# Guidelines
# for the Conduct of Test for
# Distinctiveness, Uniformity and Stability
# On
# Pointed Gourd
# (*Trichosanthes dioica* Roxb.)

**Protection of Plant Varieties and Farmers' Rights Authority**

**(PPV & FRA)**

**Government of India**

# Contents

# Pointed Gourd (*Trichosanthes dioica* Roxb.)

## I. Subject

These test guidelines apply to all cultivars/ varieties/ hybrids and parental clones of pointed gourd (*Trichosanthes dioica* Roxb.; 2n=22)

## II. Planting material required

1. The Protection of Plant Varieties and Farmers' Rights Authority shall decide when, where and in what quantity and quality of planting material is required for testing a variety denomination applied for registration under the Protection of Plant Varieties and Farmers' Rights (PPV & FR) Act, 2001. Applicants submitting planting materials from a country other than India shall make sure that all customs and quarantine requirements stipulated under relevant national legislations and regulations are complied with. The minimum quantity of planting material of cultivars/varieties/hybrids and parental clones to be supplied by the applicant should be 50 (fifty) tuberous root/ rooted vine cuttings (having minimum 3 nodes) in polybag in case of candidate varieties/hybrids under new category and 25 (twenty five) tuberous root/ rooted vine cuttings in polybag for extant varieties. Being a perennial crop the same plant of the 1st year shall be evaluated in case of new varieties. The planting materials (tuberous root cuttings, 8-10 cm long and of pencil thickness or /rooted vine cuttings in polybag) should meet the physical purity and genetic purity as prescribed for seed certification in India. Especially for *In situ* storage, which requires a higher standard, the applicant should state the actual sprouting percentage, which should be as high as possible.
2. The planting materials should be visibly healthy, not lacking in vigour or affected by any pest/diseases.
3. The planting materials must not have undergone any treatment unless the Competent Authority allow or request such treatment. If it has been treated, full details of the treatment must be given.

## III. Conduct of tests

1. The minimum duration of tests shall normally be two independent but similar growing seasons (transplanting during September and October) with reference to the

ecosystem/adaptation of the variety submitted for DUS testing under new category and one season for varieties under farmer's or varieties of common knowledge category.

2. The test shall normally be conducted at least at two test locations. If essential characteristics of 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 test shall be carried out under conditions ensuring normal growth and expression of all test characteristics. The size of the plot should be such that plants or parts of plant may be removed for measuring and counting without prejudice to the observation which must be made up to the end of the growing period. The plant shall be grown on raised bed so that observation of individual plant may be carried out. Each test shall include a minimum of 36 plants, which should be divided among three replications. Separate plots for observation and for measurement, can only be used if they have been subjected to similar environmental conditions. All testing materials shall be manually pollinated for better expression of fruit characters. Observation should be recorded from 10 plants from each replication.
4. Test plot design shall be as follows:

| | | |
|---|---|---|
| Number of rows in each bed (15-20 cm raised bed) | : | 2 |
| Row length | : | 6.0 m |
| Row to row distance | | 1.5 m |
| Plant to plant distance | : | 1.0 m |
| Number of replications | : | 3 |

5. Four male plants should be kept in a separate row in each test plot.

## IV. Methods and observations

1. The traits described in the table of characteristics (section VII) shall be used for the testing of candidate/reference varieties for DUS.
2. For the assessment of distinctiveness, uniformity and stability, observation shall be made on 30 plants or parts of plants, which should be divided among 3 replications (10 plants in each replication).

3. For the assessment of uniformity of characteristics on the plot as a whole (visual assessment by a single observation of a group of plants or parts of plant), 30 plants are considered for observations and any other observations should be made on all plants in the test.
4. For the assessment of colour characteristics, latest Royal Horticulture Society (RHS) colour chart shall be used.
5. Number of side shoots per branch will be recorded as the number of secondary branches arising from the primary branch.
6. Number of off types shall be nil as the crop is vegetatively propagated.
7. Observations on leaf characters should be made on the widest portion of the fully developed leaf (between $15^{th}$ and $20^{th}$ node).
8. Observations on the flowers shall be made on node number at which first female flower appears in 50 % populations.
9. Observations on the male plant shall be made on node number at which first male flower appears.
10. All observations on fruits set by hand pollination shall be made on fruits around 12 days after anthesis (marketable maturity) at the first harvesting.
11. All observations on the seed shall be made on fully developed and dry seed after washing and drying in the shade.
12. Stages for recording of different observation on specific characteristics will follow:

| | **Description** | | **Code** |
|---|---|---|---|
| A | Active vegetative phase | : | 10 |
| B | 50% flowering stage<br>(when 50% of the plants produce single flower or $1^{st}$ flower) | : | 20 |
| C | Fruits attaining marketable maturity (12 days after anthesis) | : | 30 |
| D | Fruit ripening stage | : | 40 |

**V. Grouping of varieties**

1. The selected varieties to be grown in the trial should be divided into groups to facilitate the assessment of distinctiveness. Characteristics, which are suitable for grouping purpose, are those which are known from experience not to vary, or to vary only to lesser extent, within a

variety. The states of expression (even produced at different locations) should be fairly and evenly distributed throughout the collection.

2. The following characteristics shall be used for grouping of pointed gourd cultivars/ varieties/ hybrids and parental clones.

| Sl. No. | Plant parts | : | Characteristics |
|---|---|---|---|
| **a.** | Leaf: Shape | | (Characteristic 2) |
| **b.** | Fruit: Shape | : | (Characteristic 15) |
| **c.** | Fruit: Skin primary colour | : | (Characteristic 16) |
| **d.** | Fruit: Surface colour pattern | : | (Characteristic 17) |
| **e.** | Fruit: Length | : | (Characteristic 19) |

**VI. Characteristics and symbols**

1. To assess Distinctiveness, Uniformity and Stability, the characteristics and their states as given in the Table of characteristics (section VII) shall be used.
2. Notes (1-9) shall be used for the purpose of recording and electronic processing of data, is given against the states of the different characteristics.
3. Legend

(*) Characteristics that shall be used during every growing period for the examination of all the cultivars/ varieties/ hybrids and parental clones shall always be included in the description of the variety, except when the state of expression of preceding phenological characteristic or environmental conditions at the test location. Under such exceptional circumstances, adequate explanation shall be provided.

(+) See explanation on the Table of characteristic in section VIII.

4. Type of assessment of characteristics indicated in column 7 of table of characteristics (Section VII) is as follows.

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

**VII. Table of Characteristics**

| S. No. | Characteristics | States | Notes | Example varieties | Stage of Observation | Type of assessment |
|---|---|---|---|---|---|---|
| 1 (+) | Stem: Shape | Round | 3 | ------- | 10 | VS |
| | | Angular | 5 | Swarna Rekha, Swarna Alaukik | | |
| 2 (*) (+) | Leaf: Shape | Auriculate | 3 | BCPG-4, Kashi Suphal | 10 | VS |
| | | Cordate | 5 | BCPG-1, Kashi Amulya | | |
| 3 (+) | Leaf: Margin | Entire | 3 | -------- | 10 | VS |
| | | Undulate | 5 | BCPG-3, Swarna Alaukik | | |
| | | Lobed | 7 | VRPG-221 | | |
| 4 | Stem: Number of secondary branches up to 20$^{th}$ node | Few(<5) | 3 | BCPG-3 | 20 | MS |
| | | Medium (5-9) | 5 | BCPG-16, Kashi Alankar | | |
| | | Many(>9) | 7 | Swarna Rekha, Swarna Alaukik | | |
| 5 | Stem: Node number at which 1$^{st}$ female flower appears on the main vine (indicates earliness) | Early maturity (<12$^{th}$ node) | 3 | BCPG-4 | 20 | MS |
| | | Medium maturity (13-15$^{th}$ node) | 5 | Swarna Rekha, BCPG-27 | | |
| | | Late maturity (>15$^{th}$ node) | 7 | BCPG-6 | | |
| 6 | Stem: Intensity of Pubescence | Sparse | 3 | BCPG-3, Narendra Parwal-520 | 20 | VG |
| | | Dense | 7 | Swarna Alaukik, Narendra Parwal-260 | | |
| 7 (+) | Leaf blade: Length (cm) | Small (< 7) | 3 | BCPG-16 | 20 | MG |
| | | Medium (7–10) | 5 | Swarna Alaukik, Swarna Rekha | | |
| | | Long (> 10) | 7 | Kashi Suphal, Kashi Alankar | | |
| 8 (+) | Leaf blade: Width (cm) | Narrow (< 6) | 3 | VRPG-220, Kashi Amulya | 20 | MG |
| | | Medium (6–9) | 5 | Swarna Alaukik, Swarna Rekha | | |
| | | Broad (> 9) | 7 | BCPG- 26 | | |
| 9 | Leaf blade size: Length/width ratio (cm) | Small (< 1.0) | 3 | - | 20 | MG |
| | | Medium (1.0–1.4) | 5 | Kashi Amulya, Swarna Rekha | | |
| | | Large (> 1.4) | 7 | Kashi Suphal | | |

| S. No. | Characteristics | States | Notes | Example varieties | Stage of Observation | Type of assessment |
|---|---|---|---|---|---|---|
| 10 | Leaf lobes | Absent | 1 | Kashi Amulya, Kashi Suphal | 20 | VS |
| | | Present | 9 | VRPG-221 | | |
| 11 (+) | Leaf blade: Depth of lobing | Shallow | 3 | Swarna Rekha | 20 | VS |
| | | Medium | 5 | BCPG-4 | | |
| | | Deep | 7 | BCPG-6, BCPG-16 | | |
| 12 | Petiole: length (cm) | Short (< 2) | 3 | BCPG-16, Kashi Alankar | 20 | MS |
| | | Medium (2-4) | 5 | Swarna Rekha | | |
| | | Long (> 4) | 7 | BCPG-17, BCPG-25 | | |
| 13 | Flower: Sex type | Dioecious | 1 | BCPG-4, Narendra Parwal-604 | 30 | MS |
| | | Gynomonoecious | 3 | ---------- | | |
| 14 | Fruit: Peduncle attachment | Soft | 3 | BCPG-16, Narendra Parwal-504 | 30 | VG |
| | | Hard | 5 | BCPG-37, VRPG-221, Kashi Suphal | | |
| 15 (*) (+) | Fruit: Shape | Club shaped | 1 | BCPG-27 | 30 | VS |
| | | Cylindrical | 2 | BCPG-6, VRPG-126 | | |
| | | Oval | 3 | BCPG-1, VRPG-103 | | |
| | | Spindle | 4 | BCPG-36 | | |
| | | Elongated Spindle | 5 | BCPG-30, VRPG-173 | | |
| | | Ovate | 6 | BCPG-3 | | |
| | | Spheroid | 7 | VRPG-219 | | |
| | | Spindle tapering | 8 | Narendra Parwal-260, Kashi Alankar | | |
| 16 (*) | Fruit: Skin primary colour | Light Green (138 C) | 1 | Swarna Alaukik, Kashi Alankar | 30 | VG |
| | | Green (138 A) | 2 | Kashi Amulya, Kashi Suphal | | |
| | | Dark green (N 137 A, N 137 B, N 137 C, N 137 D) | 3 | VRPG-219, VRPG-221 | | |
| 17 (*) (+) | Fruit: Surface colour pattern | Uniform | 1 | Swarna Alaukik, VRPG-141 | 30 | VG |
| | | Mottled | 2 | Kashi Amulya, Swarna Rekha | | |
| | | Striped | 3 | VRPG-219, VRPG-221 | | |

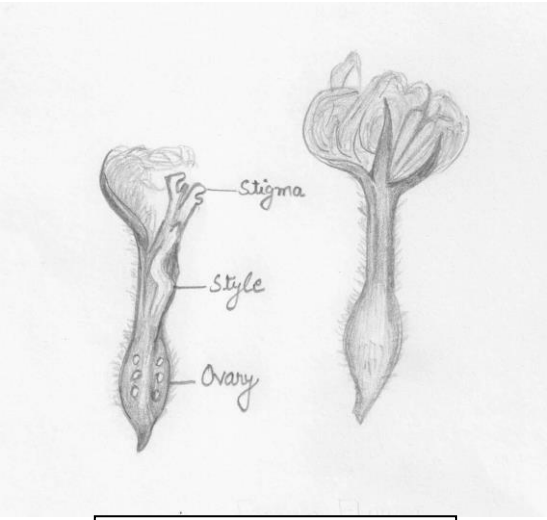
| S. No. | Characteristics | States | Notes | Example varieties | Stage of Observation | Type of assessment |
|---|---|---|---|---|---|---|
| 18 | Fruit: Glossiness | Non Glossy | 1 | BCPG-4, Narendra Parwal-307 | 30 | VG |
| | | Glossy | 9 | Kashi Alankar, Kashi Amulya | | |
| 19 (*) (+) | Fruit : Length (cm) | Small (< 5) | 3 | VRPG-219, VRPG-103 | 30 | MG |
| | | Medium (5 – 10) | 5 | Kashi Amulya, Kashi Alankar | | |
| | | Long (> 10) | 7 | Narendra Parwal-260 | | |
| 20 (*) (+) | Fruit: Diameter (cm) (at the widest portion) | Small (< 4) | 3 | Kashi Alankar, Kashi Amulya | 30 | MG |
| | | Large (> 4) | 7 | VRPG-219 | | |
| 21 | Fruit size: Length/width ratio (cm) | Small (< 1.5) | 3 | VRPG-219 | 30 | MG |
| | | Medium (1.5–2.5) | 5 | Kashi Amulya, Swarna Alaukik | | |
| | | Large (> 2.5) | 7 | Kashi Suphal, Kashi Alankar | | |
| 22 (*) (+) | Fruit: Shape of apex at blossom end | Depressed | 1 | VRPG-176-1, VRPG-219 | 30 | VS |
| | | Flattened | 3 | BCPG-1, BCPG-3 | | |
| | | Rounded | 5 | Swarna Rekha, Swarna Alaukik | | |
| | | Pointed | 7 | Kashi Suphal, Narendra Parwal-260 | | |
| 23 | Plant: Vine length (to be observed at full maturity) (m) | Short (<3) | 3 | BCPG-3, BCPG-16 | 40 | MG |
| | | Medium (3-5) | 5 | BCPG-6, Kashi Alankar | | |
| | | Long (> 5) | 7 | Swarna Rekha, Swarna Alaukik | | |
| 24 | Seediness | Absent | 1 | VRPG-105 | 40 | MS |
| | | Present | 9 | Narendra Parwal-260, Kashi Alankar | | |
| 25 | Number of seeds/fruit | Very less (<5) | 3 | Kashi Amulya | 40 | MG |
| | | Less (5-10) | 5 | Swarna Alaukik | | |
| | | Medium (10-15) | 7 | Kashi Suphal | | |
| | | Many (>15) | 9 | Kashi Alankar, Swarna Rekha | | |

## VIII. Explanations on the table of characteristics

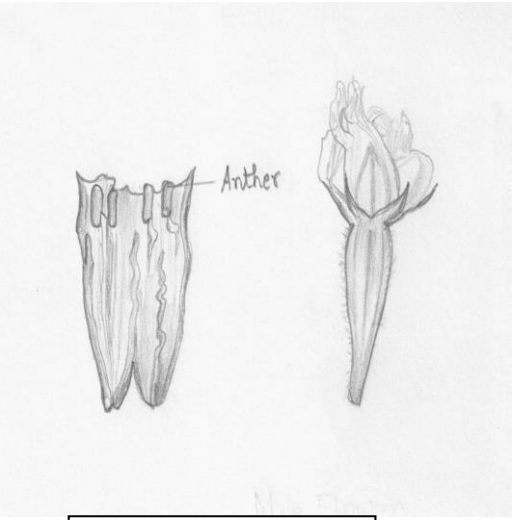
### Plant morphology:


1. An unopened female flower; 2. A coiled tendril; 3. A fully opened female flower;
4. A simple cordate leaf

**Identification of flowers:**

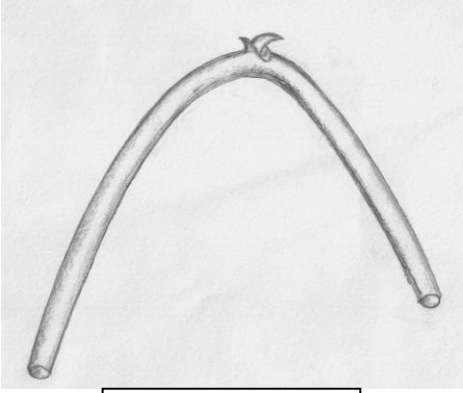



**Female flower**

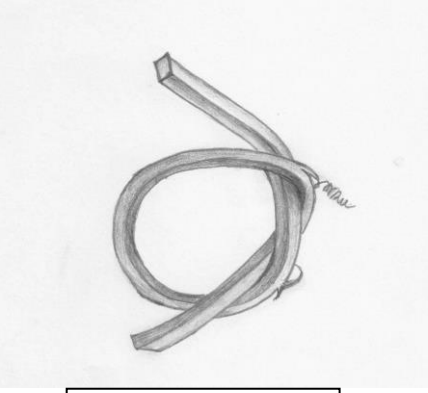



**Male flower**

## Ch.1: Stem shape

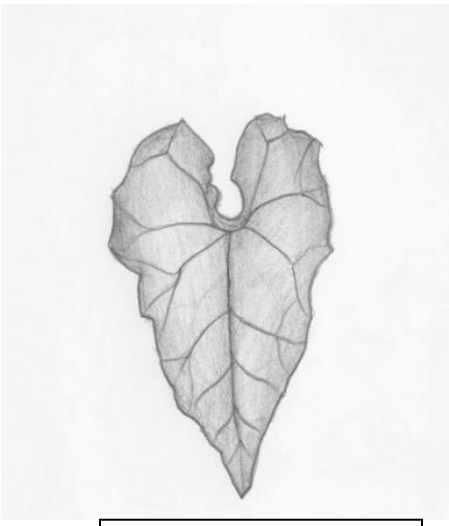


**Round (3)**

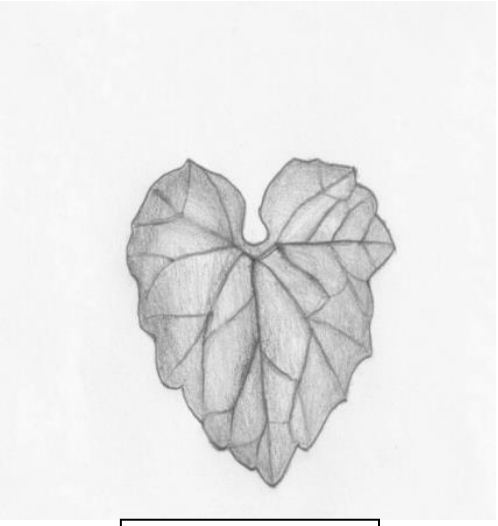


**Angular (5)**

## Ch.2: Leaf shape

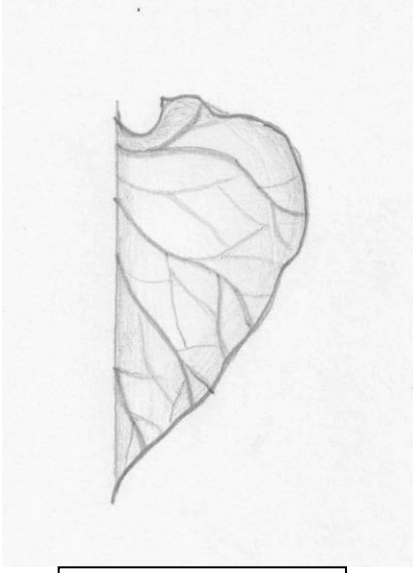


**Auriculate (3)**

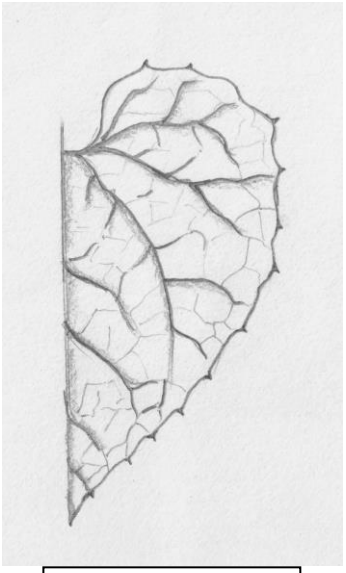


**Cordate (5)**

## Ch.3: Leaf margin



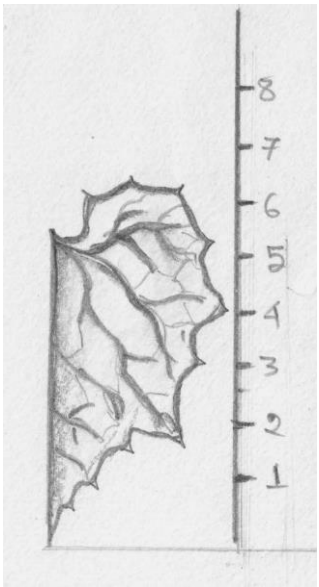
**Entire (3)**



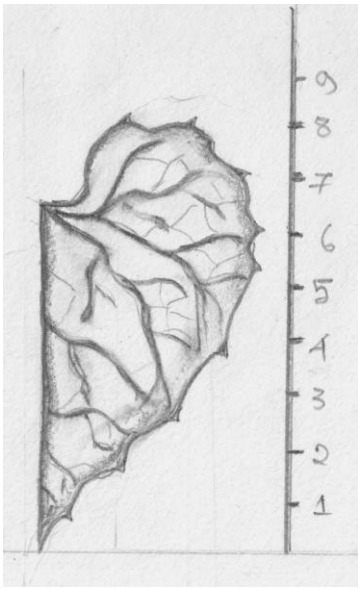
**Undulate (5)**

**Lobed (7)**

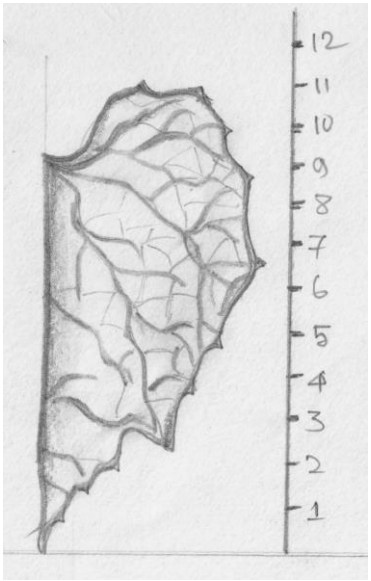
**Ch.7: Leaf blade: Length**



**Small (<7 cm) (3)**

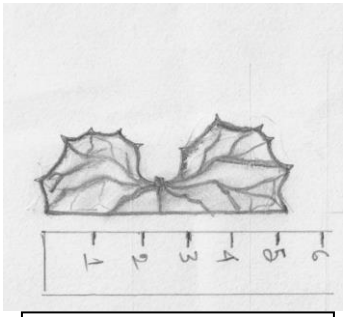


**Medium (7-10 cm) (5)**

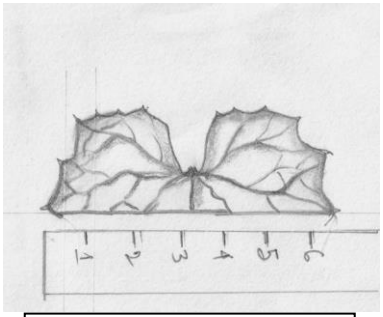


**Long (>10 cm) (7)**

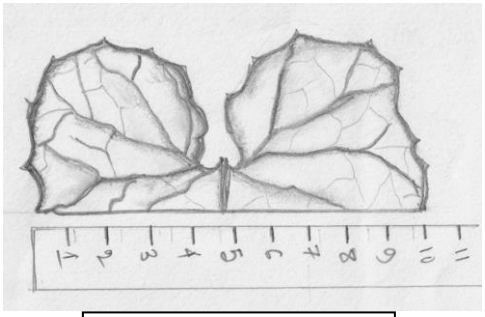
**Ch.8: Leaf blade: Width**



**Narrow (<6 cm) (3)**

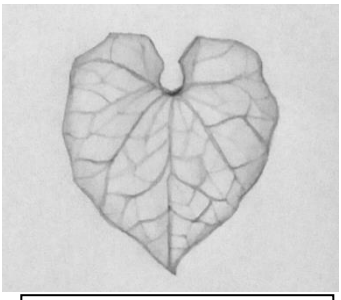


**Medium (6-9 cm) (5)**

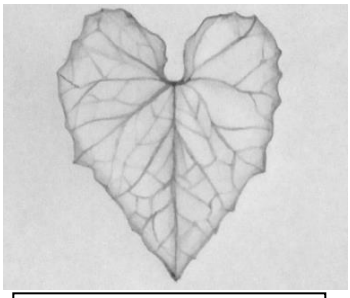


**Broad (>9 cm) (7)**

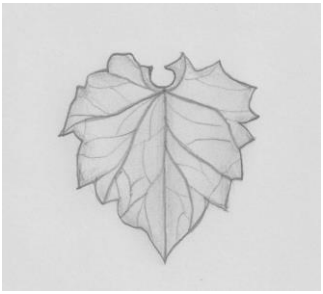
**Ch.11: Leaf blade: Depth of lobing**



**Shallow (3)**

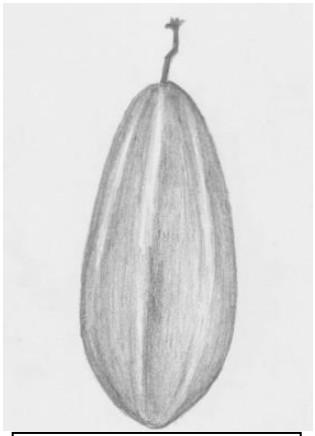


**Medium (5)**

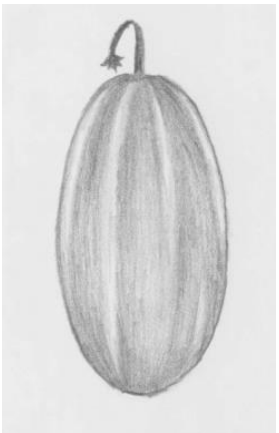


**Deep (7)**

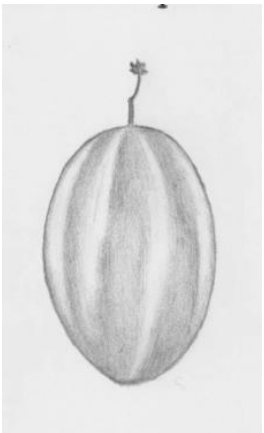
**Ch.15: Fruit shape**



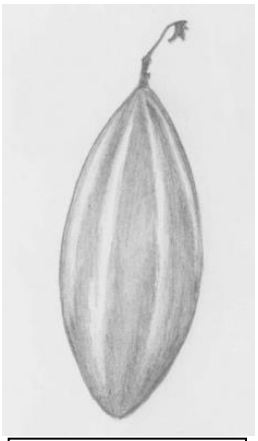
**Club shaped (1)**



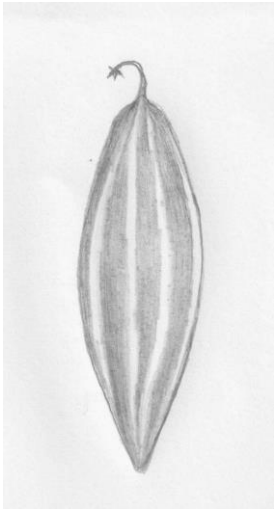
**Cylindrical (2)**



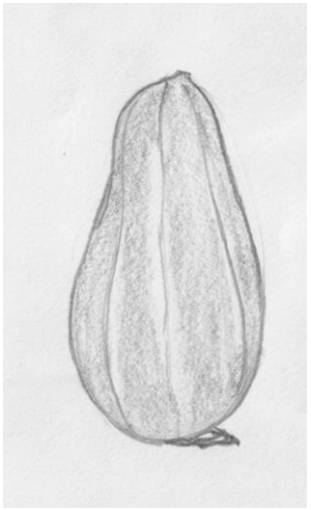
**Oval (3)**



**Spindle (4)**

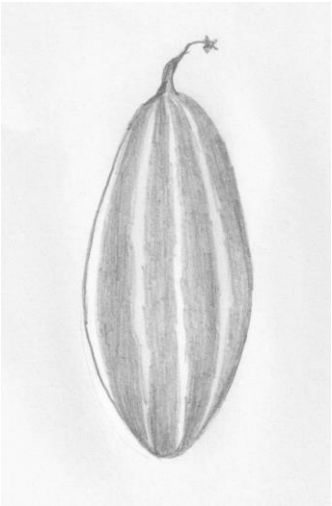


**Elongated Spindle (5)**



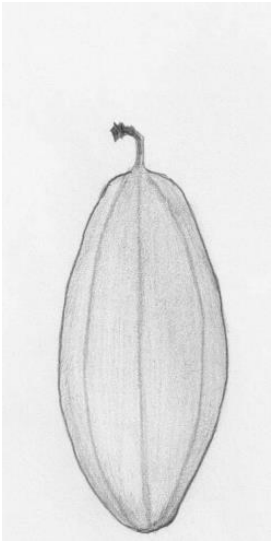
**Ovate (6)**

**Spheroid (7)**

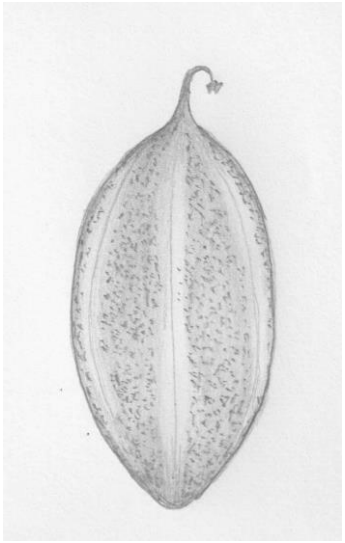


**Spindle tapering (8)**

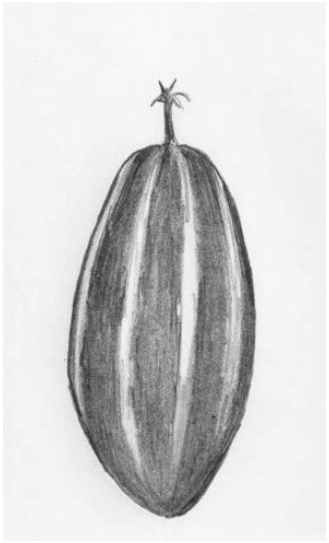
## Ch.17: Fruit: Surface colour pattern



**Uniform (1)**



**Mottled (2)**



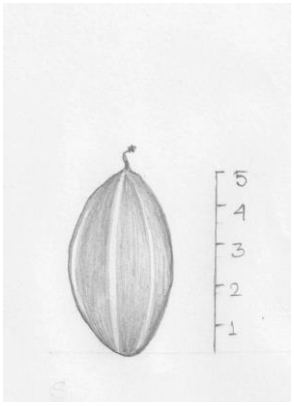
**Striped (3)**

**Uniform (1)**

**Mottled (2)**

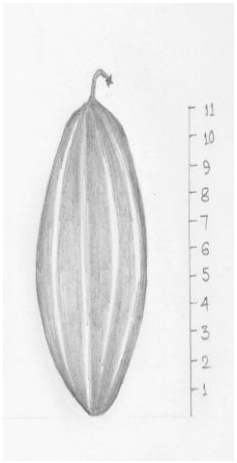
**Striped (3)**

**Ch.19: Fruit: Length**



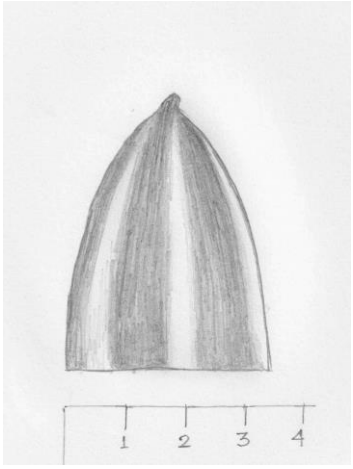

**Small (<5 cm) (3)**


**Medium (5-10 cm) (5)**

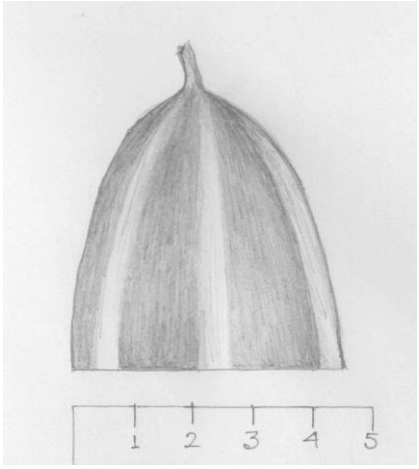



**Long (> 10 cm) (7)**

**Ch.20: Fruit: Diameter**

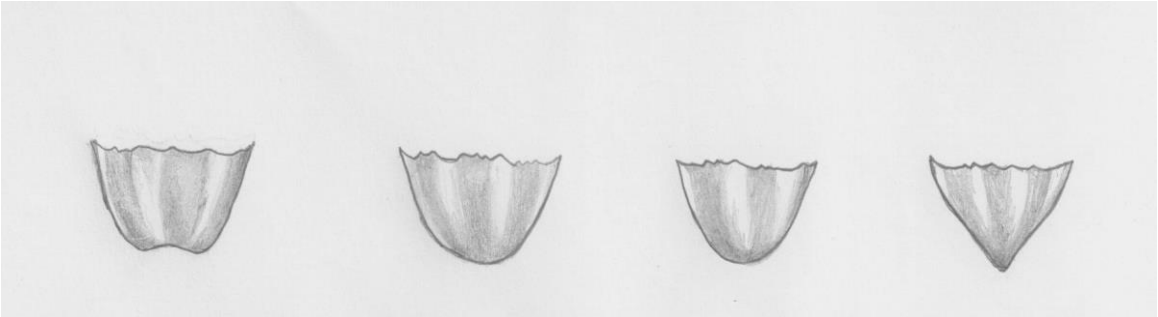



**Small (<4 cm) (3)**




**Large (>4 cm) (7)**

**Ch.22: Fruit: Shape of apex at blossom end**



| Depressed (1) | Flattened (3) | Rounded (5) | Pointed (7) |
|---|---|---|---|

**IX. Working group détails**

The Test Guidelines developed by National Core Committee in consultation with the Director, ICAR- Indian Institute of Vegetable Research (IIVR), Varanasi, the Nodal Officer and Co-Nodal Officers of Bidhan Chandra Krishi Viswavidyalaya, West Bengal, DUS testing centers and the Task Force (04/09/2018) constituted by the PPV&FR Authority, New Delhi.

**The members of the Task Force present on 04/09/2018**

**Dr. Brahma Singh** : Chairman
Former Director, Life Science, DRDO and Director FRL, New Delhi, India

**Dr. T.K. Behera** : Invited Member
Principal Scientist, Division of Vegetable Science, ICAR-IARI, New Delhi, India

**Dr. B. Singh** : Member
Director, ICAR-IIVR, Varanasi, U.P., India

**Dr. Sudhakar Pandey** : Member
Principal Scientist, ICAR-IIVR, Varanasi, U.P., India

**Dr. Arup Chattopadhyay** : Member
Professor & O I/C AICRP on Vegetable Crops, BCKV, Kalyani, Nadia, W.B., India

**Sh. Dipal Roy Choudhury** : Member Secretary
Joint Registrar, PPV&FRA, New Delhi, India

**Nodal Person**
Director, ICAR-IIVR, Varanasi, U.P., India

**Co-Nodal Person**
Dr. Sudhakar Pandey, Principal Scientist, ICAR-IIVR, Varanasi, U.P., India

Dr. T. Chaubey, Principal Scientist, ICAR-IIVR, Varanasi, U.P., India

Dr. Arup Chattopadhyay
Professor & O I/C AICRP on Vegetable Crops, BCKV, Kalyani, Nadia, W.B., India

**X. DUS test centres**

| Nodal Centre | Other Centre |
|---|---|
| ICAR-Indian Institute of Vegetable Research, P. B. No.-01, P. O. -Jakhini (Shahanshahpur), Varanasi-221 305 (U.P.) | Bidhan Chandra Krishi Viswavidyalaya, Kalyani- 741235, Nadia, West Bengal |