# GUIDELINES
# FOR THE CONDUCT OF TEST FOR DISTINCTIVENESS, UNIFORMITY AND STABILITY

**ON**

# CARNATION

**(*Dianthus caryophyllus* L.)**

**PROTECTION OF PLANT VARIETIES AND FARMERS' RIGHTS AUTHORITY**

**GOVERNMENT OF INDIA**

**NEW DELHI-110012**

# CONTENTS

# Carnation (*Dianthus caryophyllus* L.)

## I. Subject

These test guidelines shall apply to all varieties of *Dianthus caryophyllus* L.

## II. Seed Material Required

1. The Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA) shall decide when, where and in what quantity and quality of the plant material required for testing the variety is to be delivered. Applicants submitting plant material from a country other than India must make sure that all customs and formalities are complied with.
2. The planting material is to be supplied in the form of rooted cuttings.
3. The minimum quantity of planting material, to be supplied by the applicant, should be 150 rooted cuttings.
4. The planting material supplied should be visibly healthy, not lacking in vigour or affected by any important pest or disease.
5. The plant material must not have undergone any treatment 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

1. The minimum duration of test should normally be a single growing cycle.
2. The test should normally be conducted at two different locations. If any essential characteristic of the variety cannot be observed at these places, the variety may be tested at an additional place.
3. 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.
4. In particular, it may be necessary for separate growing trials to be established for cut flower types, garden types and pot types in order to ensure the satisfactory growth of varieties of those types.
5. Each test shall include 75 plants per test centre which should be divided among 3 replications. Separate plots for observations and for measuring can only be used if they have been subjected to similar environmental conditions.
6. Test plot design

| | | |
|---|---|---|
| Number of rows | : | 5 |
| Bed width | : | 100 cm |
| Row to row distance | : | 20 cm |
| Plant to plant distance | : | 20 cm |
| Number of replications | : | 3 |

7. Observations should not be recorded on plants in border rows.
8. If needed, 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 (Section VII) should be used for the testing of varieties for DUS.
2. Because daylight varies, colour determinations made using a colour chart should be made in the middle of the day in a room without direct sunlight. These determinations should be made with the plant part placed against a contrasting background.
3. For the assessment of Distinctiveness and Stability, observations should be made on 30 plants or parts of plants selected randomly, which should be divided among 3 replications (10 plants in each replication)**.**
4. For the assessment of Uniformity of characteristics in the plot as a whole (visual assessment by a single observation of a group of plants or parts of plants), a population standard of 1% with an acceptance probability of at least 95% should be applied.

## V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of Distinctiveness. Characteristics which are suitable for grouping purposes are those, which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.
2. The following shall be used as grouping characteristics:

   a. Plant: cultural type (Characteristic 1)
      Type 1: one flower per stem (Standard)
      Type 2: more than one flower per stem (Spray)
      Type 3: pot carnation

   In varieties bred to be grown as spray carnation, the lateral flower heads or lateral shoots are not removed. In varieties bred to be grown as one flower per stem carnation, the lateral flower heads or lateral shoots (if existing) are removed at an early stage to leave just the terminal flower head. Varieties bred to be grown as pot carnation do not need a cold treatment (period) to induce optimal flowering.

   b. Flower: type (Characteristic 37)
   c. Petal: main colour (Characteristic 48)
   d. Petal: secondary colour (Characteristic 49)

## VI. Characteristics and Symbols

1. To assess Distinctiveness, Uniformity and Stability, the characteristics and their states as given in the Table of Characteristics should be used.
2. Notes (1-9) should be used for the purpose of recording and electronic processing of data. Each state of expression is allotted a corresponding numerical note (1-9) for the different characteristics.

3. Legend

**(*)** Characteristics that should be used in every growing season on all varieties and shall always be included in the description of the variety, except when the states of expression of any of these characters is rendered impossible by a preceding characteristic or by the environmental conditions of the testing region. Under such exceptional situation, adequate explanation shall be provided.

**(a) to (g), (+)** See the Explanation on the Table of Characteristics in Section VIII.

4. **QL:** Qualitative characteristic
   **QN:** Quantitative characteristic
   **PQ:** Pseudo-qualitative characteristic

5. Type of assessment of characteristics indicated in Section VII 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. |

## VII. Table of Characteristics

| S. No. | Characteristics | States of expression | Notes | Example Varieties | Stage of observation | Type of Assessment |
|---|---|---|---|---|---|---|
| 1. (a) QL (*) | **Stem: flowering laterals** | absent | 1 | All standard varieties | At full flowering stage | VS |
| | | present | 9 | Cs-1, H-13, Ooty Spray | | |
| 2. (a) QL (*) (+) | **Stem: number of internodes between epicalyx and lowest node with laterals with flower buds or flowers** | one | 1 | ------ | At full flowering stage | VS |
| | | two | 2 | ------ | | |
| | | three | 3 | ------ | | |
| | | four | 4 | ------ | | |
| | | more than five | 5 | All standard varieties | | |
| 3. (a) QN | **Plant: second order laterals, flower buds or flowers** | absent | 3 | ------ | At full flowering stage | VG |
| | | few | 5 | ------ | | |
| | | many | 7 | Cs-1, H-13, Ooty Spray | | |
| 4. | **Stem:** | horizontal | 3 | Cs-1, H-13, Ooty Spray | At full | VG |

| | | | | | | |
|---|---|---|---|---|---|---|
| PQ (a) (+) | **arrangement of totality of flowers** | domed | 5 | All standard varieties | flowering stage | |
| | | cylindrical | 7 | ------ | | |
| 5. QL (a) (+) | **Plant: arrangement of individual flowers, top flower excluded** | single | 1 | All standard varieties | At full flowering stage | VG |
| | | clustered | 2 | Cs-1, H-13, Ooty Spray | | |
| | | both | 3 | ------ | | |
| 6. (b) (*) QN | **Main stem: length of internode (cm)** | short (upto 5) | 3 | Cs-1, H-13, Ooty Spray | At full flowering stage | MS |
| | | medium (5-10) | 5 | | | |
| | | long (> 10) | 7 | Kleos, Marathon | | |
| 7. (c) PQ | **Stem: thickness of internode (mm)** | thin (less than 4) | 3 | Turbo Red, Pink Dover, White Dover | At full flowering stage | MS |
| | | medium (4-8) | 5 | Gaudina, Raggio-di-Sole, White Baltico, Bizet | | |
| | | thick (more than 8) | 7 | Dustin | | |
| 8. (b) QL (*) | **Stem: cross section** | circular | 1 | Cinderella, Madame Colette | At full flowering stage | VG |
| | | edged | 2 | Aicardi | | |
| 9. QL | **Stem: hollowness** | absent | 1 | All standard and spray varieties | At full flowering stage | VG |
| | | present | 9 | -------- | | |
| 10. (d) (*) PQ (+) | **Leaf: shape of apex** | ovate | 1 | Bright Rendezvous, Farmer Yellow, Pink Dover, | At full flowering stage | VS |
| | | linear | 2 | Gaudina, White Wedding, Navidad | | |
| | | elliptic | 3 | Kleos, White Baltico, UnknownRed, Madame Colette, Kiro, Bizet | | |
| | | obovate | 4 | Flamina Violet, White Dover, Diama, 12-604, Tempo Pink | | |
| 11. (d) (*) QN | **Leaf: length (cm)** | short (< 5) | 3 | ------ | At full flowering stage | MS |
| | | medium (5-10) | 5 | Don Pedro | | |
| | | long (> 10 ) | 7 | Rendezvous, Pink Dover, Bizet | | |
| 12. (d) | **Leaf: width (mm)** | narrow (< 5) | 3 | White Wedding, Madame Colette, | At full | MS |
| | | medium(5-10) | 5 | Madras, Don Pedro, Kiro, Bizet | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| (*) QN | | broad (> 10 ) | 7 | Klaus | flowering stage | |
| 13. (d) (*) PQ (+) | **Leaf: longitudinal axis** | straight | 1 | Cinderella, Turbo Red, Liberty | At full flowering stage | VS |
| | | weakly recurved | 2 | Navidad, White Dover, Tempo Pink, Pink Dover, Felix | | |
| | | moderately recurved | 3 | Castellaro-2000, Bizet | | |
| | | strongly recurved | 4 | Glampi | | |
| | | rolled | 5 | ------- | | |
| 14. (d) PQ (+) | **Leaf: cross section (upper side)** | straight | 1 | ------- | At full flowering stage | VG |
| | | weakly concave | 2 | Rendezvous, Kleos, Cool | | |
| | | moderately concave | 3 | Cinderella, Liberty, Dark Rendezvous, | | |
| | | strongly concave | 4 | Marathon, Raggio-di-Sole | | |
| 15. (d) QN | **Leaf: waxy layer** | absent | 1 | ------- | At full flowering stage | VG |
| | | present | 9 | Raggio-di-Sole, Aicardi | | |
| 16. (*) PQ (+) | **Bud: shape** | globose | 1 | Raggio-di-Sole, Domas | Just after colour showing stage | VG |
| | | cylindrical | 2 | Marathon, Master, White Baltico, Unknown White | | |
| | | ovoid | 3 | ------- | | |
| | | ellipsoid | 4 | Turbo Red, Hermes, Navidad | | |
| | | obovoid | 5 | Madras, Don Pedro | | |
| 17. (e) (*) QL (+) | **Bud: extrusion of styles** | absent | 1 | Snow Storm, Don Pedro, Diana Yellow, Nordika | Just after colour showing stage | VG |
| | | present | 9 | Yanez | | |
| 18. (*) QN (+) | **Flower: height of corolla (cm)** | low (upto 2) | 3 | ------ | At full flowering stage | MS |
| | | medium (>2 – 4) | 5 | Kleos, Madras, Marathon | | |
| | | tall (> 4) | 7 | Pink Dover, Madame Colette | | |
| 19. (*) PQ (+) | **Flower: profile of upper part of corolla** | concave | 1 | Madras, Purias | At full flowering | VS |
| | | flat | 2 | Marathon, Don Pedro, Bizet | | |
| | | flat convex | 3 | Rendezvous, Madame Colette, Tempo Pink , Farmer Yellow, Kiro | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | convex | 4 | Turbo Red, Dark Rendezvous, Dustin | stage | |
| 20. (*) PQ (+) | **Flower: profile of lower part of corolla** | concave | 1 | Rendezvous, White Baltico, Castellor-2000, Kiro, Bizet | At full flowering stage | VS |
| | | flat | 2 | Marathon, Flamina Violet, Navidad | | |
| | | flat convex | 3 | Dark Rendezvous, Don Pedro, Madame Colette | | |
| | | convex | 4 | ------ | | |
| 21. QL | **Epicalyx: position of outer bractiole in relation to calyx** | adpressed | 1 | ------ | At full flowering stage | VG |
| | | free | 2 | All standard varieties | | |
| 22. (*) PQ (+) | **Epicalyx: apex of outer lobes** | acute | 1 | ------ | At full flowering stage | VG |
| | | acute to acuminate | 2 | All standard varieties | | |
| | | acuminate | 3 | ------ | | |
| 23. QN (+) | **Epicalyx: length of apex of outer lobes (mm)** | short ( < 2 ) | 3 | ------ | At full flowering stage | MS |
| | | medium (2-4 ) | 5 | Raggio-di-Sole, Baltico, White Baltico, Navidad | | |
| | | long (> 4 ) | 7 | Master, Pink Dover, Felix, Luna | | |
| 24. (*) PQ (+) | **Epicalyx: apex of inner lobes (mm)** | acute | 1 | All standard varieties | At full flowering stage | VG |
| | | acute to acuminate | 2 | ------ | | |
| | | acuminate | 3 | ------ | | |
| 25. QN (+) | **Epicalyx: length of apex of inner lobes (mm)** | short ( < 2 ) | 3 | Cool | At full flowering stage | MS |
| | | medium (2-4 ) | 5 | Raggio-di-Sole, Baltico, Madame Colette | | |
| | | long (> 4) | 7 | Aicardi, Don Pedro, Kiro, Bizet | | |
| 26. QN (+) | **Calyx: length (cm)** | short (<2) | 3 | Cs-1 | At full flowering stage | MS |
| | | medium (2-4 ) | 5 | All Standard varieties | | |
| | | long (> 4 ) | 7 | ------- | | |
| 27. (*) PQ (+) | **Calyx: shape** | funnel-shaped | 1 | ------- | At full flowering stage | VG |
| | | cylindrical | 2 | White Baltico, Madame Colette, Farmer Yellow | | |
| | | campanulate | 3 | Happy Golem, Navidad | | |
| 28. PQ (+) | **Calyx: longitudinal axis of lobes (tip excluded** | straight | 3 | Marathon, Wizard | At full flowering stage | VG |
| | | concave | 5 | Master | | |
| | | angled | 7 | ------- | | |
| | | convex | 9 | Happy Golem, Dark Rendezvous, Navidad | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 29. (*) QL (+) | **Calyx: anthocyanin colouration of lobes** | absent | 1 | Raggio-di-Sole, White Baltico, Navidad, White Dover, Kiro | At full flowering stage | VS |
| | | present | 9 | Don Pedro | | |
| 30. (*) PQ (+) | **Calyx: position of anthocyanin colouration** | edge of lobe | 1 | Turbo Red, Don Pedro | At full flowering stage | VS |
| | | whole lobe | 2 | Gaudina, Flamina Violet, Bizet | | |
| | | whole calyx | 3 | ------- | | |
| 31. PQ | **Calyx: hue of anthocyanin colouration** RHS colour chart (indicate reference number) | reddish | 1 | Don Pedro, Gaudina | At full flowering stage | VS |
| | | purplish | 2 | Marathon, Happy Golem | | |
| | | blackish | 3 | ------- | | |
| 32. PQ (+) | **Calyx: shape of lobe** | long acute | 1 | Dark Rendezvous, Navidad | At full flowering stage | VG |
| | | short acute | 2 | Raggio-di-Sole, Gaudina, Don Pedro | | |
| | | short acuminate | 3 | Domingo | | |
| 33. QN (+) | **Calyx: length of lobe (cm)** | short (up to 1) | 3 | Baltico, Raggio-di-Sole, White Dover | At full flowering stage | MS |
| | | medium (1-2) | 5 | Cool, Madame Colette, Bizet, Kiro | | |
| | | long (>2) | 7 | ------- | | |
| 34. (*) QL | **Flower: type** | single | 1 | ------ | At full flowering stage | VG |
| | | double | 9 | All standard varieties | | |
| 35. (*) QN | **<u>Varieties with double flowers only</u>: Flower: number of petals** | few (up to 40) | 3 | Cs-1, Ooty Spray, H-13 | At full flowering stage | MS |
| | | medium (40-80) | 5 | Madras, Spike, Madame Colette | | |
| | | many (> 80) | 7 | Kiro, Star, Big Mama | | |
| 36. (f) QL (+) | **Petal: predominant shape** | type 1 | 1 | Raggio-di-Sole, Don Pedro | At full flowering stage | VG |
| | | type 2 | 2 | Flamina Violet, White Baltico, Bizet | | |
| | | type 3 | 3 | Madras, Bright Rendezvous, Navidad | | |
| | | type 4 | 4 | Rendezvous, Wizard, Tempo Pink | | |
| | | type 5 | 5 | ----- | | |
| | | type 6 | 6 | ----- | | |
| 37. (f) PQ (+) | **Petal: surface of blade** | flat | 3 | Liberty, White Baltico, Tempo Pink, Flamina Violet | At full flowering stage | VG |
| | | undulate | 5 | Madame Colette, Don Pedro, Kiro | | |
| | | folded | 7 | Kleos, White Dover | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 38. (f) QL | **Petal: incisions of margin** | absent | 1 | ------ | At full flowering stage | VG |
| | | present | 9 | All standard varieties | | |
| 39. (f) (*) PQ (+) | **Petal: type of incisions of margin** | sinuate | 1 | ---- | At full flowering stage | VG |
| | | crenate | 3 | Bright Rendezvous, Unknown Red-2 | | |
| | | dentate | 5 | Purias | | |
| | | serrate | 7 | Cool, Snow Storm, Madame Colette | | |
| | | crenate-dentate | 9 | Don Pedro, Castellaro-2000 | | |
| 40. (f) QN | **Petal: depth of incisions of margin (mm)** | shallow (up to 4) | 3 | Madras, Tempo Pink, Flamina Violet, Felix, Kiro | At full flowering stage | MS |
| | | medium (>4-8) | 5 | Gaudina, Don Pedro | | |
| | | deep (>8) | 7 | Pink Dover, White Baltico, Madame Colette | | |
| 41. (f) QN (+) | **Petal: length (cm)** | short ( upto 4) | 3 | Master, Don Pedro, Kiro | At full flowering stage | MS |
| | | medium (>4-8) | 5 | Baltico, Cool , Dustin | | |
| | | long ( > 8) | 7 | ----- | | |
| 42. (f) QN (+) | **Petal: width (cm)** | narrow ( up to 2) | 3 | Marathon | At full flowering stage | MS |
| | | medium (>2 – 4) | 5 | Tamarind, Baltico | | |
| | | broad ( > 4) | 7 | ----- | | |
| 43. (f) (*) PQ | **Petal: number of colours of blade (claw and macule excluded)** | one | 3 | Bizet, Don Pedro, Kiro, White Baltico | At full flowering stage | VG |
| | | two | 5 | Bright Rendezvous, Navidad, 940,Tempo Pink,12-668 | | |
| | | three | 7 | ----- | | |
| | | more than three | 9 | ----- | | |
| 44. (f) (*) PQ (+) | **<u>Varieties with more than one colour only:</u> Petal: colour pattern of blade (claw and macule excluded)** | picotee | 1 | Bright Rendezvous, Happy Golem, Tempo Pink | At full flowering stage | VG |
| | | edged | 2 | ----- | | |
| | | striated | 3 | ----- | | |
| | | speckled | 4 | Madame Colette, Raggio-di-Sole, Myrella | | |
| | | picotee-striated | 5 | ------ | | |
| | | picotee-speckled | 6 | Star | | |
| | | edged-striated | 7 | Rendezvous, Purias, | | |
| | | edged-speckled | 8 | ----- | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | picotee-striated-speckled | 9 | ----- | | | |
| | | edged-striated-speckled | 10 | ----- | | | |
| | | striated-speckled | 11 | ------ | | | |
| | | shading off | 12 | ------ | | | |
| | | flushed | 13 | ------ | | | |
| 45. (f) (g) (*) PQ | **Petal: main colour (macule and claw excluded)** | RHS Colour Chart (indicate reference number) | | **Variety** | **Main Colour** | At full flowering stage | VG |
| | | | | Rendezvous | Red Purple Group 72(B) | | |
| | | | | Madras | Yellow Group 13(D) | | |
| | | | | Happy Golem | White Group 115 (D) | | |
| | | | | Bright Rendezvous | Yellow Group 3 (D) | | |
| | | | | Tempo | Red Group 36 (D) | | |
| 46. (f) (g) PQ | **Petal: secondary colour (macule and claw excluded)** | RHS Colour Chart (indicate reference number) | | **Variety** | **Secondary Colour** | At full flowering stage | VG |
| | | | | Rendezvous | Purple Violet Group 82(D) | | |
| | | | | Madras | Red Purple Group 64(A) | | |
| | | | | Happy Golem | Red Purple Group 72 (D) | | |
| | | | | Bright Rendezvous | Red Group 48 (B) | | |
| | | | | Tempo | Purple Group 59 (B) | | |
| 47. (*) QL (+) | **Petal: macule** | absent | 1 | All standard varieties | | At full flowering stage | VG |
| | | present | 9 | ----- | | | |
| 48. PQ | **Petal: macule: main colour** | RHS Colour Chart (indicate reference number) | | ----- | | At full flowering stage | VG |
| 49. (*) PQ (+) | **Ovary: shape** | globose | 1 | ----- | | At full flowering stage | VG |
| | | ellipsoid | 2 | Rendezvous, Madras, Castellaro-2000 | | | |
| | | ovoid | 3 | Turbo Red, White Baltico, Flamina Violet, Bizet | | | |
| | | obovoid | 4 | Bright Rendezvous, Diama | | | |
| | | rhomboid | 5 | | | | |
| | | cylinder | 6 | ----- | | | |
| 50. PQ | **Ovary: main colour** | whitish | 1 | Marathon, Gaudina | | At full flowering | VG |
| | | yellowish | 2 | Baltico, Cool, Nordika | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **of lower part** | green | 3 | | stage | |
| 51. QL | **Ovary: surface** | smooth | 1 | Rendezvous, Dark Rendezvous, Flamina Violet, Felix | At full flowering stage | VG |
| | | ribbed | 2 | Madras, Happy Golem, White Baltico, Kiro | | |
| 52. QL | **Styles: number** | only two | 1 | Dark Rendezvous, Madras, Don Pedro | At full flowering stage | VS |
| | | two and three | 2 | ----- | | |
| | | only three | 3 | Turbo Red, Madame Colette | | |
| | | three and four | 4 | Kleos | | |
| | | only four | 5 | Master, Cinderella, White Baltico, Kiro | | |
| | | two, three, four and five | 6 | Snow Storm, Cool | | |
| | | more than five | 7 | ------ | | |
| 53. QN | **Style: length (cm)** | short ( upto 2) | 3 | Snow Storm, Castello-2000 | At full flowering stage | MS |
| | | medium (>2 – 4) | 5 | Madras, Don Pedro | | |
| | | long ( > 4) | 7 | Liberty | | |
| 54. QL (+) | **Style: shoulder** | absent | 1 | Rendezvous, Marathon, Hermes, Madame Colette, White Baltico | At full flowering stage | VG |
| | | present | 9 | Gaudina, Pink Dover, Dustin, Castellaro-2000, Star | | |
| 55. PQ (+) | **Stigma: colour** | white or cream | 1 | White Baltico, Madame Colette, Tempo Pink, Kiro | At full flowering stage | VG |
| | | yellow | 2 | Happy Golem, Master | | |
| | | pink | 3 | Attend | | |
| | | white with red flush | 4 | Master, Tamarind, Castellaro-2000 | | |
| | | white with purple flush | 5 | Turbo Red, Gaudina, Dustin | | |
| | | red | 6 | ----- | | |
| | | pale purple | 7 | Purias | | |
| | | purple | 8 | ----- | | |

## VIII. Explanations for individual characteristics

i. Explanation covering several characteristics

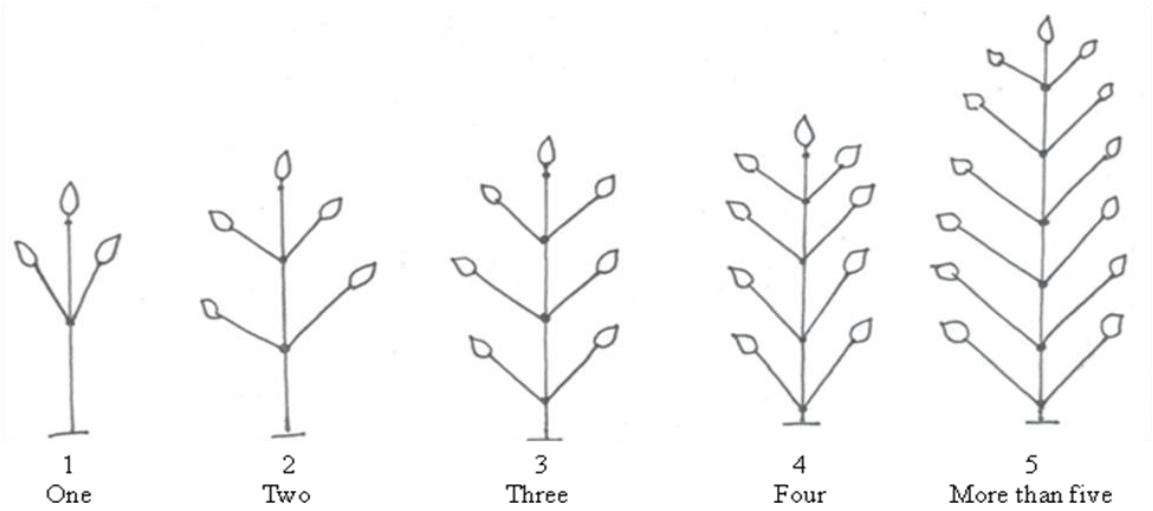
Unless otherwise indicated below, all characteristic should be recorded at the time of full flowering.

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

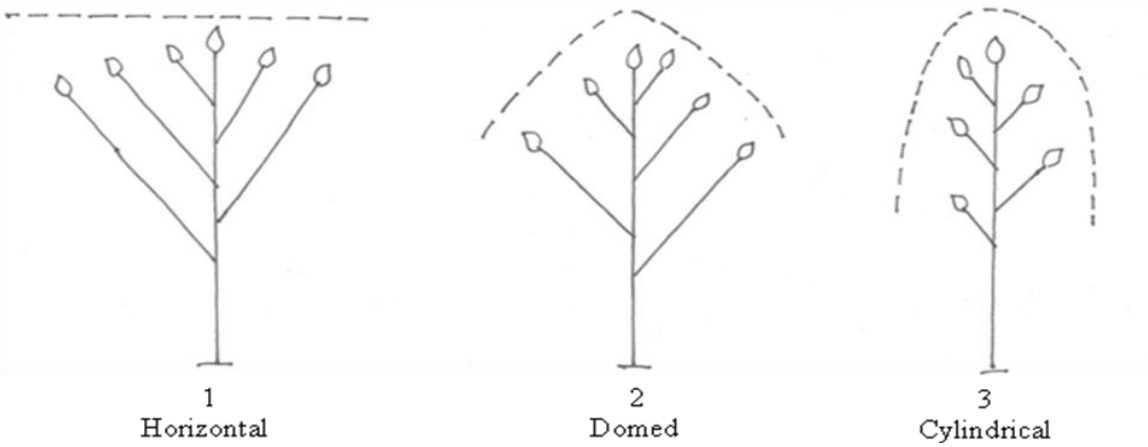
| | | |
|---|---|---|
| (a) | Stem | Only to be observed in varieties bred to be grown as spray carnations, without disbudding |
| (b) | Length of internode | The main stem can be found by following the most direct line from top-flower to base. In varieties bred to be grown as spray and as one flower per stem carnation the total length of seven internodes directly below flower should be observed. In varieties bred to be grown as pot carnation, the total length of five internodes directly below flower should be observed. This characteristic should only to be observed if at least seven internodes for spray and one flower per stem (pot carnation, five internodes) are present. |
| (c) | Thickness of internode | In varieties bred to be grown as spray and as one flower per stem carnation the thickness of fifth internode directly below flower should be observed. In varieties bred to be grown as pot carnation the thickness of third internode directly below flower should be observed. |
| (d) | Leaf | In varieties bred to be grown as spray and as one flower per stem carnation to be observed on the fifth node directly below flower. In varieties bred to be grown as pot carnation to be observed on the third node directly below flower. |
| (e) | Bud | To be observed immediately before colour shows. |
| (f) | Petal | To be observed on petals of the outer third row. |
| (g) | Petal colour | The main colour is the colour with the largest total surface area, the secondary colour (if present) is the colour with the second largest total surface area. In case of when none of the colours is clearly predominant then the lightest colour will be the main colour |
| (+) | Diagram/photographs shown | |

ii) Explanation for individual characteristic

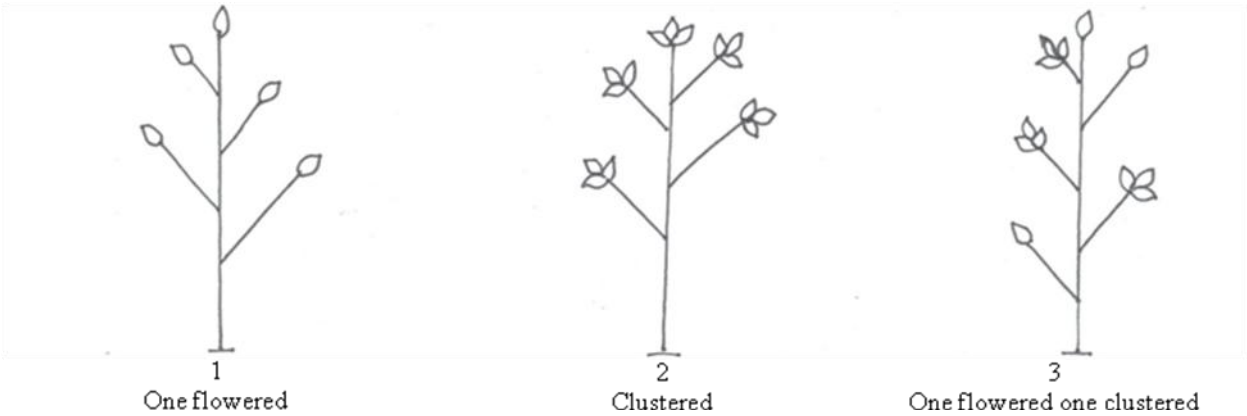
Characteristic 2. Stem: Number of internodes between epicalyx and lowest node with laterals with flower buds or flowers



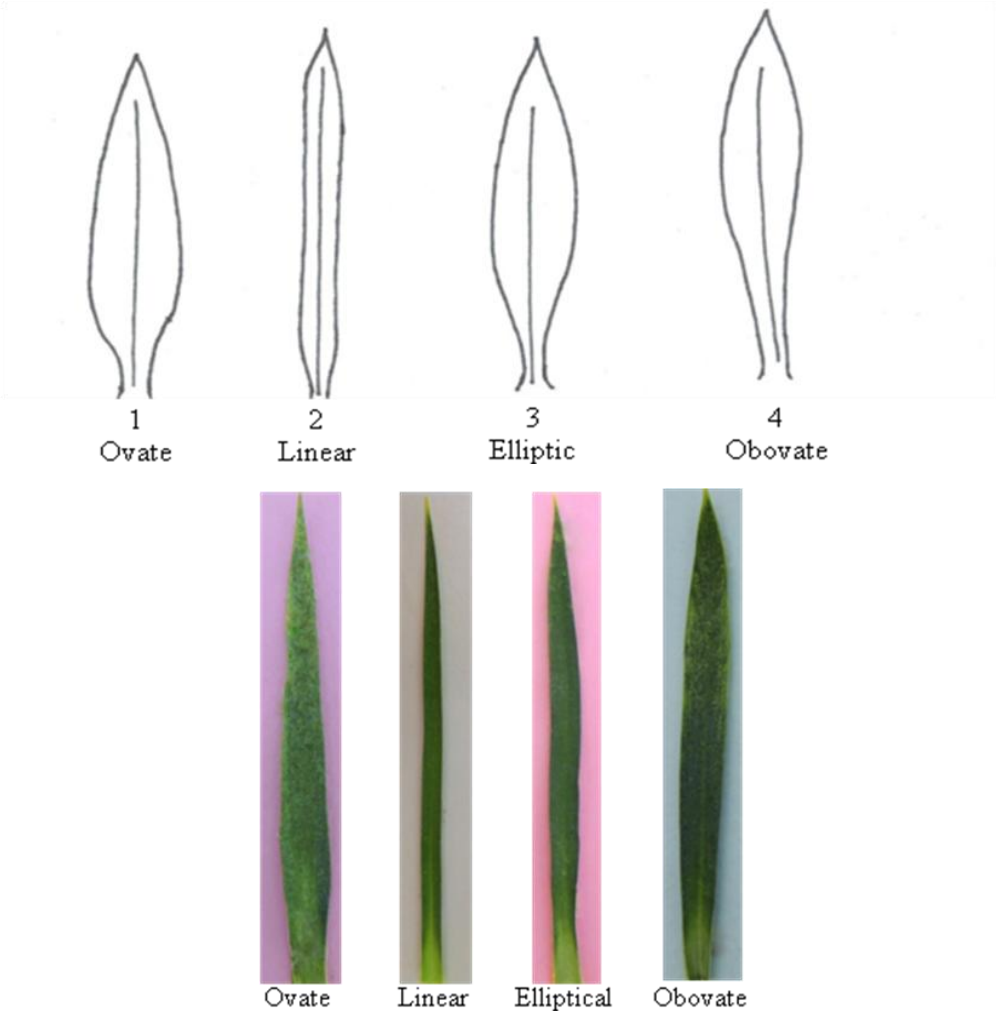

Characteristic 4. Stem: Arrangement of totality of flowers



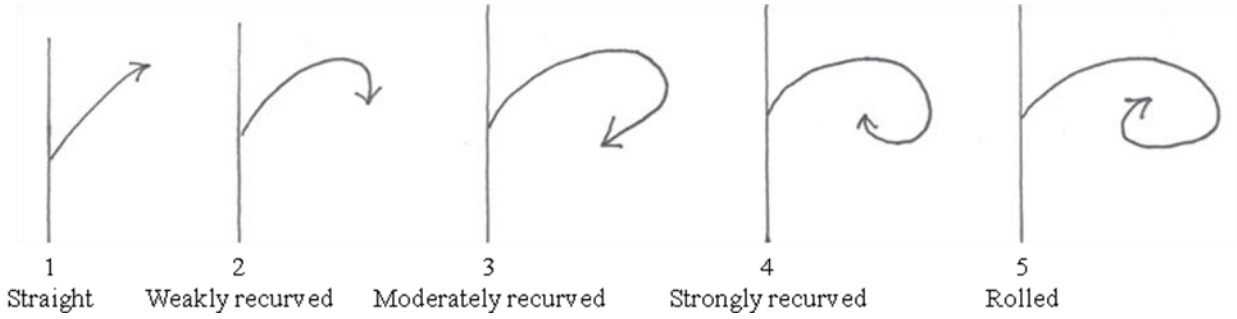

Characteristic 5. Plant: arrangement of individual flowers, top flower excluded



Characteristic 10. Leaf: shape

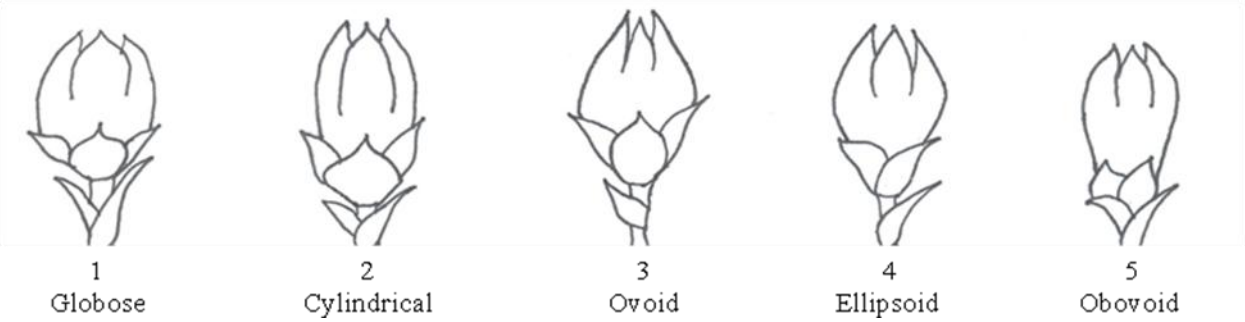



Characteristic 13: Leaf: Longitudinal axis



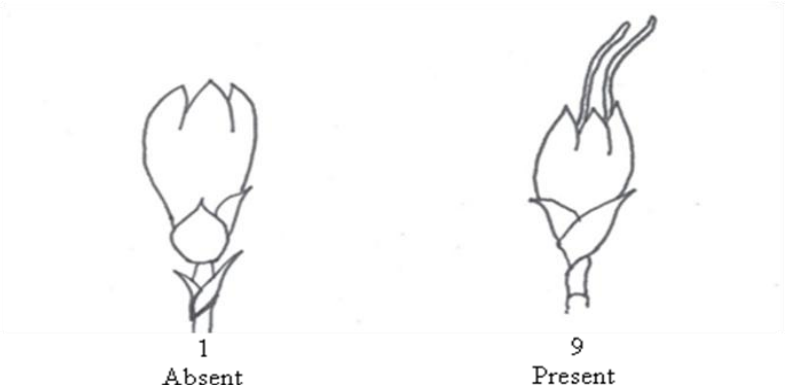
Characteristic 14. Leaf: Cross section (upper side)


Characteristic 16. Bud: Shape

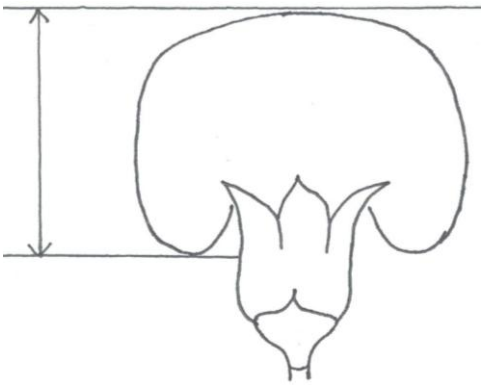


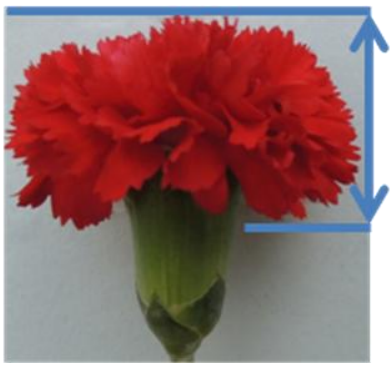


Characteristic 17. Bud: extrusion of styles

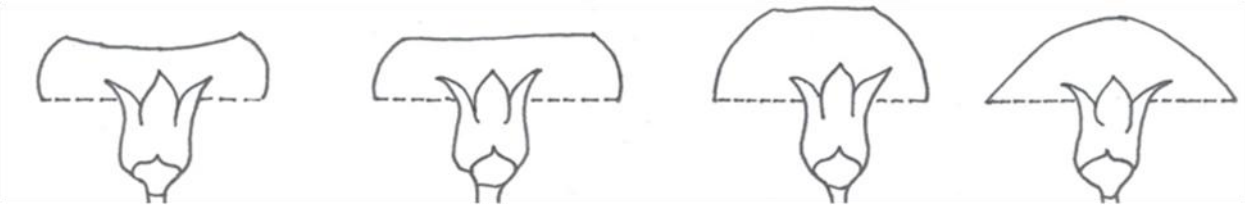


Characteristic 18: Flower: height of corolla



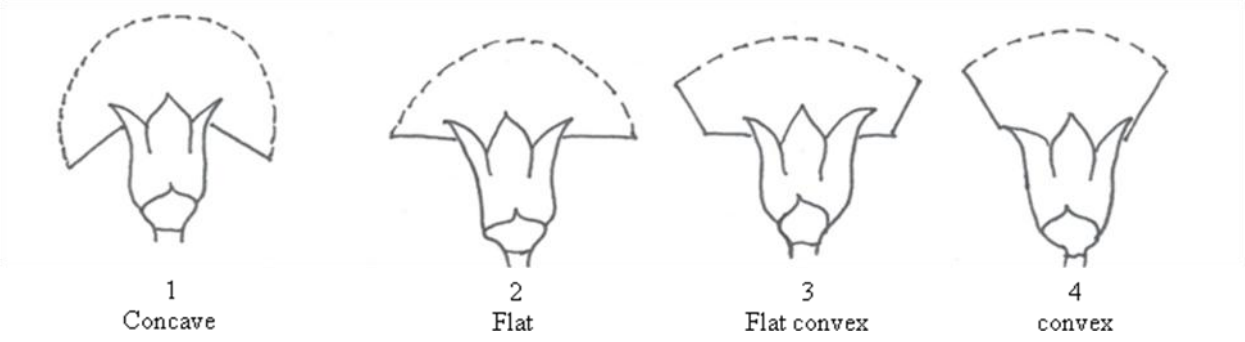


Characteristic 19. Flower: profile of upper part of corolla





Characteristic 20: Flower: profile of lower part of corolla



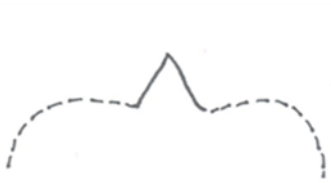
Concave

Flat

Flat convex

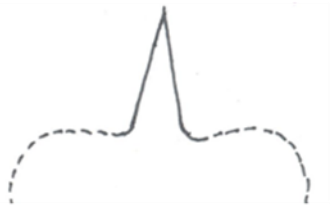
Convex

Characteristic 22+24. Epicalyx: apex of outer lobes/inner lobe



1
Acute

2
Acute to acuminate



3
Acuminate

Inner lobe: acute

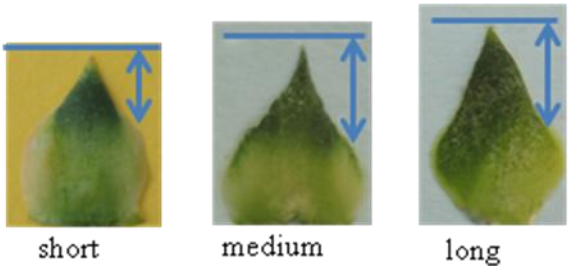
Outer lobe: acute to acuminate

Characteristic 23+25. Epicalyx: length of apex of outer/inner lobes

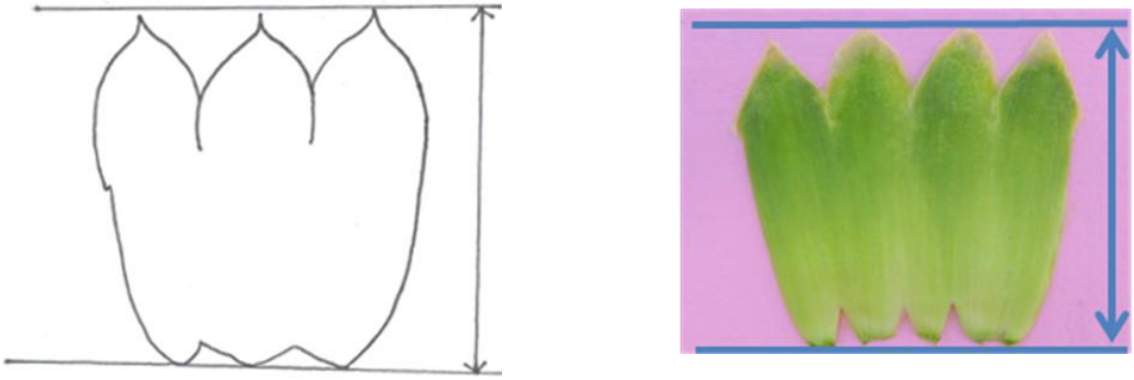
3
Short

5
Medium

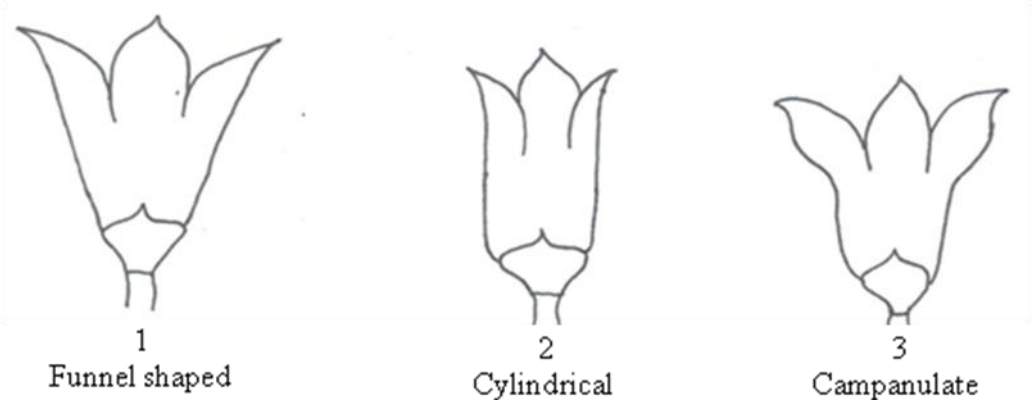
7
Long

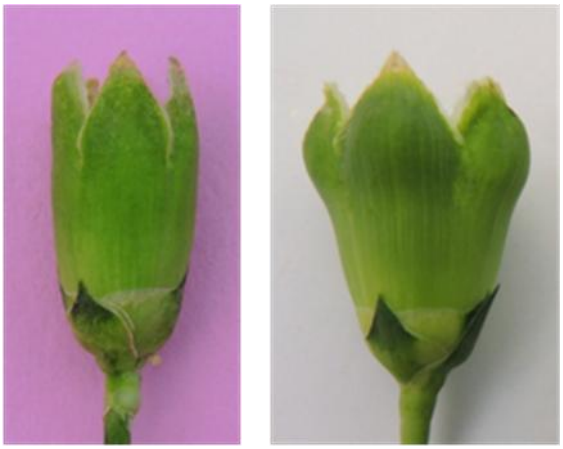



Characteristic 26. Calyx: length



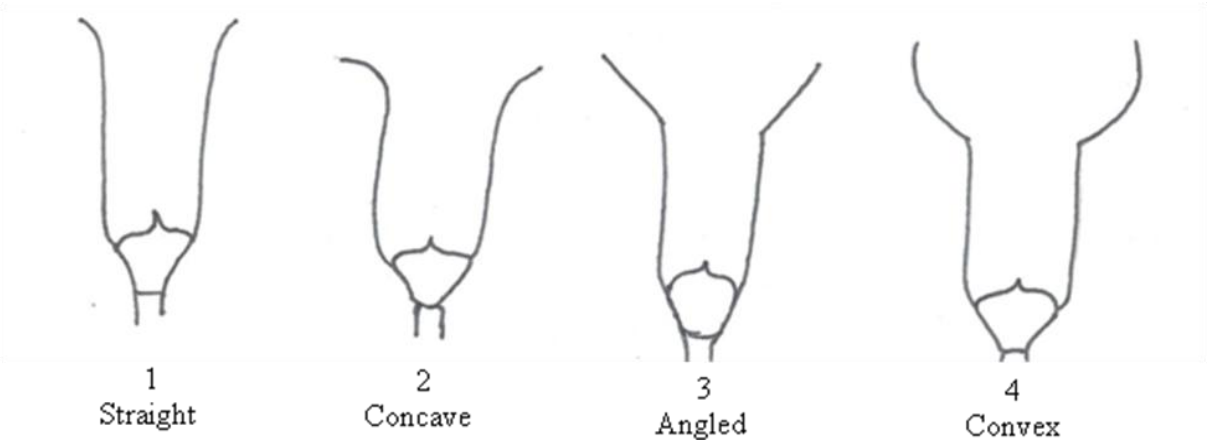
Characteristic 27. Calyx: shape

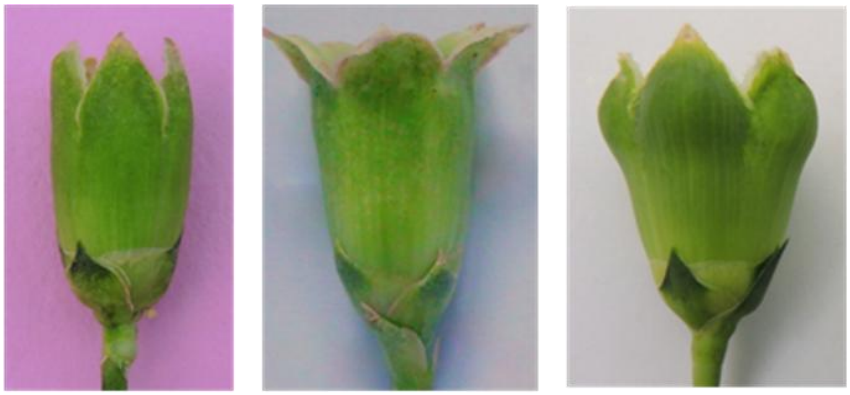




Cylindrical Campanulate

Characteristic 28. Calyx: longitudinal axis of lobes (tip excluded)

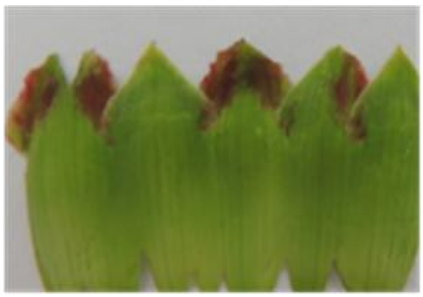


Straight Concave Convex

Caharacteristic 29. Calyx: anthocyanin colouration of lobes

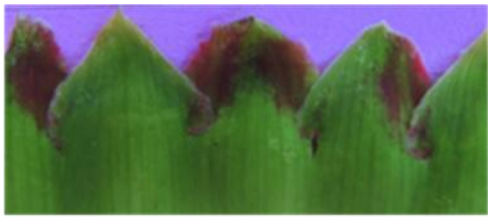
Absent



Present

Characteristic 30. Position of anthocyanin colouration

edge of lobes



whole lobes

Characteristic 32. Calyx: shape of lobe

1
Long acute

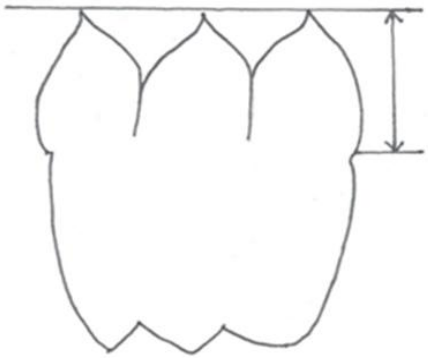
2
Short acute

3
Short acuminate

long acute

short acute

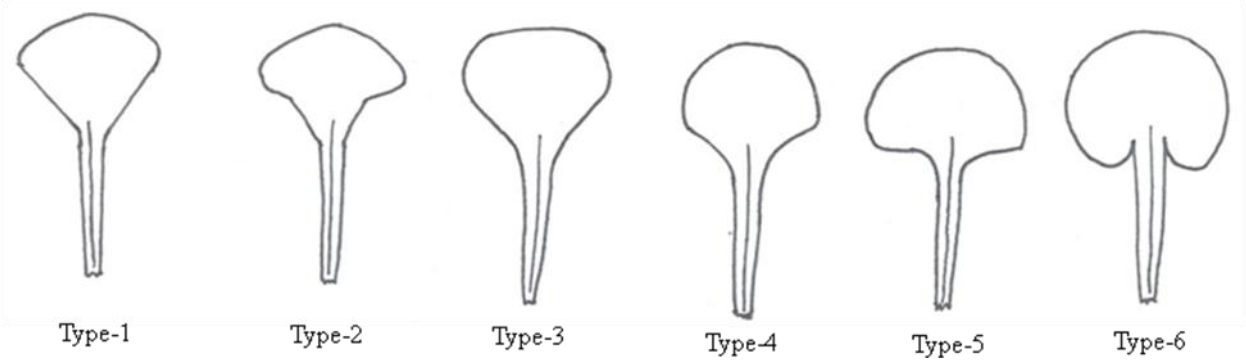
Characteristic 33: Calyx: length of lobe



Characteristic 34. Flower: type

When a flower has more than 5 petals, it can be classified as a double flower type.

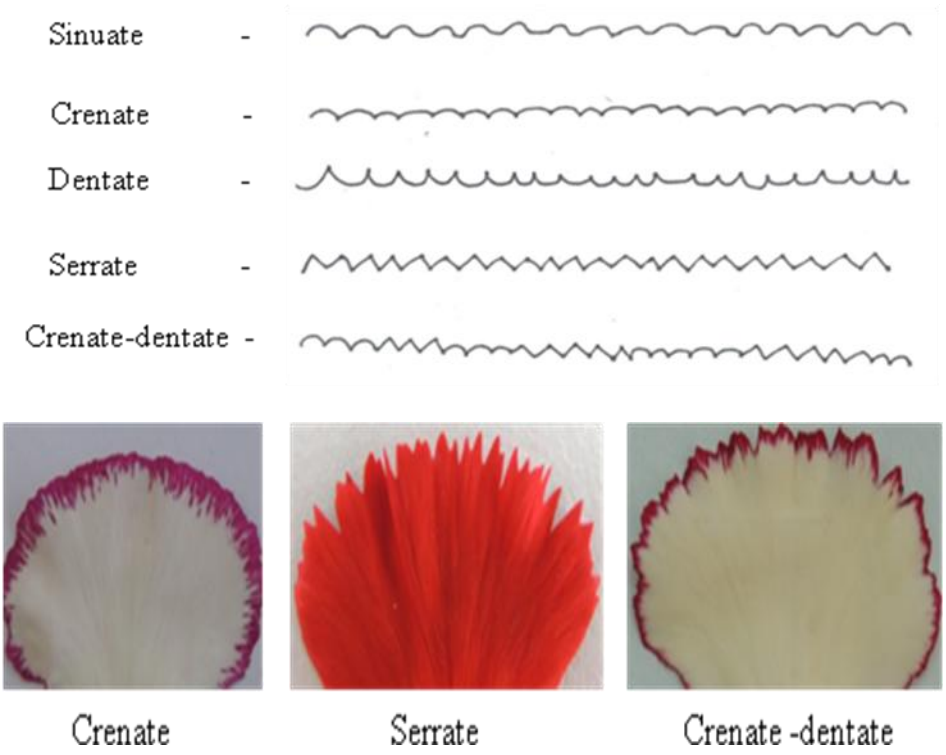
Characteristic 36. Petal: prominent shape



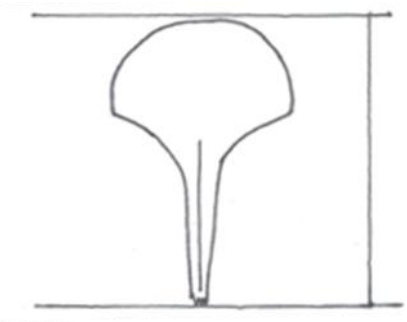

Type 1 Type 2 Type 3 Type 4

Characteristic 37. Petal: surface of blade

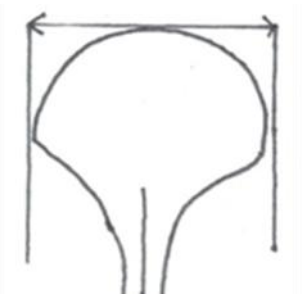

Characteristic 39. Petal: incisions of margins



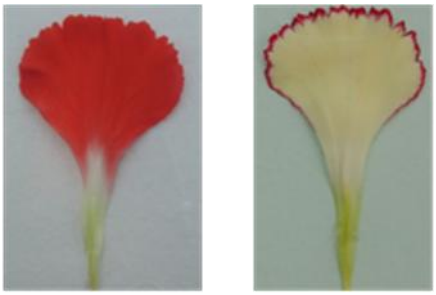

Characteristic 41. Petal: length



Characteristic 42. Petal: width



Characteristic 43. Petal: number of colors of blade (claw and macule excluded)




Characteristic 44. Varieties with more than one color only: Petal: color pattern of blade (claw and macule excluded)

Characteristic 45. Petal: main colour (macule and claw excluded)

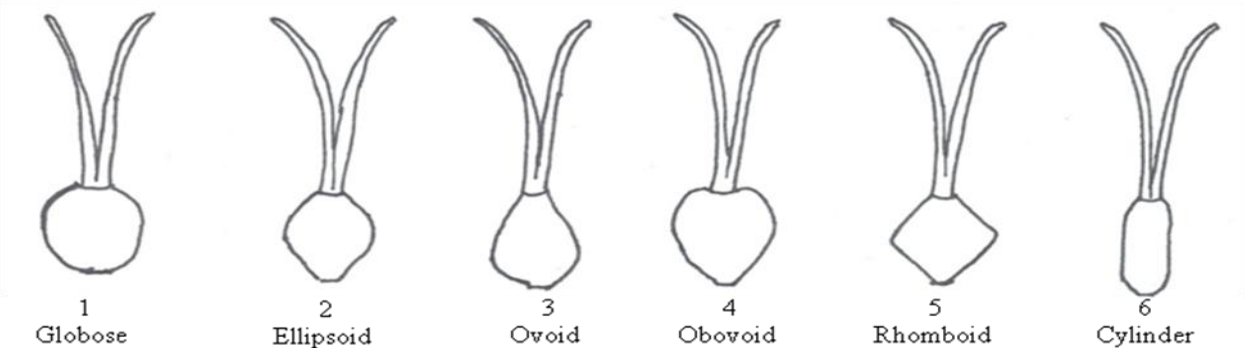
Characteristic 46. Petal: secondary colour (macule and claw excluded)

The main colour is the colour with the largest total surface area, the secondary colour (if present) is the colour with the second largest total surface area. In case of when none of the colours is clearly predominant then the lightest colour will be the main colour.

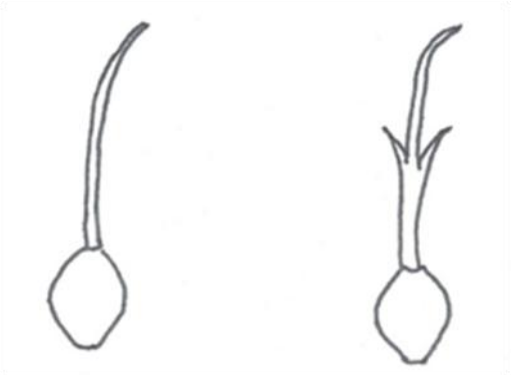
Characteristic 47. Petal: macule

Absent

Characteristic 49. Ovary: shape



Characteristic 54. Style : shoulder



1
Absent

2
Present

Absent

Present

Characteristic 55. Stigma: colour

White or cream

White with purple flesh

## IX. Working Group Details

The Test guidelines were developed by the Task Force (10/2011) constituted by the PPV&FR Authority, New Delhi in consultation with the Dr. Y.C.Gupta Chairman of the task Force. The technical inputs has also been provided by the officials of the PPV&FR Authority.

**The Members of the Task Force**

| | | |
|---|---|---|
| Dr. Y.C. Gupta<br><br>Head of Division, Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni-Solan, Himachal Pradesh | : | Chairman |
| Dr. M. V. Dhananjaya<br><br>Principal Scientist, Indian Institute of Horticulture Research, Hessarghata, Lake Post, Bangalore | : | Member |
| Dr. S. R. Dhiman<br><br>Professor, Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni-Solan, Himachal Pradesh | : | Member (Nodal Officer) |
| Dr. Ravi Prakash<br><br>Registrar, PPV&FRA, New Delhi | : | Member Secretary |

## X. DUS Testing Centres

| **Nodal Centre** | **Co-ordinating Centre** |
|---|---|
| Indian Institute of Horticulture Research (IIHR), Hessarghata Lake Post, Bangalore | Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni-Solan, Himachal Pradesh |