

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

on

Hibiscus
(Hibiscus L.)



**Protection of Plant Varieties and Farmers' Rights Authority
(A Statutory Body created by an Act of Parliament)
Government of India, New Delhi**

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Hibiscus (*Hibiscus* L.)

1. Subject

These test guidelines will apply to all varieties of *Hibiscus* spp. of the family Malvaceae. These test guidelines have been developed for all the hibiscus species mostly on *Hibiscus rosa-sinensis* L., and few from the following species *H. tillaceus*, *H. heterophyllus*, *H. liliiflorus*, *H. hirtus*, *H. syriacus*, *H. coccineus* and *H. schizopetalus*.

2. Plant Material Required

The Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA) shall determine when, where, how much and what kind of plant material is required for testing of the variety applied for registration under the Protection of Plant Varieties and Farmers' Rights (PPVFR) Act of 2001.

The applicant submitting such plant material from a country other than India **or state other than the testing place** shall make sure that all customs and quarantine requirements stipulated under relevant national legislation and regulations are complied with.

The plant material should be supplied in the form of **young plants having roots preferably 3 months old**. In case of grafted plants, suitable root stock of *Hibiscus rosa-sinensis* cv. Kali Jaba and Sakherbazar Yellow may be used.

The planting material should be supplied during March to July. The plant material supplied by the applicant should be **minimum number of 20 for plants growing under open field condition and 25-30 plants for pot grown type** of new varieties, varieties of common knowledge and farmer varieties, keeping in view the chances of mortality of saplings for each center. The plant material supplied must be vigorous, healthy and free from any insects and diseases.

The plant materials should not have undergone any bio-physical or chemical treatments that might influence the expression of the characteristics of the variety unless the competent authority request or allow for such treatments. If it is treated then the complete details of the treatment procedure must be given.

The supplied planting materials must also meet the maximum genetic uniformity, purity, and phyto-sanitary criteria besides data on the propagation method/ multiplication of plants.

3. Conduct of Tests

The minimum time duration for conduct of the DUS tests should last at least a complete growing season. The test may, however, be conducted for

- i) New varieties: two seasons at two locations
- ii) Varieties of common knowledge: one season at two locations

In case, if any of the characteristics are inconsistent, the tests will be continued for another growing season of the crop.

If any key characteristics of the example or candidate variety are not visible for visual examination or data is unable to record in one location, the variety may be considered for intense investigation at another relevant test site or under a special test procedure at the applicant's indicated request.

The field test should be conducted in favorable environmental conditions that promote normal development and expression of all relevant test characteristics of the varieties. The plot area must be sufficiently large such that the plant parts can be removed or plucked for the measurement and observation without interfering with the other test observations on the standing plants until the end of the growing season.

In instance, separate growing media trials, may be required to assure the satisfactory growth and development of the varieties.

The evaluation to be conducted in an open condition either as field grown or pot-grown plants depending on the claims of the applicant.

All the test observations should be taken on fully grown plant (6-months old after planting at testing site) and on the typical organs especially flowering traits at its full bloom stage.

Unless otherwise specified, all the observations of the flower must be conducted after petal separation stage at full blossoming preferably in the morning times.

Unless otherwise specified, all the observations of the anther/stamen/stigma characters must be conducted at anther dehiscence during the initial flush of flower.

The plants must be planted in the test field at the standard spacing suggested for each variety, or, if appropriate, at the spacing recommended by the applicant.

The PPVFR Authority shall recommend additional testing procedures for special purposes.

Test plot design

- a. Each test should be planned to provide results in total of **at least 12 plants in case of garden types and at least 18 plants for pot types.**
- b. The test design must be planned in such a manner that plants or portions of plants can be detached for counting or measuring without affecting the other observations which have to be made until the end of the growth cycle.

Row to row distance: 1 m x 1m

Plant to plant distance: 1m x 1m

Planting 3 rows of 4 plants each (garden-type), 3 rows of 6 pots each (pot-type)

4. Methods and Observations

The plant traits listed in the table of characteristics must be considered to test the varieties for distinctiveness, uniformity, stability (DUS).

For the assessment of distinctiveness, uniformity and stability all observations on single plants should be made on 5 plants or parts taken from each of 5 plants, disregarding any off-type plants.

For the uniformity evaluation, a 1% population standard and an acceptance probability of minimum 95% should be used and no off-type is allowed.

To assess the colour quality, the most recent Royal Horticultural Society (RHS) colour chart should be used. As the daylight changes, colour judgments must be made against a colour chart conducted either in an appropriate cabinet with artificial daylight or during mid-day in a room that is not exposed to direct sunlight.

All the assessments must be conducted with the plant parts placed against a contrasting background or in the open field.

All the vegetative characteristics of the plant must be taken at the time of the initial flush of flower in the center third of the flowering stem.

All the measurements mainly the leaf characteristics must be taken on only fully matured leaves present in the middle of the stem.

All the measurements or observations on the flower must be performed only when maximum number of the flowers have bloomed and on the most recently completely opened flower before fading of its colour.

Observations should be taken on minimum 6-months old plants preferably for plant growth, leaf and stem characters and flower characters should be taken at full bloom stage during maximum number of flowers whereas anther characters during the dehiscence stage.

All the measurements of the diameter and length of the flower, leaf characteristics and its components must be taken by spreading out the position (using measuring scale or graph).

The following general introduction should be reviewed prior making any decisions regarding distinctiveness. However, in some cases can observe clear differences between two varieties within less than one growing cycle. In case of few characteristics test may be done for at least two independent growing cycles in order to check whether the difference remains consistent or not.

In many varieties, when they have been shown to be uniform, they are so considered as stable. However, if there is any doubt, stability tests should be conducted by growing the plant material for further generations or tests to be carried out on new plant stock to check whether they exhibit the same traits as like as previous material.

5. Grouping of varieties

To assist the assessment of distinctiveness, the example/candidate varieties for the purpose of DUS testing should be divided into various groups. Characteristics that are known from the experience not to fluctuate or vary relatively little within a variety and that are uniformly distributed across all varieties in the collection in their various stages are acceptable for grouping purpose.

Grouping characteristics are the characteristics in which the state of expression remains same even when grown under different localities either in combination or individually with other such traits.

The following characteristics have been considered as grouping characteristics based on growth habit and flowering behavior:

- a. Plant growth habit (Characteristic-1)
- b. Leaf shape (Characteristic-10)
- c. Flower type: arrangement of petals (Characteristic-19)
- d. Flower colour (Characteristic-24)
- e. Flower: type of eye zone with extensions (Characteristic-27)
- f. Flower: overlapping of petals (Characteristic-33)

The grouping characteristics are denoted with the symbol (*) in the table of characteristics for easy identification.

(+) see the explanation of characters

6. Characteristics and Symbols

The traits and their states of expression indicated in the table of traits will be used to assess distinctiveness, uniformity and stability.

The states of expression are provided for each characteristic in order to describe and unify the descriptions. Each state of expression is assigned a numerical note for ease of data entry, processing and interchange of the description.

The following criteria will be used to assess qualities and these are tabulated in the following column of the table of characteristics:

- a. **Qualitative characteristics (QL):** The traits that exhibit discontinuous state of expression and every form of the expression can be described by a single state. These characteristics cannot be measured. As a rule, these characteristics are not at all influenced or very little impact by the external environmental conditions. Ex: Plant growth habit, Flower type, Flower petal serration, etc.
- b. **Quantitative characteristics (QN):** The characteristics in which the expression covers the wide range of variations or continuous variations from one extreme point to the other that can be measured easily. The wide range of the

expressions is divided into several states for the purpose of description. Ex: Plant height, Leaf blade length, Flower diameter, Staminal column length etc.

- c. **Pseudo-qualitative characteristics (PQ):** In this instance, the range of expression is least partially continuous, but it fluctuates in more than one dimension and making it impossible to accurately characterize by just identifying the two ends of a linear range. Ex: Leaf shape, Type of incisions of margin, Anther colour etc.

The following are the types of assessments of attributes stated in the table of characteristics:

MG: single measurement taken from a group of plants or components of plants

MS: measurements taken from number of individual plants or components of plants

VG: visual evaluation based on a single view of a group of plants or components of plants

VS: visual evaluation by observation of specific individual plants based or components of plants

Type of observation: visual (V) or measurement (M)

Visual observations or sensory observations relate to those in which different reference points (side-by-side comparison and diagrams) or non-linear charts (colour charts) shall be used.

A measurement is an objective assessment made by comparing against a calibrated, linear scale, such as using a colorimeter, ruler, dates, weighing scales, counts, and so on.

7. Table of Characteristics

S. No	Characteristics	State of expressions	Note	Example varieties	Assessment
1. QL (* (+)	Plant growth habit	Prostrate Semi-upright Upright	1 3 5	Viceroy, Fragalis Red Dragon, Eureka Sakherbazar Pink, Sakherbazar Yellow	VG
2. QN (+)	Plant height (cm)	Short (<75 cm) Medium (76-120 cm) Tall (>120 cm)	3 5 7	Viceroy, Butterfly Apollo, Rani Rasmoni Kali Jaba, Celia	MS
3. QN (+)	No. of primary branches	Few (<6) Medium (6-12) Dense (>12)	3 5 7	Apollo Valentine's Day, Double Peach Kali Jaba, Sakherbazar Pink	VG
4. QL (+)	Branch attitude	Horizontal Semi-upright Upright	1 3 5	Versicolor Pinwheel Holly's Pride, Sakherbazar White Fragalis, Cinnamon Girl	VG
5. PQ (+)	Branch colouration	Green Red Purple Brown	1 3 5 7	Viceroy, Celia Plam Spring Kali Joba, Sakherbazar Yellow Cinnamon Girl	VG
6. QN (+)	Leaf blade length (cm)	Small (<8 cm) Medium (8-12 cm) Long (>12 cm)	3 5 7	Apollo, Viceroy Eureka, Kali Jaba June's Joy, Valentine's Day	MS
7. QN (+)	Leaf blade width (cm)	Narrow (<4 cm) Medium (4 - 9 cm) Broad (>9 cm)	3 5 7	Sakherbazar Pink, Viceroy Apollo, Celia Valentine's Day, Holly's Pride	MS

8.	Leaf blade colour on upper side	Light green Medium green Dark green Variegated	3 5 7 9	Valentine's Day (141D) Apollo (139C) Kali Jaba, Viceroy, Celia(141A) Snowflake	VG
9.	Glossiness of upper side of leaf	Absent Present	1 9	Sakherbazar Pink, Double Peach Celia, Kali Jaba	VG
10.	Leaf shape	Lanceolate Ovate Obovate Oblong Cordate Deltoid Circular Rhomboid Palmatipartite Palmatisect	1 2 3 4 5 6 7 8 9 10	<i>H. heterophyllum</i> Celia, Arambagh Mini Viceroy, Kali Jaba Madam Curie Apollo, Elephant Ear Valentine's Day Fragalis El Capitolio Double Choice <i>H. coccineus</i> Red	VG
11.	Leaf blade: Shape of the base	Cuneate Truncate Cordate Rounded	1 2 3 4	Celia Kali Jaba, Arambagh Minu Apollo, Versicolor Pinwheel Sakherbazar Pink, Holly's Pride	VG
12.	Leaf blade: Shape of the apex	Acuminate Acute Obtuse Rounded	1 2 3 4	<i>H. coccineus</i> Red Celia, Viceroy Double Peach, Versicolor Pinwheel Eureka, Holly's Pride	VG
13.	Leaf blade: Lobing	Absent Present	1 9	Kali Jaba, Celia Double Choice	VG

14.	Leaf blade:	Weak	3	Butterfly	VG
QL	Intensity of	Medium	5	Double Choice	
(+)	lobing	Strong	7	<i>H. coccineus</i> Red	
15.	Leaf blade:	Absent	1	Apollo, Fragalis	VG
QL	Undulation of	Moderate	5	Holly's Pride, Double Peach	
(+)	margin	Strong	7	Indian's Magic	
16.	Leaf blade:	Entire	1	Viceroy, Cinnamon Girl	VG
PQ	Type of	Sinulate	2	Creme de Cacao	
(+)	incisions of	Crenate	3	Rani Rashmoni, Heartbreak Hotel	
	margin	Serrate	4	Kali Jaba, Celia	
		Dentate	5	Isobel Beard, Elephant Ear	
		Lobed	6	Arden's	
17.	Depth of	Weak	1	Viceroy	VG
QL	incisions of	Shallow	5	Sakherbazar Pink	
(+)	margin	Medium	7	Holly's Pride, Celia	
		Deep	9	Kali Jaba	
18.	Pedicle length	Short (<4 cm)	3	Eureka, Rani Rashmoni	MS
QN	(cm)	Medium (4 - 8 cm)	5	Sakherbazar White, Celia	
(+)		Long (>8 cm)	7	Kali Jaba, Versicolor Pinwheel	
19.	Flower type:	Single	1	Viceroy, Sakherbazar Pink	VG
QL	Arrangement	Semi-double	3	Eureka	
(*)	of petals	Double	5	Double Peach, Celia	
(+)		Multiple	7	Visheswari	
20.	Flower	Short (<4 cm)	3	Viceroy, Celia	MS
QN	(Length) (cm)	Medium (4 - 8 cm)	5	Sakherbazar White, Fragalis	
(+)		Long (>8 cm)	7	Kali Jaba, Versicolor Pinwheel	
21.	Flower size	Small (<10 cm)	3	Viceroy, Celia	MS
QN	(Diameter)	Medium (10-15	5	Cinnamon Girl, Kali Jaba	
(+)	(cm)	cm)	7	Valentine's Day, Sudarshan Chakra	
		Large (>15 cm)			

22.	Flower petals	Absent	1	Butterfly, Sakherbazar Yellow	VG
QL (+)	Serration	Present	9	<i>H. shizopetalus</i>	
23.	Flower petals:	Weak	3	Viceroy, Versicolor Pinwheel	VG
QL (+)	Undulation of margin	Medium	5	Apollo, Fragalis	
		Strong	7	Sakherbazar Yellow, Double Peach	
24.	Flower colour	White	1	Sakherbazar White (RHSN99D)	VG
PQ (* (+)	(Indicated as per RHS chart)	Cream	2	Sakherbazar Yellow (RHS26D)	
		Peach	3	Double Peach (RHS48C)	
		Pink	4	Sakherbazar Pink (RHS54D)	
		Violet	5	Fibonacci (RHS91B)	
		Yellow	6	Butterfly (RHS12A)	
		Orange	7	Apollo (RHS32A)	
		Red	8	Kali Jaba (RHS44A)	
		Brown	9	Pepper Queen (RHS172A)	
25.	Flower: Eye	Absent	1	Butterfly, Sakherbazar White	VG
QL (+)	Zone	Present	9	Valentine's Day, Crème de cacao	
26.	Flower: Size of	Small (less than $\frac{1}{4}$ of the petal)	3	Misty pink, Sakherbazar Yellow	VG
QL (+)	eye zone	Medium (less than $\frac{1}{2}$ and more than $\frac{1}{4}$ of the petal)	5	Valentine's Day, Crème de Cacao	
		Large (more than $\frac{1}{2}$ of the petal)	7	Shiba, Celestial Moon	
27.	Flower: Type	T-1	1	Butterfly	VG
QL (* (+)	of eye zone with extensions	T-2	2	Apollo	
		T-3	3	Valentine's Day	
		T-4	4	Crème de Cacao	
28.	Flower: Colour	White	1	Sakherbazar White (N999D)	VG

PQ (+)	of eye zone	Light pink Pink Dark pink Orange Red Dark red Brown	2 3 4 5 6 7 8	Indian's Magic (54D) Sakherbazar Pink (N57D) Fibonacci (61C), Creme de Cacao (61C) Apollo (41A) Sakherbazar Yellow (44A) Valentine's Day (45A) Pepper Queen (N199C)	
29. QN (+)	Petal: Length (cm)	Short (<5 cm) Medium (5 - 8 cm) Long (>8 cm)	3 5 7	Viceroy, Celia Versicolor Pinwheel, Fragalis June's Joy, Rani Rasmoni	MS
30. QN (+)	Petal: Width (cm)	Narrow (<5 cm) Medium (5 - 9 cm) Broad (>9 cm)	3 5 7	Butterfly, Viceroy Eureka, Sakherbazar Yellow Valentine's Day, Sudarshan Chakra	MS
31. QL (+)	Petal: Shape	Spatulate Obovate Rounded	1 3 5	Sakherbazar Yellow, Red Dragon Storckii, Sakherbazar White Eureka, Valentine's Day	VG
32. PQ (+)	Petals: No. of colours, except eye zone	Single colour Double colour Multiple colour	1 2 3	Sakherbazar Pink, Sakherbazar White Silver Memory Golden Rain	VG
33. QN (*) (+)	Flower: Overlapping of petals	Very weak Weak Medium Strong Very strong	1 3 5 7 9	Sakherbazar Yellow, S. Pink Viceroy, Versicolor Pinwheel Kali Joba, Storckii Elephant Ear Visheswari, Celia	VG
34. PQ (+)	Petals: Main colour on lower and upper side	Same Different	1 9	Sakherbazar Pink, S. White Apollo, Golden Rain	VG

35. QL (+)	Petal waviness	Absent	1	Viceroy, Versicolor Pinwheel	VG
		Present	9	Kali Jaba, Apollo	
36. QN (+)	Petal curving	Inward	3	Snowflake, Pepper Queen	VG
		No curving	5	Golden Rain, Indian's Magic	
		Outward	7	Fragalis, Sakherbazar Pink	
37. PQ (+)	Petal colour pattern excluding eye zone	Spotted	1	Golden Rain	VG
		Blotched	2	Gelia Castilo	
		Streaked	3	Fragalis	
		Margined	4	Apollo	
		Banded	5	Gator Pride	
		Flushed	6	Versicolor Pinwheels	
		Patched	7	Cherry Appolasa	
		Entire	8	Kali Jaba	
		Mixed-Combinations of any of the above patterns	9		
38. QN (+)	Length of staminal column (cm)	Short (<6 cm)	3	Viceroy, Elephant Ear	MS
		Medium (6 - 9 cm)	5	Eureka, Fragalis	
		Long (> 9 cm)	7	Sakherbazar White, Versicolor Pinwheel	

39. PQ (+)	Staminal column- main colour at apex	White Cream Peach Pink Violet Yellow Orange Red Purple Brown	1 2 3 4 5 6 7 8 9 10	Sakherbazar White Sakherbazar Yellow Double Peach Viceroy, Sakherbazar Pink Fibonacci Butterfly Crème de Cacao Kali Jaba Isobel Beard Pepper Queen	VG
40. PQ(+)	Staminal column- main colour at base	White Cream Peach Pink Violet Yellow Orange Red Brown	1 2 3 4 5 6 7 8 9	Sakherbazar White Madam Curie Double Peach Fragalis Soft Spot Butterfly Golden Rain Sakherbazar Yellow, Adonis Pearl <i>H. heterophyllus</i>	VG
41. PQ (+)	Staminal column-colour at apex and base	Identical or same Different	1 9	Sakherbazar White, Byron Metts Valentine's Day, Apollo	VG
42. QL (+)	Shape of staminal column	Straight Curved	1 9	Eureka, Viceroy Sakherbazar White, Kali Jaba	VG
43. QL (+)	Anther filament	Absent Present	1 9	Byron Metts Sakherbazar White, Versicolor Pinwheel	VG

44. PQ (+)	Anther filament colour	White Cream Peach Violet Yellow Orange Pink Purple Red	1 2 3 4 5 6 7 8 9	Sakherbazar White Madam Curie Visheswari Fibonacci Silver Memory Soft Spot, Cinnamon Girl Versicolor Pinwheels Isobel Beard, Gator Pride Kali Jaba, Snowflake	VG
45. PQ (+)	Anther colour	Cream Yellow Orange Brown Others	1 3 5 7 9	Crème de Cacao, <i>H. syriacus</i> Apollo Cinnamon Girl <i>H. heterophyllus</i> , Gator Pride <i>H. grandiflorus</i>	VG
46. PQ (+)	Stigma pad colour	Cream Yellow Pink Orange Red Brown	1 2 3 4 5 6	Sakherbazar White Golden Doublon, Eureka Sakherbazar Pink Fragalis Kali Jaba, Snowflake <i>H. tillaceus</i> , GoutamBhoumik	VG
47. QL (+)	Nature of stigma	Fused Free	1 9	Apollo, Byron Metts Sakherbazar Pink, Silver Memory	VG
48. QL (+)	Face of the flower	Upright Semi-upright Horizontal Downward	1 2 3 4	Rico Suyev, White Satin Apollo, Celia Viceroy, Adonis Pearl Sakherbazar Yellow, Kali Jaba	VG

*Essential characters for grouping; + see the explanation of characters

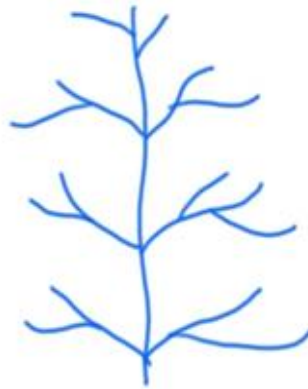
Most of the stated example varieties/reference varieties belong to *H. rosa-sinensis* L. species from All India Coordinated Research Project, Floriculture, Bidhan Chandra Krishi Viswavidyalaya center and collected from different reputed nurseries

8. Explanations of Table of Characteristics

Characteristic-1: Plant growth habit



Prostrate (1)



Semi-upright (2)



Upright (3)



Prostrate



Semi-upright

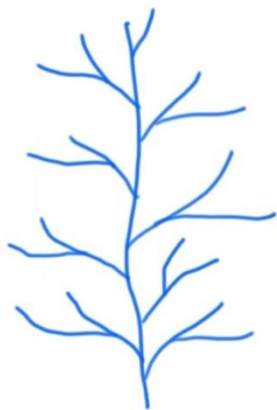


Upright

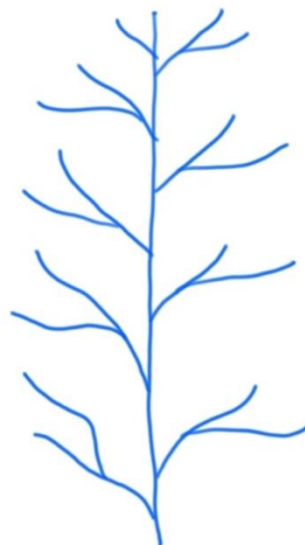
Characteristic-2: Plant height



Short (3)

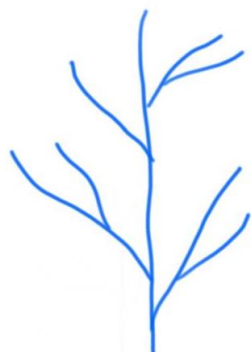


Medium (5)

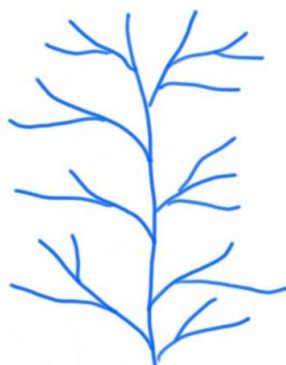


Tall (7)

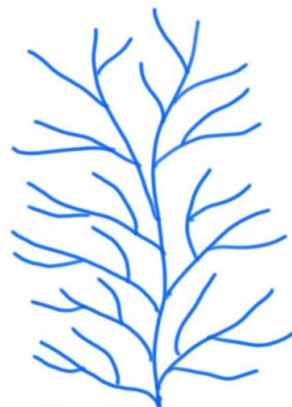
Characteristic-3: No. of Primary Branches



Few (3)



Medium (5)



Dense (7)



Few

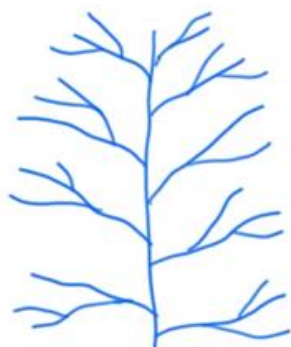


Medium



Dense

Characteristic-4: Branching attitude



Horizontal (1)



Semi-upright (3)



Upright (5)



Horizontal



Semi-upright



Upright

Characteristic-5: Branch colouration



Green (1)



Red (3)

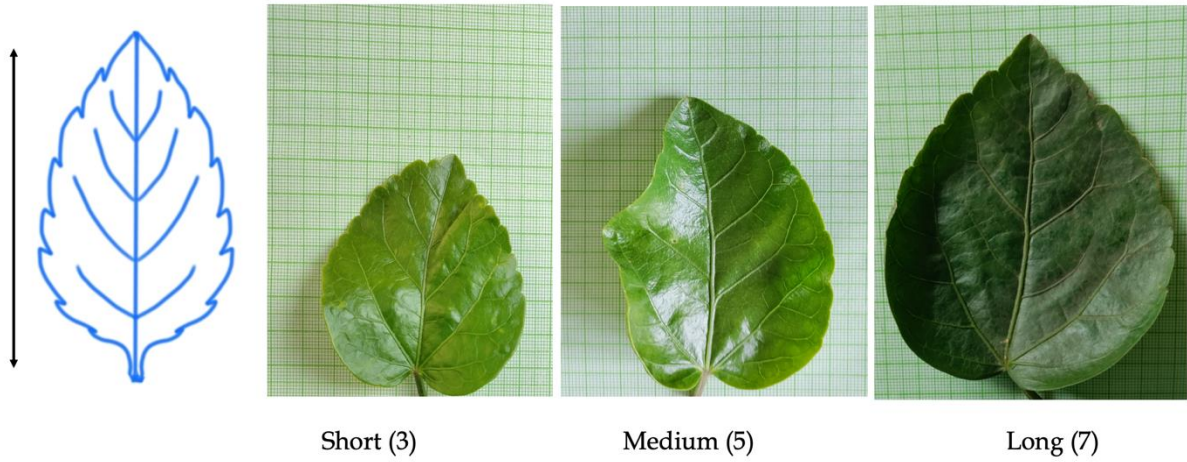


Dark purple (5)

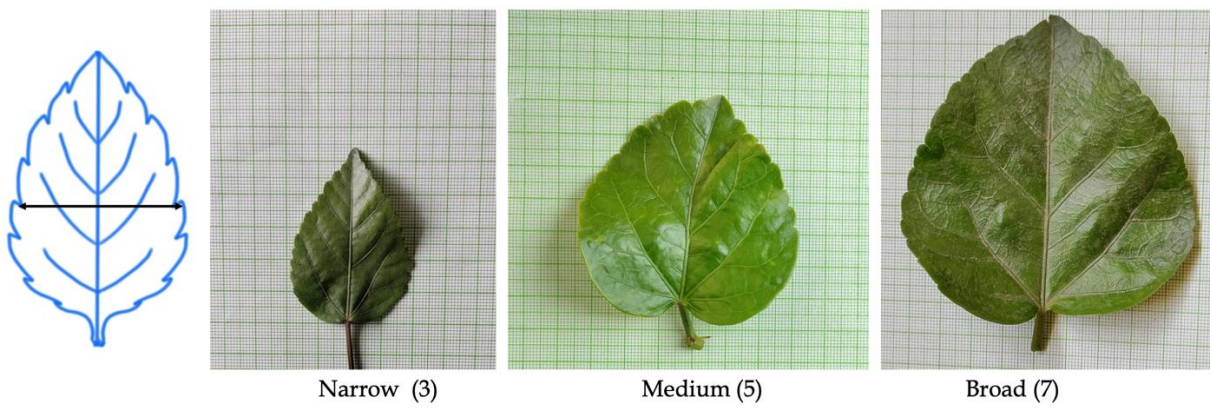


Brown (7)

Characteristic-6: Leaf blade length



Characteristic-7: Leaf blade width



Characteristic-8: Leaf blade colour on upper side



Characteristic-9: Glossiness of upper side of leaf



Non-glossy (1)



Glossy (9)

Characteristic-10: Leaf shape



Lanceolate (1)



Ovate (2)



Obovate (3)



Oblong (4)



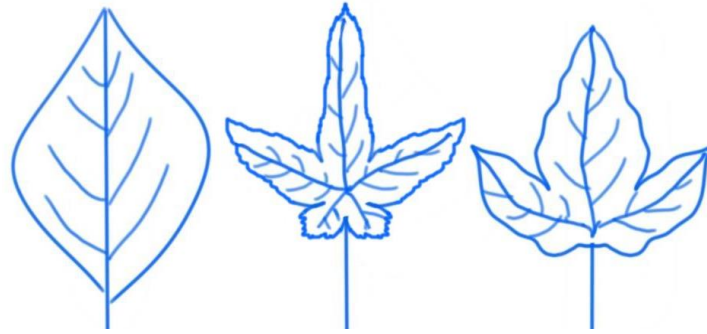
Cordate (5)



Deltoid (6)



Circular (7)



Rhomboid (8)

Palmatisect (9)

Palmatipartite (10)



Lanceolate (1)



Ovate (2)



Obovate (3)



Oblong (4)



Cordate (5)



Deltoid (6)



Circular (7)



Rhomboid (8)

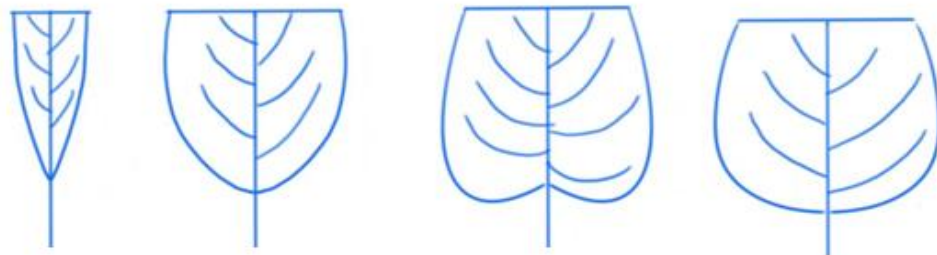


Palmatisect (9)



Palmatipartite (10)

Characteristic-11: Leaf blade: Shape of the base



Cuneate (1)

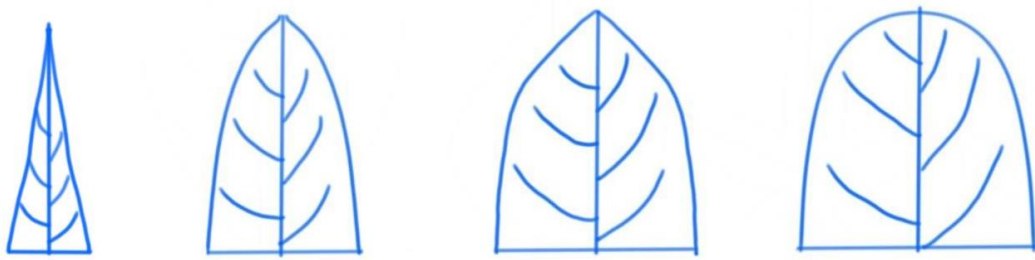
Truncate (2)

Cordate (3)

Rounded (4)



Characteristic-12: Leaf blade: Shape of the apex



Acuminate (1)

Acute (2)

Obtuse (3)

Rounded (4)



Acuminate (1)



Acute (2)

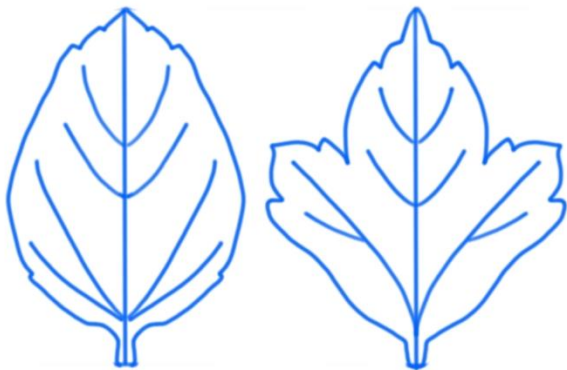


Obtuse (3)



Rounded (4)

Characteristic-13: Leaf blade: Lobbing



Absent (1)

Present (9)



Characteristic-14: Leaf blade: Intensity of lobbing



Absent (3)

Medium (5)

Strong (7)

Characteristic-15: Leaf blade: Undulation of margin



Absent (1)



Moderate (5)



Strong (7)



Characteristic-16: Leaf blade: Type of incisions of margin



Entire (1)



Sinuate (2)



Crenate (3)



Serrate (4)



Dentate (5)



Lobbed (6)



Entire (1)

Sinulate (2)

Crenate (3)

Serrate (4)

Dentate (5)

Lobbed (6)

Characteristic-17: Depth of incisions of margin



Absent (1)



Shallow (5)



Medium (7)

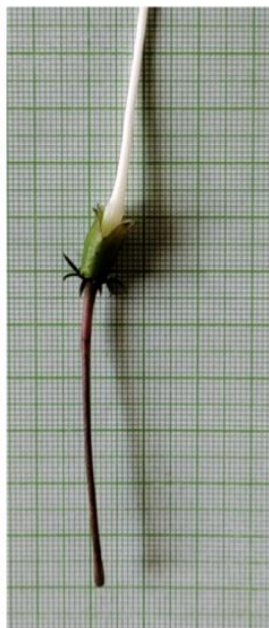


Deep (9)

Characteristic-18: Pedicel length



Short (3)

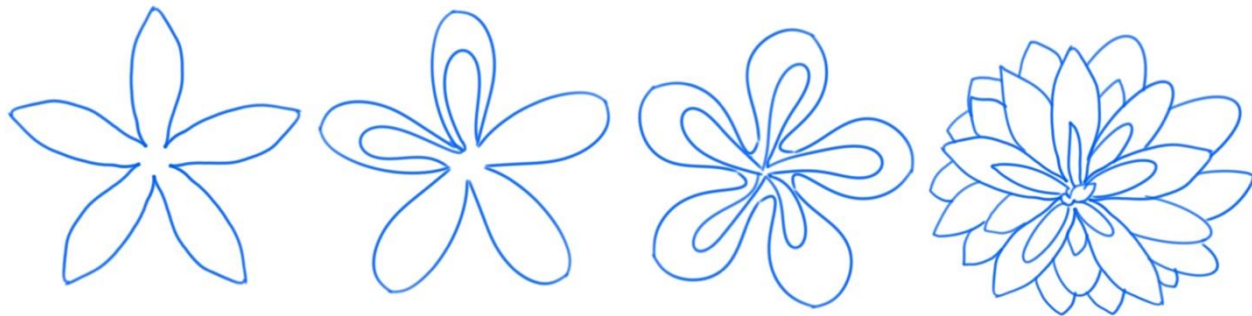
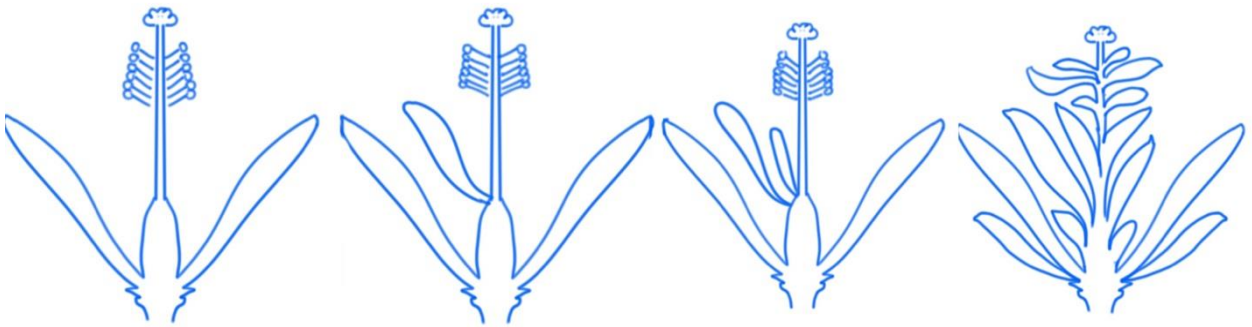


Medium (5)



Long (7)

Characteristic-19: Flower type: Arrangement of petals



Single (1)

Semi-double (3)

Double (5)

Multiple (7)



Single (1)

Semi-double (3)

Double (5)

Multiple (7)

Characteristic-20: Flower length (before opening)



Short

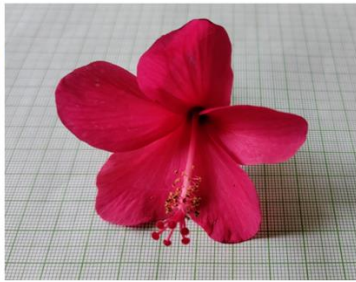
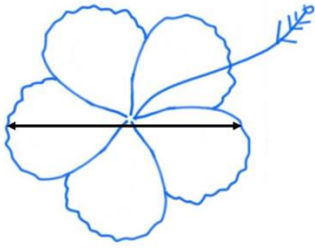


Medium



Long

Characteristic-21: Flower diameter



Small (3)

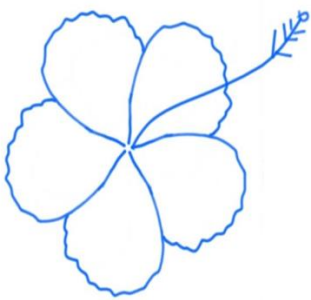


Medium (5)

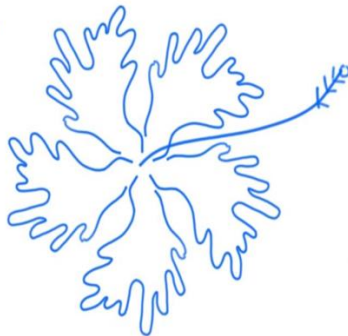


Large (7)

Characteristic-22: Flower petal serration



Absent (1)



Present (9)

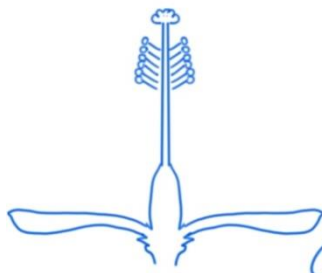


Absent (1)

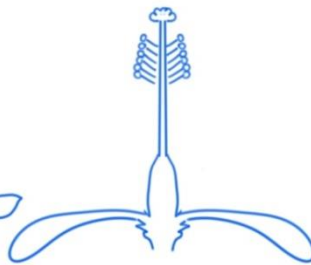


Present (9)

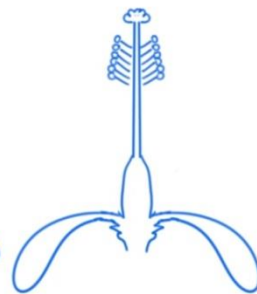
Characteristic-23: Flower petals: Undulation of margin



Absent (3)



Medium (5)



Strong (7)



Weak (3)

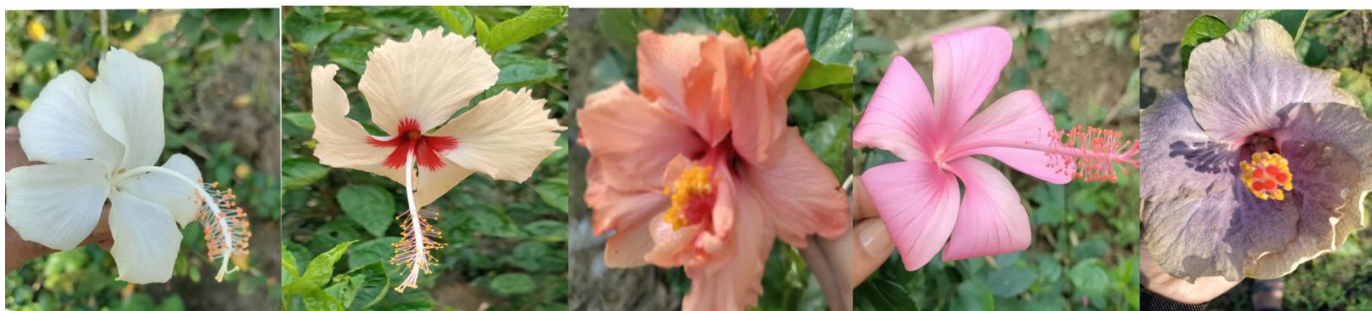


Medium (5)



Strong (7)

Characteristic-24: Flower colour



White (1)

Cream (2)

Peach (3)

Pink (4)

Violet (5)



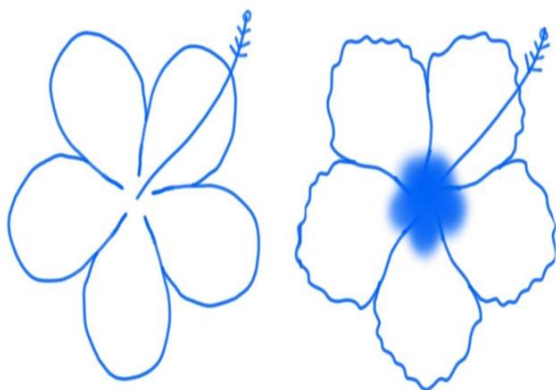
Yellow (6)

Orange (7)

Red (8)

Brown (9)

Characteristic-25: Flower: Eye zone



Absent (1)

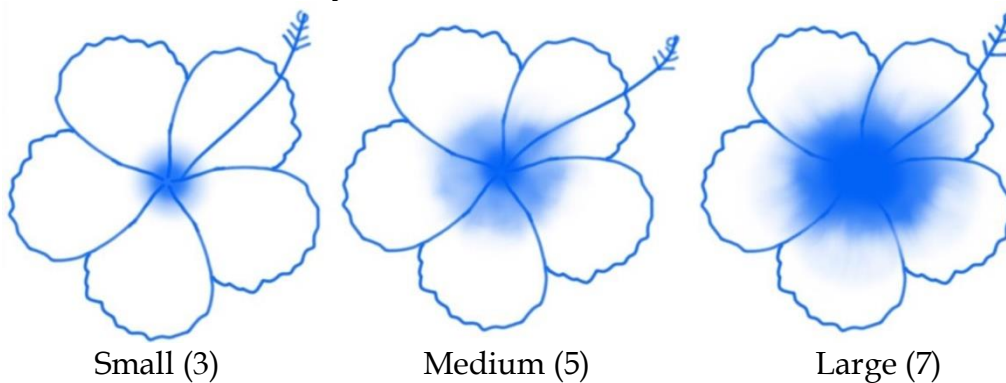
Present (9)



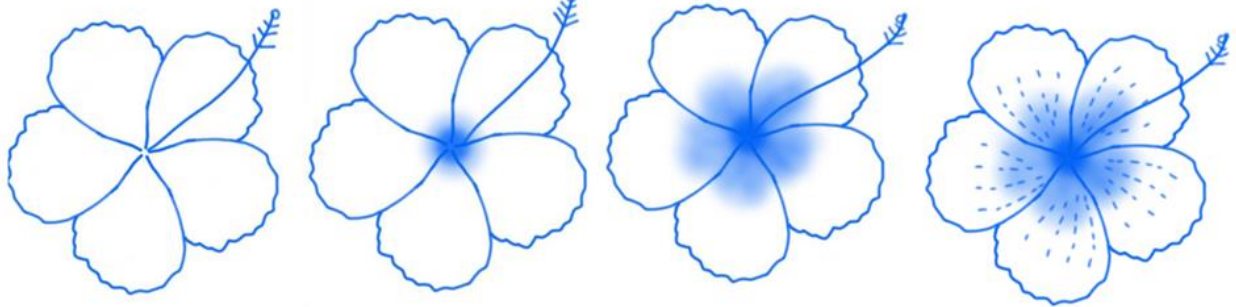
Absent (1)

Present (9)

Characteristic-26: Flower: Size of eye zone



Characteristic-27: Flower: Type of eye zone with extensions



T-1 (1)

T-2 (2)

T-3 (3)

T-4 (4)



T-1 (1)



T-2 (2)



T-3 (3)



T-4 (4)

Characteristic-28: Flower: Colour of eye zone



White (1)



Light pink (2)



Pink (3)



Dark pink (4)



Orange (5)



Red (6)

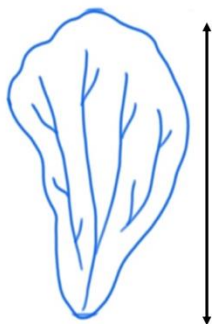


Dark red (7)



Brown (8)

Characteristic-29: Petal: Length



Short (3)

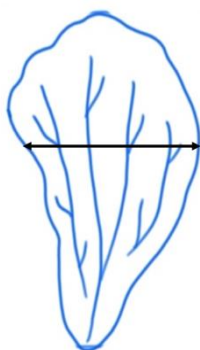


Medium (5)



Long (7)

Characteristic-30: Petal: Width



Narrow (3)

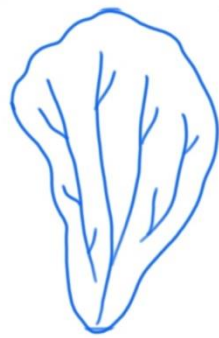


Medium (5)

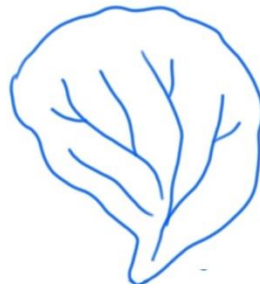


Broad (7)

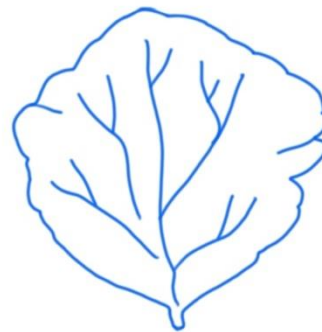
Characteristic-31: Petal shape



Spatulate (1)



Obovate (3)



Rounded (5)



Spatulate (1)



Obovate (3)



Rounded (5)

Characteristic-32: Petals: No. of colours, except eye zone



Single colour (1)

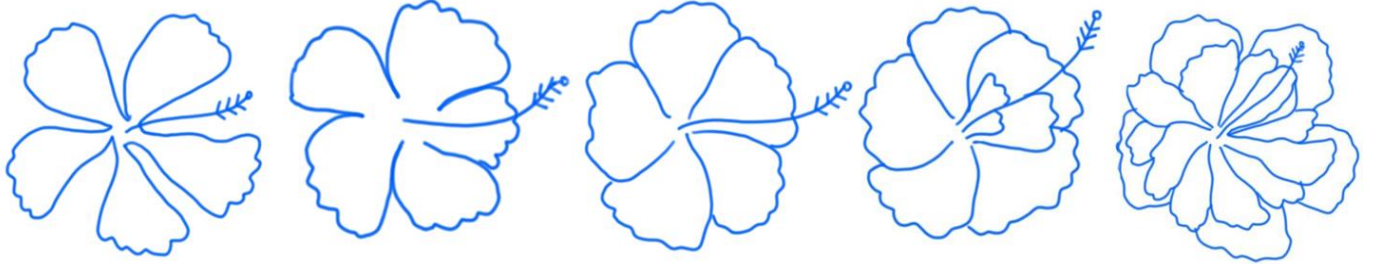


Double colour (2)



Multiple colour(3)

Characteristic-33: Flower: Overlapping of petals



Very weak (1)

Weak (3)

Medium (5)

Strong (7)

Very strong (9)



Very weak (1)

Weak (3)

Medium (5)

Strong (7)

Very strong (9)

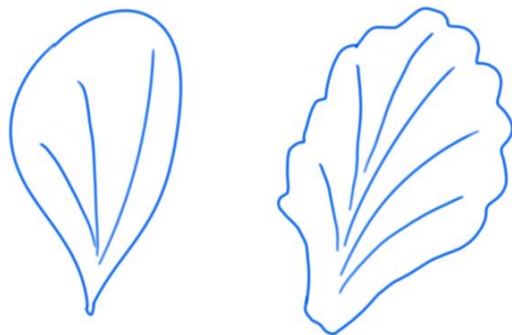
Characteristic-34: Petals: Main colours on lower side and upper side



Same (1)

Different (9)

Characteristic-35: Petal waviness



Absent (1)

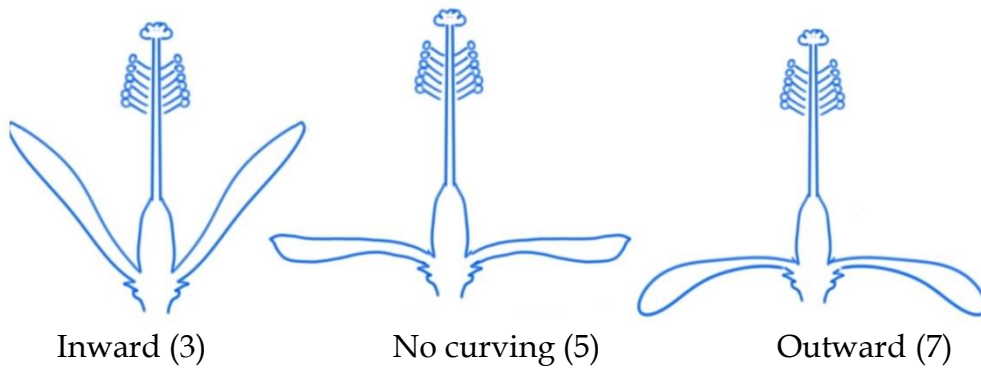
Present (9)



Absent (1)

Present (9)

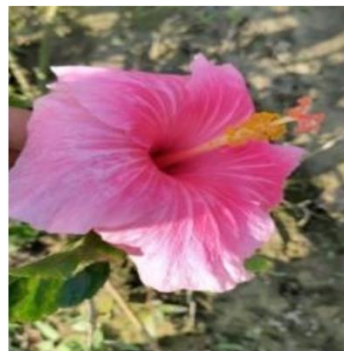
Characteristic-36: Petal curving



Inward (3)

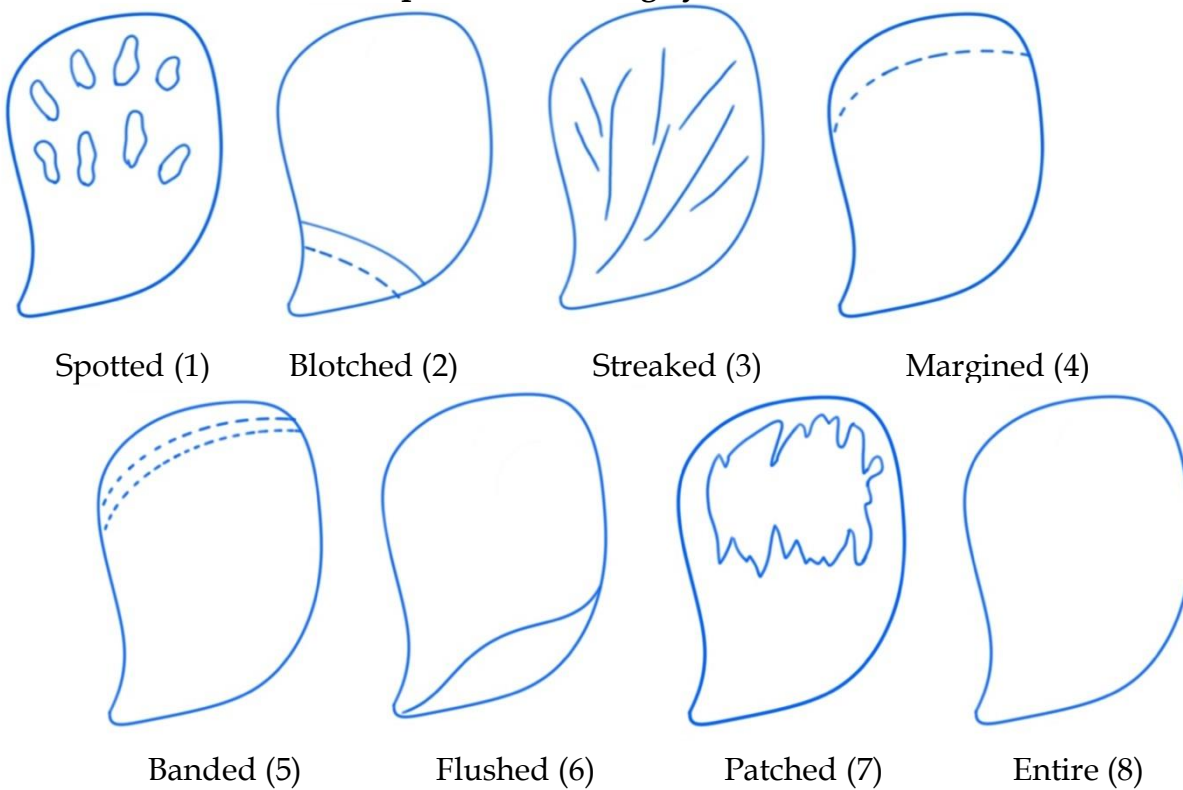


No curving (5)



Outward (7)

Characteristic-37: Petal colour pattern excluding eye zone





Spotted (1)



Blotched (2)



Streaked (3)



Margined (4)



Banded (5)



Flushed (6)

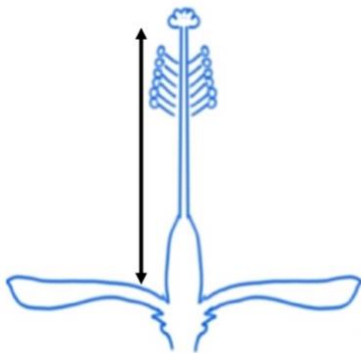


Patched (7)



Entire(8)

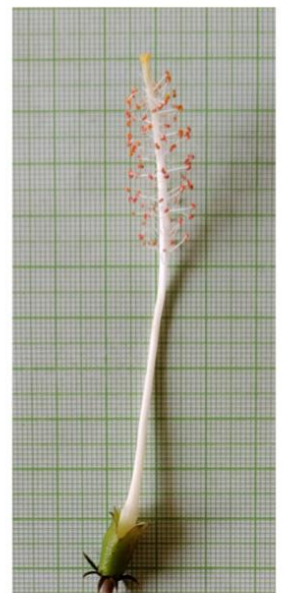
Characteristic-38: Length of staminal column



Short (3)



Medium (5)



Long (7)

Characteristic-39: Staminal column main colour at apex



White (1)

Cream (2)

Peach (3)

Pink (4)

Violet (5)



Yellow (6)

Orange (7)

Red (8)

Purple (9)

Brown (10)

Characteristic-40: Staminal column colour at base



White (1)

Cream (2)

Peach (3)

Pink (4)

Violet (5)



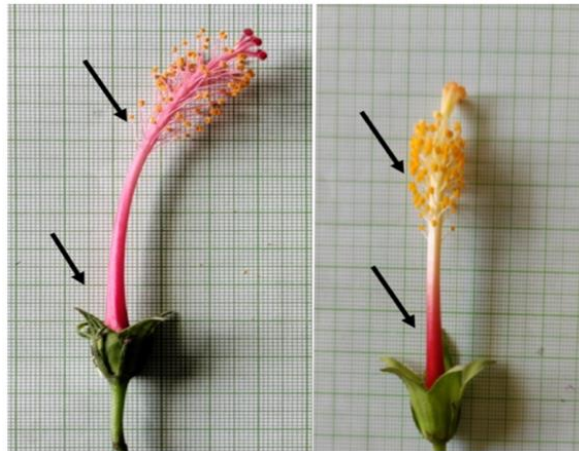
Yellow (6)

Orange (7)

Red (8)

Brown (9)

Characteristic-41: Staminal column colour at apex and base



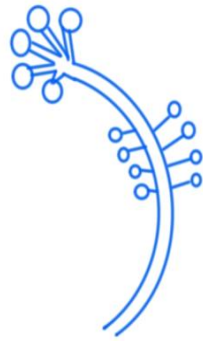
Same (1)

Different (9)

Characteristic-42: Shape of staminal column



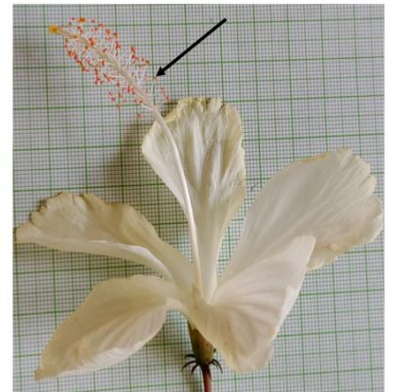
Straight (1)



Curved (9)



Straight (1)



Curved (9)

Characteristic-43: Anther filament



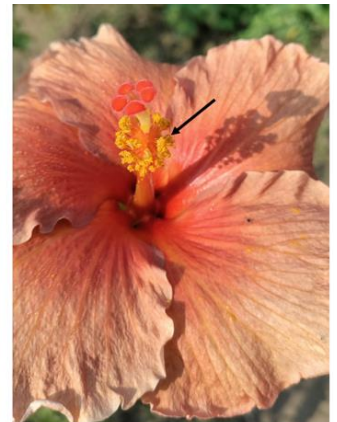
Absent (1)



Present (9)



Absent (1)



Present (9)

Characteristic-44: Anther filament colour



White (1)



Cream (2)



Peach (3)



Violet (4)



Yellow (5)



Orange (6)



Pink (7)



Purple (8)



Red (9)

Characteristic-45: Anther colour



Cream (1)

Yellow (2)

Orange (3)

Brown (4)

Characteristic-46: Stigma pad colour



Cream (1)

Yellow (2)

Pink (3)



Orange (4)



Red (5)

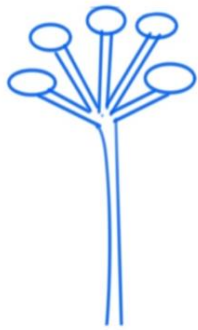


Brown (6)

Characteristic-47: Nature of stigma



Fused (1)



Free (9)

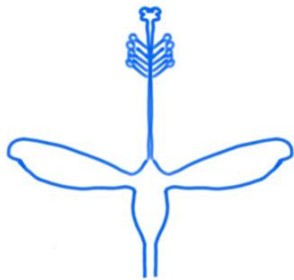


Fused (1)



Free (9)

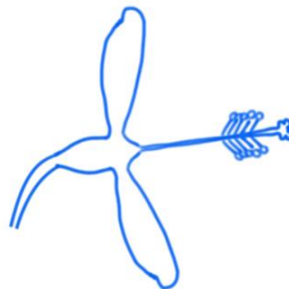
Characteristic-48: Face of the flower



Upright (1)



Semi-upright (2)



Horizontal (3)



Downward (4)



Upright (1)



Semi-upright (2)



Horizontal (3)



Downward (4)

9. Working Group Details

These test guidelines were designed by the (1) Dr. Raghunath Sadhukhan, Professor in Genetics and Plant Breeding, Bidhan Chandra Krishi Viswavidyalaya, Principal Investigator of the project;; (2) Dr. Tapas Kumar Chowdhuri, Associate Professor in Floriculture and Landscaping, AICRP on Floriculture, Bidhan Chandra Krishi Viswavidyalaya and Co-Principal Investigator; (3) Dr. Saikat Gantait, Assistant Professor in Genetics and Plant Breeding (4) Miss Tsama Subrahmanyeswari, Research Fellow; (5) Sri Gourishankar Tripathy, Research Scholar and (6) Sri Saptarshi Mandal, Research Fellow. The technical inputs and suggestions provided by Sri Deep Chakraborty, AJC Bose Indian Botanical Garden and the following task force members constituted by the PPV&FR Authority for the finalization and development of the following DUS guidelines are duly acknowledged.

Members of task force

Chairman: Dr. T. Janakiram, Vice-Chancellor, Dr. Y S R Horticultural University, Venkataramannagudem, West Godavari District-534101, Andhra Pradesh, Email: Tolety07@gmail.com, vc@drysru.edu.in

Member: Dr. S. S. Sindhu, Principal Scientist @ Ex-HOD, Division of Floriculture and Landscaping, IARI, Pusa, New Delhi-12, Email: sssindhuiari@gmail.com

Member: Dr. P. Naveen Kumar, Principal Scientist, Directorate of Floricultural Research, Near Z corner, Manjari Road, Mundhwa, Pune-411036, Email: naveeniari@gmail.com

Member: Dr. Rup Kumar Roy, Ex Principal Scientist and Head, Floriculture and Landscaping Division, National Botanical Research Institute, Lucknow, Email: roynbri@rediffmail.com

Member: Dr. Tapas Kumar Chowdhuri, Associate Professor (FLS), Bidhan Chandra KrishiViswavidyalaya, Mohanpur, Nadia, West Bengal-741252, Email: tkc.hort@gmail.com; chowdhuri.tapas@bckv.edu.in

Member Secretary: Sri R. S. Sengar, Deputy Registrar, PPV&FR, New Delhi, Email: dr-ppvfra@nic.in

10. DUS Testing Centre-

Nodal DUS Centre	Co- nodal DUS test Centre
Bidhan Chandra KrishiViswavidyalaya, Mohanpur, 741252, Nadia, West Bengal	ICAR- Indian Institute of Horticultural Research (IIHR), Hessarghatta-56089, Bengaluru, Karnataka.