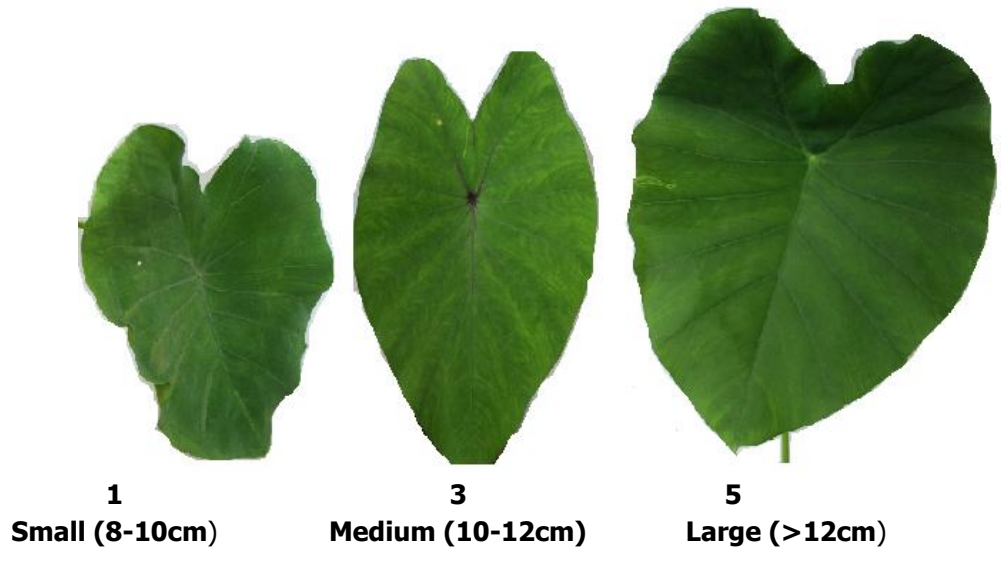
Characteristics-7: Leaf width



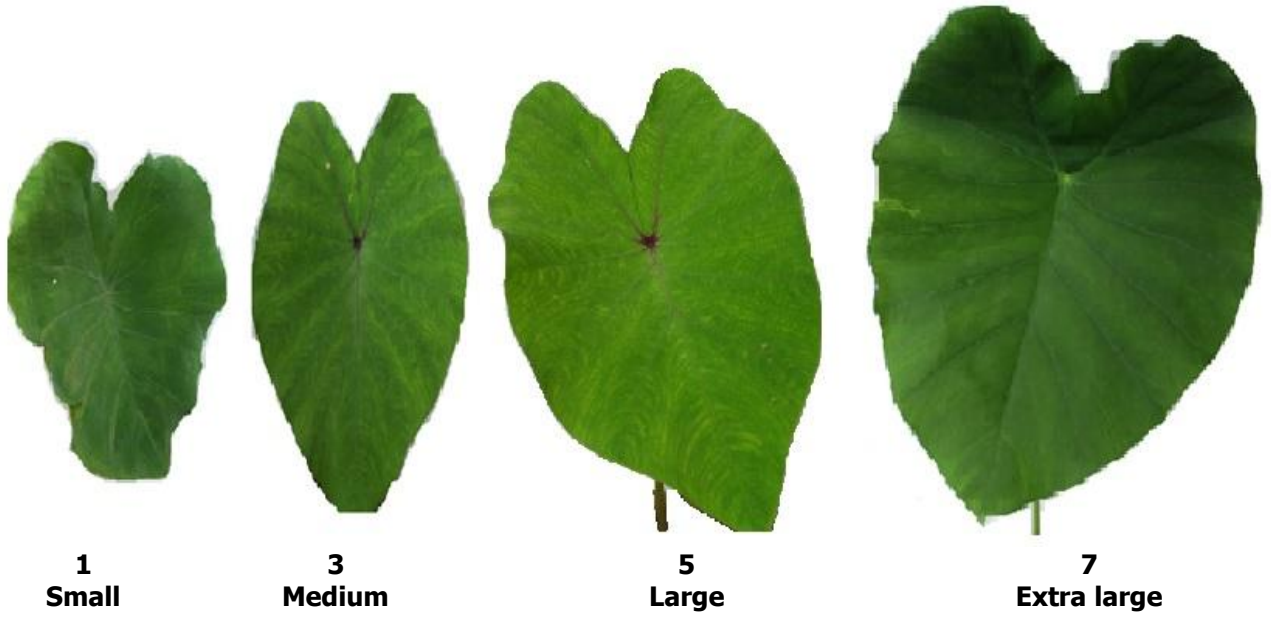
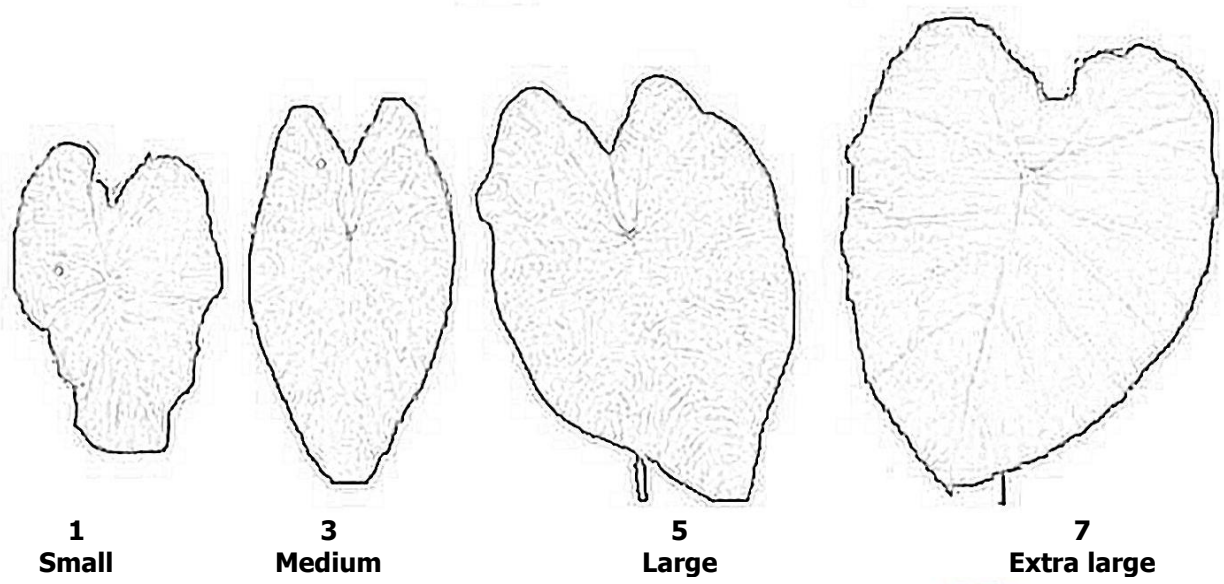
1
Small (8-10cm)

3
Medium (10-12cm)

5
Large (>12cm)



Characteristics- 8: Cross section area



Characteristics- 9 : Leaf colour



3
Green



5
Dark Green

Characteristics-10 : Leaf main vein colour



2
Yellow



4
Green

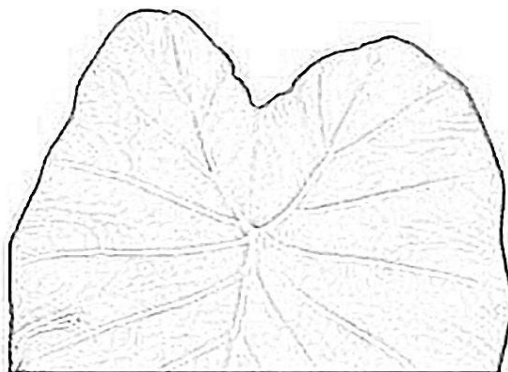


5
Pink

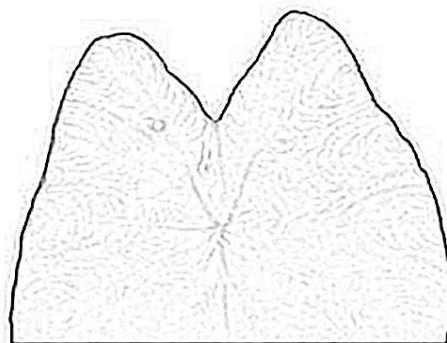


8
Purple

Characteristics-11 : Leaf vein pattern



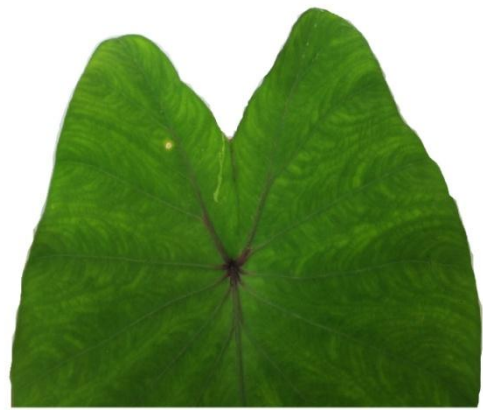
1
V type



3
Y type



1
V type

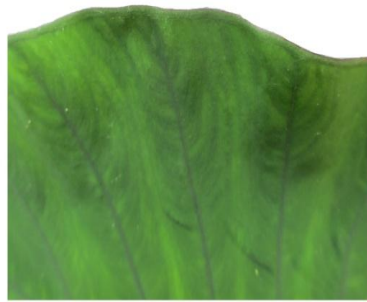


3
Y type

Characteristics-12 : Leaf blade colour



3
Green

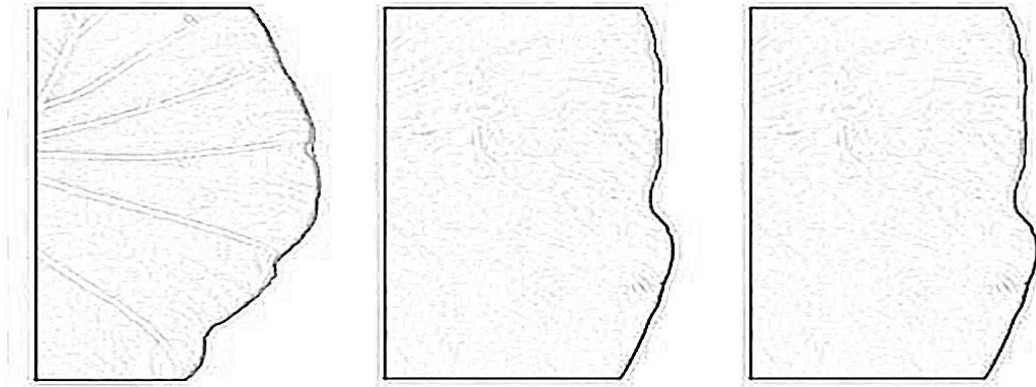


4
Dark green



7
Purple

Characteristics-14: Leaf blade margin pattern



1
Sinate

3
Undulate

5
Entire



1
Sinate

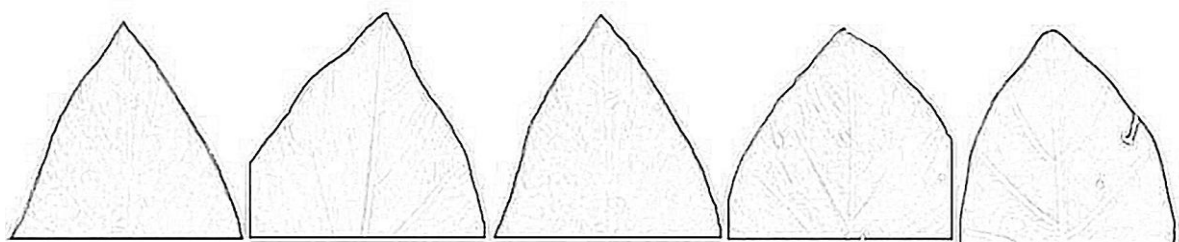


3
Undulate



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

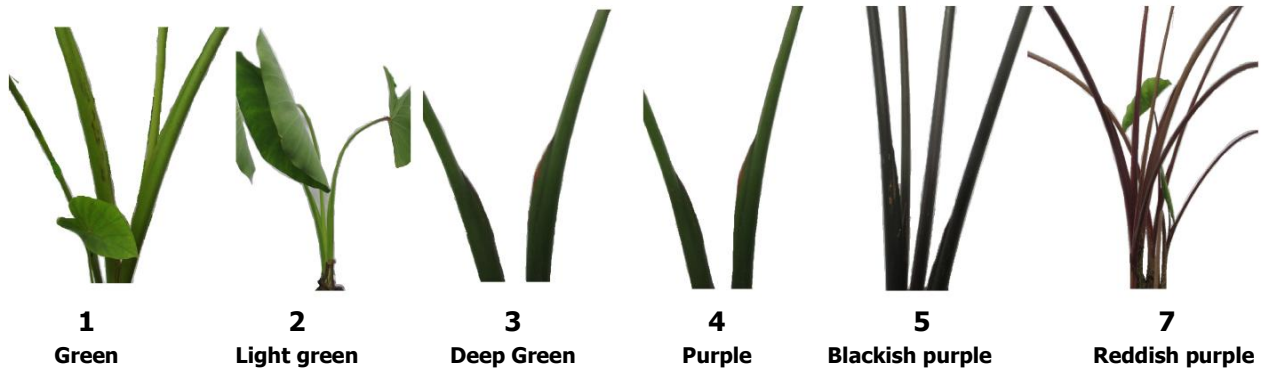


7
Slightly round

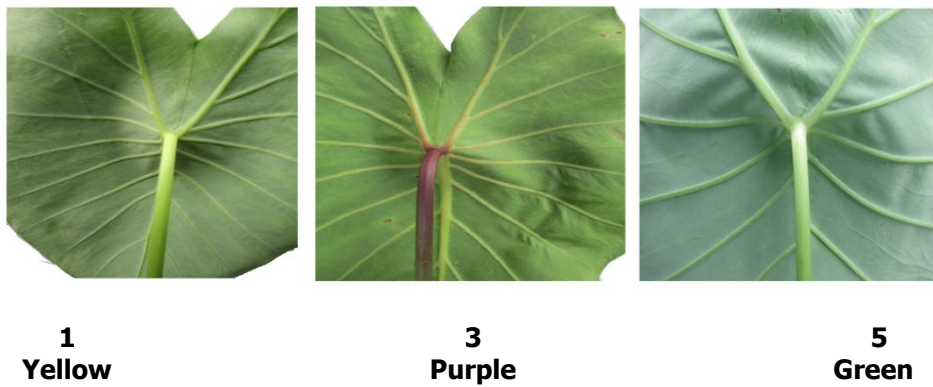


9
Round

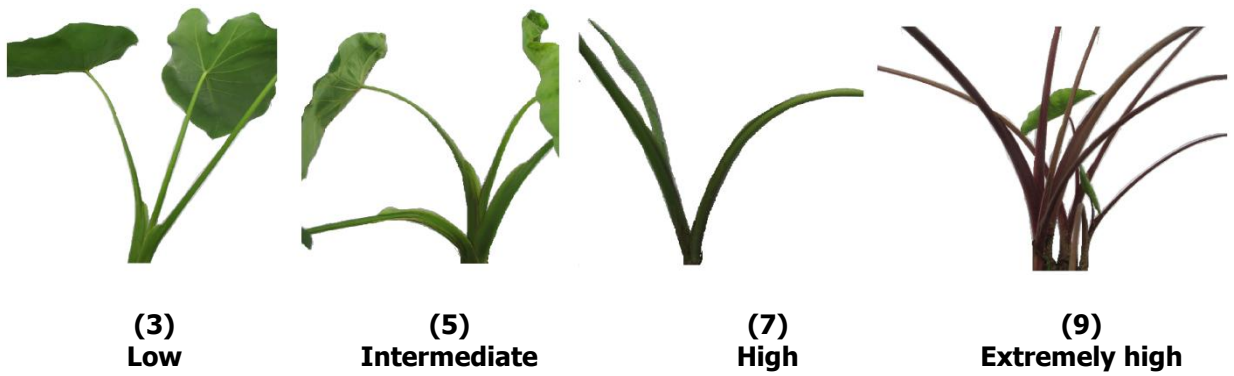
Characteristics-18: Petiole colour



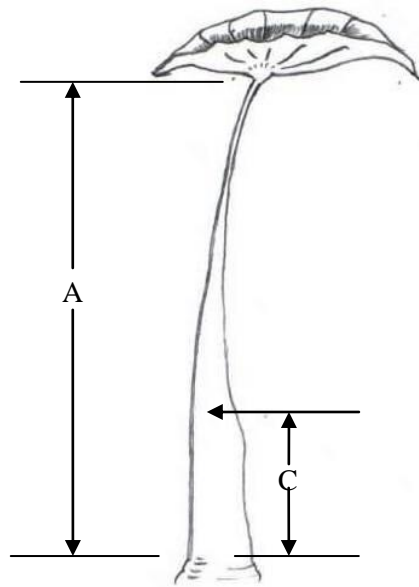
Characteristics-19: Petiole junction colour



Characteristics-22: Petiole bent at lamina junction



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

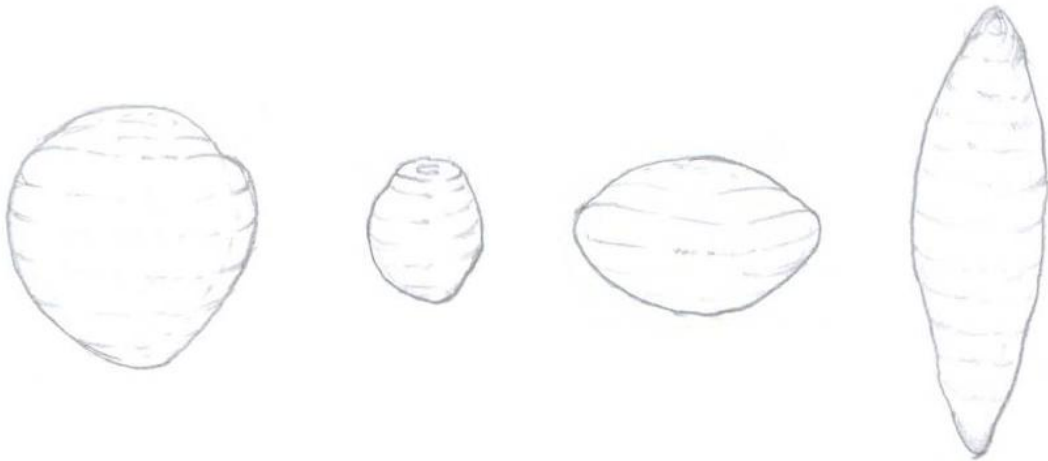


(1)
Low (< 10 cm)

(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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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

- | | |
|--|-------------------------|
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| 2. Dr. R. K. Tyagi,
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| 3. Dr. M. Unnikrishnan
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| 7. 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