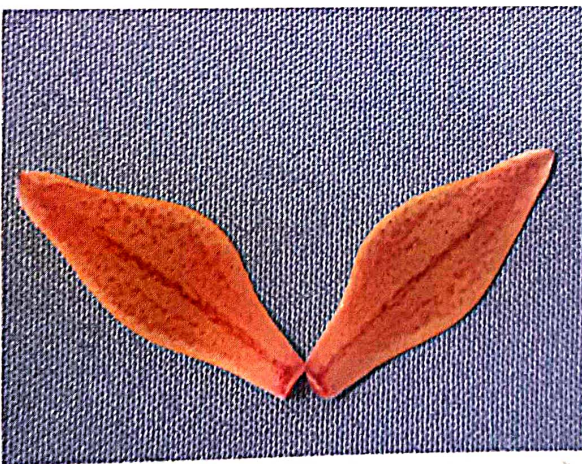
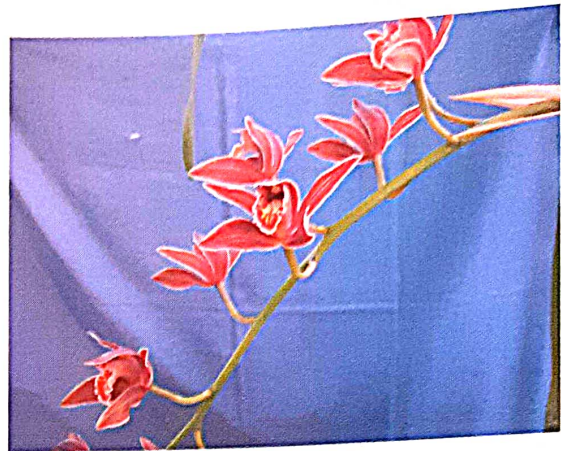


# Morphological Characterization in CYMBIDIUM SPP.



L.C. De, R.G. Devadas  
Geetamani Chhetri  
Manoj Srivastava, R.P. Medhi



National Research Centre for Orchids  
(Indian Council of Agricultural Research)  
Pakyong – 737 106,  
Sikkim, India



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IN CYMBIDIUM SPP.**

**L.C. De**

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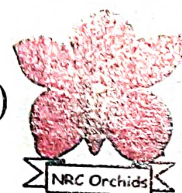
**Geetamani Chhetri**

**Manoj Srivastava**

**R.P. Medhi**



**National Research Centre for Orchids**  
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Pakyong – 737 106,  
Sikkim, India



# **Morphological Characterization in Cymbidium spp.**

National Research Centre for Orchids  
Pakyong-737106, Sikkim

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**Compiled and Edited by**

L.C. De

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L.C. De and R.P. Medhi  
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**Cover Photographs**

**Front:** Glimpses of Cymbidium species

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## PREFACE

Cymbidiums are among the most popular winter and spring blooming semi-terrestrial orchids originated from tropical and subtropical Asia covering North Eastern India, China, Japan, Malaysia, the Philippines, Borneo islands and North Australia, usually grown in cooler climates at high elevations. Cymbidiums are highly valued for genetic resources, cut flowers, hanging baskets, potted plants and herbal medicines. Cymbidium has been considered as top commercial orchids in Europe since many years. They fetch the highest price in the international markets of which major Asian markets of Singapore and Japan or the Dutch market. In India, Arunachal hills, Sikkim and Darjeeling hills with cool summer night and monsoonal summer rain are ideal for cymbidium cultivation. The growth of orchid exports from north eastern hill region especially Sikkim would provide opportunities for employment and also for development of supporting industries like packaging, cold storage and transportation. East Sikkim has been declared as Agri Export Zone exclusively for production of cymbidium orchids. In Sikkim, more than 350 hybrids of cymbidium orchids are commercially cultivated in an around 25 ha of land and about 5 lakhs spikes are produced annually.

The present technical publication '*Morphological Characterization in Cymbidium spp.*' under project '**Preparation for Plant Varieties Protection and DUS Testing through ICAR-SAU system**' covers the wide aspects of taxonomic description starting botanical description, valuable genetic resources, grouping of species, characteristics and

symbol, morphological descriptors, explanations of characteristics and digitalization of important species used for improvement program.

I hope that it will be a useful handy reference technical bulletin for amateur and professional orchid growers, small and big orchid farmers, orchid entrepreneurs, florist shops, taxonomists, plant breeders and students.

Lakshman Chandra De  
(Lakshman Chandra De)

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## **Introduction**

Cymbidiums are among the most popular winter and spring blooming semi-terrestrial orchids originated from tropical and subtropical Asia covering North Eastern India, China, Japan, Malayasia, the Philippines, Borneo islands and North Australia, usually growing in cooler climates at high elevations. The important Cymbidium growing countries in the world are Australia, New Zealand, Japan, the Netherlands, the USA and England. Cymbidium consists of 70 semi-terrestrial and epiphytic orchids of tropical and subtropical Asia.

## **Botanical description**

The plants are characterized by short and stout pseudobulbs ensheathed by encircling leaf bases. Leaves are long, ribbon shaped, leathery or soft and lanceolate. The flower spikes develop from the base of the pseudobulbs.

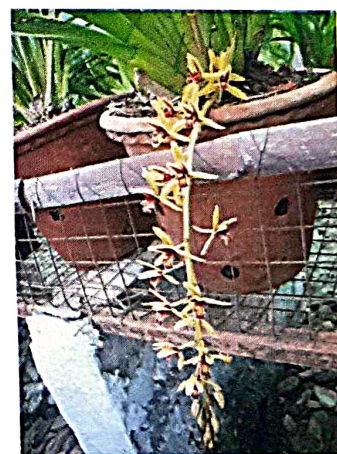
**A plant has three types of bulbs.** 1. Old back bulbs without leaves: These bulbs act as a reserve food supply for emergencies. It is advisable to leave one of these on each divided plant. Back bulbs can make new plants but they may take years to flower. 2. Old bulbs with leaves: These bulbs support the new growth and may produce flowers for a number of years depending on the variety. When dividing, the plant must retain at least two old bulbs or have one back bulb attached to be able to reflower next year. 3. New leads or bulbs.: These are the youngest bulbs on the plant that the flowers and most new growth comes. When dividing, at least 1 old bulb and one back bulb must be retained with this bulb to ensure that the plant

may flower the following year.

The spikes are erect, arching or pendulous and arranged with 2 to 15 flowers. The individual florets are 1cm to 12.5cm across and are of various colours of shades of colour. Cymbidiums are famous for its beautiful spikes derived from species and hybrids. Among the orchids, Cymbidium ranks first and in floricultural crops it accounts for 2.7% of the total cut flower production.

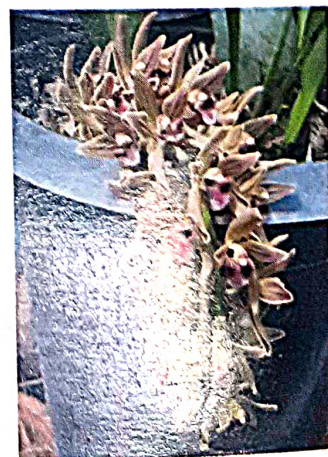
### Valuable genetic resources

*Cymbidium aloifolium*: This species is native to Sri Lanka, Peninsular India, Indo-China and East Indies. Plants are clumpy and pseudobulbless. The leaves are fleshy, rigid, linear or linear ligulate, obtuse and 30-45cm long. The floral spikes are 60-75cm long, pendent and arranged with upto 30 flowers. The flowers are waxy, segmented with edged yellow and reddish brown middle part and produced in May-June.



*Cym. aloifolium*

*Cymbidium devonianum*: Native to Himalayas, Sikkim and Meghalaya. Pseudobulbs are short and hidden by persistent leaf bases. The leaves are long petioled, thick, coriaceous and oblanceolate. The inflorescence is stout, pendulous, many flowered and compact. The flowers are heavily textured, long



*Cym. devonianum*



lasting, 2.5 to 4.5cm across and segmented with purple lips and produced in May-June.

*Cymbidium eburneum*: Native to India, Himalayas, Thailand and Indo-China. The pseudobulbs are round, clustered and furrowed. The leaves are dark, glossy green and many. The flowers are fragrant, long lasting, ivory white with pink dots and produced in late winter and springs.

*Cymbidium elegans*: Native to Meghalaya and Manipur. The leaves are narrow, many, 60cm long. The plants are pseudobulbless. The flower spike is arching with 20 to 40 flowers. The flowers are straw yellow, long lasting, 5cm across and produced during October-November.

*Cymbidium ensifolium*: Native to China, Japan, IndoChina, Sumatra and Java. The plants are pseudobulbless with long grass like leaves. The flower spikes are erect, 40cm long and arranged with 4 to 8 greenish yellow flowers with brown and reddish markings. The flowers are fragrant, long lasting, 5cm across and produced during May-June.



*Cym. ensifolium*

*Cymbidium finlaysonianum*: A robust species, native to Thailand, Malaya Peninsula, Philippines, Sumatra, Java, Borneo, Laos and Cambodia. Plants are short, stout stemmed with thick and leathery leaves. The flower spike is 60 to 120cm long, pendulous and loosely arranged many flowered. The flowers are heavily textured, yellowish green with olive tints,

rosy wine purple lips and produced during summer and spring season.

*Cymbidium giganteum*: Native to Nepal, Bhutan, Khasia Hills, Sikkim, Indo-China and Burma. The pseudobulbs are ovoid, clustered and compressed. The leaves are 90cm long and linear ligulate. The flower spike is stout and 8 to 20 flowered. The flowers are scented, long lasting, 10cm across and yellowish green in colour with yellow reddish tip. The flowers are produced during September and October.

*Cymbidium lancifolium*: Native to Sikkim, Meghalaya, Arunachal Pradesh and Nagaland. The stems are fleshy, fusiform. The leaves are oblanceolate, 20cm long. The spikes are 6 to 8 flowered, 4 to 5 cm across. Segments are white ended greenish yellow with white reddish lip. The flowers are produced during June.



*Cym. lancifolium*

*Cymbidium longifolium*: Native to Sikkim, Meghalaya and Nagaland. The pseudobulbs are short with linear, acuminate leaves. The inflorescence is stout and many flowered. The flowers are pale green, brown and whitish, 6cm across with white lip having purple spots and produced during November to February.

*Cymbidium lowianum*: Native to India and Burma. The pseudobulbs are ovoid, clustered and compressed. The leaves

are linear ligulate. The inflorescence is pendent, 120cm long and arranged with 10 to 25 apple green flowers having greenish yellow markings and purple yellow lip. The flowers are produced during November to February.



*Cym. lowianum*

*Cymbidium mastersii*: Native to India. The flowers are pure white, fragrant with pinkish lips and produced during winter.

*Cymbidium tracyanum*: Distributed in Burma and Thailand. The pseudobulbs are clustered, ovoid and compressed with ensiform, acute and long leaves. The inflorescence is 90cm long, arching with many flowers. The flowers are 10-12.5cm across, greenish yellow streaked with brown red and the lip is yellow marked with purple. The flowers are produced during October-November.



*Cym. tracyanum*

*Cymbidium hookerianum*: Native to Sikkim, Meghalaya and Arunachal Pradesh. Pseudobulbs are ovoid with linear –elliptic leathery leaves. Inflorescence is robust, arching and 5-20 flowered. Flowers are highly fragrant, apple green with red spotted white yellow lip. Flowers are produced during February –March.



*Cym. hookerianum*

*Cymbidium munronianum* : Native to Arunachal Pradesh and Sikkim. Pseudobulbs are small, ovoid with erect, linear leaves. Inflorescence is stout, erect and 7-12 flowered. The flowers are 2.5 to 4cm across, fragrant, straw purple brown in colour and produced during October-May.

*Cymbidium tigrinum*: A dwarf species from Manipur and Nagaland. Pseudobulbs are ovoid-globose with 3 to 5 broad coriaceous lanceolate leaves. The inflorescence is semi-arching and 3-6 flowered. The flowers are 5-6cm in diameter, strongly fragrant, yellow to olive green in colour and produced during April.



*Cym. tigrinum*

*Cymbidium pumilum*: A dwarf species with 40cm long spikes and arranged with 4cm across flowers of red to reddish brown colours. An important parent for Miniature cymbidiums.

*Cymbidium insigne*: This species have been used to produce large flowered hybrids. The inflorescence is arranged with 12-25 flowers of 7.5-10cm across. Flowers are variously coloured with crimson/purple lips.

## Grouping of species

The following characteristics shall be used for grouping of Cymbidium species:

- (a) Pseudobulb: shape

- (b) Inflorescence: length
- (c) Inflorescence: number of flowers
- (d) Flower: width
- (e) Flower: longevity on plant
- (f) Flower: predominant color
- (i) Lip: ornamentation
- (i) Flowering season

## **Characteristics and Symbols**

1. To the characteristics and their states as given in the Table of Characteristics should be used.
2. Notes 1-9 (numbers), shall be used to describe the state of each character for the purpose of electronic data processing.
3. Legend

(\*) Characteristics that shall be observed during every growing season for all species, and shall always be included in the description of the species, except when the state of expression of any of these characters is rendered impossible by a preceding phenological characteristic or by the environment conditions of the testing region. Under such exceptional situation, adequate explanation shall be provided.

(+) See explanations on the Table of Characteristics

4. Characteristics containing the following key in the first column of the Table characteristics shall be examined as indicated below:

**QL-** Qualitative characteristic

**QN-** Quantitative characteristic

**PQ-** Pseudo-Qualitative characteristic

5. Type of assessment of characteristics indicated in column six of the Table characteristics are 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

# Table of Morphological Characteristics

| S. No.                      | Characteristics                          | States                         | Notes | Example Varieties species  | Type of Assessment |
|-----------------------------|--|--------------------------------|-------|--|--------------------|
| 1.<br>*<br>QN<br>(a)        | Pseudobulb size (length x breadth)       | Small (<30cm <sup>2</sup> )    | 3     | <i>Cym. pendulum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. tigrinum</i> , <i>Cym. dayanum</i> ,<br><i>Cym. gammieanum</i> , <i>Cym. elegans</i>                                | MS                 |
|                             |  | Medium (30-60cm <sup>2</sup> ) | 5     | <i>Cym. lowianum</i>   |                    |
|                             |  | Large (>60cm <sup>2</sup> )    | 7     |  |                    |
| 2.<br>*<br>PQ<br>(+)<br>(a) | Pseudobulb shape                         | Narrow cylindrical             | 1     |  | VG                 |
|                             |  | Round                          | 3     | <i>Cym. dayanum</i> , <i>Cym. gammieanum</i> , <i>Cym. tigrinum</i>  |                    |
|                             |  | Ovoid                          | 5     | <i>Cym. pendulum</i> , <i>Cym. elegans</i> ,<br><i>Cym. hookerianum</i> , <i>Cym. erythraeum</i> , <i>Cym. tracyanum</i> ,<br><i>Cym. aloifolium</i> , <i>Cym. irridioides</i> |                    |
|                             |  | Conical                        | 7     | <i>Cym. elegans</i> ,  |                    |
| 3.<br>QN                    | Number of leaves at flowering pseudobulb | Few (<3)                       | 3     |  | VG                 |
|                             |  | Medium (3-6)                   | 5     | <i>Cym. pendulum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. devonianum</i> , <i>Cym. tigrinum</i> ,<br><i>Cym. dayanum</i>  |                    |
|                             |  | Many (>6)                      | 7     | <i>Cym. lowianum</i> , <i>Cym. gammieanum</i> , <i>Cymb. elegans</i> ,<br><i>Cym. lancifolium</i> , <i>Cym. erythraeum</i>   |                    |
| 4.<br>*<br>QN<br>(a)        | Leaf length                              | Short (<40cm)                  | 3     | <i>Cym. tigrinum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. pendulum</i> , <i>Cym. devonianum</i>   | VG                 |
|                             |  | Medium (40-80cm)               | 5     | <i>Cym. hookerianum</i> , <i>Cym. lowianum</i> , , <i>Cym. dayanum</i> , <i>Cym. elegans</i> , <i>Cym. iridioides</i> ,  |                    |
|                             |  | Long (>80cm)                   | 7     | <i>Cym. erythraeum</i> , <i>Cym. ensifolium</i> ,  |                    |
| 5.<br>QN<br>(a)             | Leaf width                               | Narrow (<1.5cm)                | 3     | <i>Cym. dayanum</i>  | VG                 |
|                             |  | Medium (1.5-3.0cm)             | 5     | <i>Cym. lowianum</i> , <i>Cym. pendulum</i> ,<br><i>Cym. gammieanum</i> , <i>Cym. elegans</i> ,<br><i>Cym. iridioides</i>  |                    |
|                             |  | Broad (>3.0cm)                 | 7     | <i>Cym. devonianum</i> , <i>Cym. aloifolium</i>  |                    |
| 6.<br>*<br>(+)<br>PQ<br>(a) | Leaf shape                               | Linear                         | 1     | <i>Cym. hookerianum</i> , <i>Cym. pendulum</i> , <i>Cym. lowianum</i> , <i>Cym. aloifolium</i> , <i>Cym. erythraeum</i> ,<br><i>Cym. irrioides</i> ,                           | VG                 |
|                             |  | Linear-oblong                  | 3     | <i>Cym. devonianum</i> , <i>Cym. dayanum</i> ,<br><i>Cym. lancifolium</i> ,  |                    |
|                             |  | Lanceolate                     | 5     | <i>Cym. gammieanum</i> , <i>Cym. erythraeum</i> , <i>Cym. elegans</i> , <i>Cym. tigrinum</i> , <i>Cym. iridioides</i> , <i>Cym. lancifolium</i>                                |                    |
| 7.<br>PQ<br>(a)             | Leaf petiole                             | Absent                         | 1     | <i>Cym. gammieanum</i> , <i>Cym. erythraeum</i> , <i>Cym. elegans</i>  | VG                 |
|                             |  | Present                        | 9     | <i>Cym. devonianum</i> , <i>Cym. tigrinum</i> ,<br><i>Cym. lancifolium</i> ,   |                    |

|                        |                                    |                         |   |   |    |
|------------------------|------------------------------------|-------------------------|---|---|----|
| 8.<br>(+)<br>PQ<br>(a) | Leaf apex                          | Acute                   | 1 | <i>Cym. lowianum, Cym. dayanum, Cym. elegans, Cym. gammieanum, Cym. pendulum, Cym. devonianum</i>                   | VG |
|                        |                                    | Obluse                  | 3 | <i>Cym. pendulum, Cym. devonianum</i>   |    |
|                        |                                    | Forked                  | 5 | <i>Cym. aloifolium,</i>   |    |
| 9.<br>QN<br>(b)        | No. of flower spike / pseudobulb   | One                     | 1 | <i>Cym. tracyanum</i>   | MS |
|                        |                                    | Two                     | 3 | <i>Cym. lowianum, Cym. elegans, Cym. eburneum</i>   |    |
|                        |                                    | > Two                   | 5 | --  |    |
| 10.<br>PQ<br>(b)       | Inflorescence orientation          | Erect                   | 1 | <i>Cym. eburneum,</i>   | VG |
|                        |                                    | Horizontal / Arching    | 3 | <i>Cym. erythraeum, Cym. hookerianum, , Cym. tracyanum, Cym. iridioides,</i>  |    |
|                        |                                    | Drooping/ Pendulus      | 5 | <i>Cym. devonianum, Cym. aloifolium, Cym. lowianum, Cym. dayanum, Cym. elegans, Cym. pendulum,</i>                  |    |
| 11.<br>PQ<br>(b)       | Inflorescence type                 | Dense                   | 1 | <i>Cym. devonianum, Cym. elegans,</i>   | VG |
|                        |                                    | Lax (Sparsely arranged) | 3 | <i>Cym. pendulum, Cym. iridioides,</i>  |    |
| 12.<br>*<br>QN<br>(b)  | Length of inflorescence            | Short (<30 cm)          | 3 | <i>Cym. devonianum, Cym. eburneum, Cym. erythraeum, Cym. tigrinum, Cym. pendulum, Cym. dayanum</i>                  | MS |
|                        |                                    | Medium (30-60cm)        | 5 | <i>Cym. gammieanum, Cym. elegans</i>  |    |
|                        |                                    | Long (>60cm)            | 7 | <i>Cym. concerto, Cym. lowianum, Cym. aloifolium, Cym. eburneum, Cym. tracyanum</i>                                 |    |
| 13.<br>QN<br>(b)       | Peduncle length                    | Short (<30cm)           | 1 | <i>Cym. devonianum, Cym. pendulum, Cym. iridioides,</i>   | MS |
|                        |                                    | Medium (30-60cm)        |   |   |    |
|                        |                                    | Long (>60cm)            | 3 |   |    |
| 14.<br>QN<br>(b)       | Peduncle thickness                 | Thin (<0.5cm)           | 1 | <i>Cym. pendulum, Cym. devonianum, Cym. aloifolium, Cym. tigrinum, Cym. dayanum,</i>                                | MS |
|                        |                                    | Medium (0.5-0.8 cm)     | 3 | <i>Cym. lowianum, Cym. elegans , , Cym. irrioides,</i>  |    |
|                        |                                    | Thick (>0.8cm)          | 5 |   |    |
| 15.<br>*<br>QN<br>(b)  | Number of flowers/inflorescence    | <12                     | 1 | <i>Cym. pendulum, Cym. irridiodes</i>   | VS |
|                        |                                    | 12-20                   | 3 | <i>Cym. devonianum</i>  |    |
|                        |                                    | >20                     | 5 | <i>Cym. lowianum, Cym. devonianum, C. aloifolium, Cym. tigrinum, Cym. elegans, Cym. dayanum</i>                     |    |
| 16.<br>QL<br>(b)       | Anthocyanin coloration in peduncle | Absent                  | 1 | <i>Cym. lowianum, Cym. dayanum, Cym. devonianum, Cym. dayanum, Cym. elegans, Cym. erythraeum, Cym. irridioides,</i> | VG |
|                        |                                    | Present                 | 9 | <i>Cym. devonianum , Cym. aloifolium, Cym. tigrinum,</i>  |    |
| 17.<br>PQ<br>(b)       | Peduncle bract                     | Absent                  | 1 | <i>Cym. lowianum</i>  | VG |
|                        |                                    | Present                 | 9 | <i>Cym. pendulum, Cym. devonianum, Cym. dayanum, Cym. elegans, Cym. erythraeum, Cym. irridioides,</i>               |    |



|                       |   |                                |   |   |    |
|-----------------------|---|--------------------------------|---|---|----|
| 18.<br>QN<br>(b)      | No. of inflorescences / plant                     | Few (<5)                       | 3 | <i>Cym. dayanum</i> , <i>Cym. hookerianum</i> , <i>Cym. lowianum</i> , <i>Cym. lancifolium</i> ,  | VG |
|                       |   | Medium (5-10)                  | 5 | <i>Cym. devonianum</i> , <i>Cym. aloifolium</i> , <i>Cym. pendulum</i> , <i>Cym. tigrinum</i> , <i>Cym. iridioides</i> ,  |    |
|                       |   | Many (>10)                     | 7 |   |    |
| 19.<br>*<br>QN<br>(c) | Flower length (Tip of dorsal sepal to tip of lip) | Small (<2cm)                   | 3 | <i>Cym. elegans</i>   | MS |
|                       |   | Medium (2cm-4cm)               | 5 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> , <i>Cym. gammieanum</i> , <i>Cym. iridioides</i> , <i>Cym. lowianum</i>  |    |
|                       |   | Large (>4cm)                   | 7 | <i>Cym. tigrinum</i> , <i>Cym. dayanum</i> , <i>Cym. aloifolium</i> , <i>Cym. dayanum</i>   |    |
| 20.<br>*<br>QN<br>(c) | Flower width (Tip distance of two lateral petals) | Small (<2cm)                   | 3 | <i>Cym. aloifolium</i> , <i>Cym. dayanum</i>  | MS |
|                       |   | Medium (2cm-4cm)               | 5 | <i>Cym. pendulum</i> , <i>Cym. elegans</i> , <i>Cym. devonianum</i> , <i>Cym. dayanum</i>   |    |
|                       |   | Large (>4cm)                   | 7 | <i>Cym. lowianum</i> , <i>Cym. tigrinum</i> , <i>Cym. gammieanum</i> , <i>Cym. aloifolium</i>   |    |
| 21.<br>QL<br>(b)      | Flower fragrance                                  | Absent                         | 1 | <i>Cym. devonianum</i> , <i>Cym. pendulum</i> , <i>Cym. lowianum</i> , <i>Cym. dayanum</i>  | VG |
|                       |   | Present                        | 9 | <i>Cym. eburneum</i> , <i>Cym. tracyanum</i> , <i>Cym. hookerianum</i> , <i>Cym. tigrinum</i> , <i>Cym. aloifolium</i> ,  |    |
| 22.<br>*<br>QN        | Flower longevity on the plant                     | Short (<20 days)               | 1 | <i>Cym. ensifolium</i>  | VG |
|                       |   | Medium (20-40 days)            | 3 | <i>Cym. erythraeum</i> , <i>Cym. devonianum</i> , <i>Cym. elegans</i> , <i>Cym. mastersii</i> , <i>Cym. pendulum</i> , <i>Cym. tigrinum</i> , <i>Cym. tracyanum</i> |    |
|                       |   | Long (>40 days)                | 5 | <i>Cym. hookerianum</i> , <i>Cym. lowianum</i> , <i>Cym. aloifolium</i> ,   |    |
| 23.<br>PQ<br>(b)      | Flower orientation on inflorescence               | Facing one side                | 1 |   | VG |
|                       |   | Facing all directions          | 3 | <i>Cym. devonianum</i> , <i>Cym. pendulum</i>   |    |
| 24.<br>QL<br>(b)      | Flower predominant colour                         | White                          | 1 | <i>Cym. mastersii</i> , <i>Cym. affine</i>  | VG |
|                       |   | Pink                           | 2 |   |    |
|                       |   | Yellow                         | 3 | <i>Cym. tracyanum</i> , <i>Cym. lowianum</i> , <i>Cym. elegans</i>  |    |
|                       |   | Green                          | 4 | <i>Cym. lowianum</i> , <i>Cym. hookerianum</i>  |    |
|                       |   | Red                            | 5 | <i>Cym. pendulum</i> , <i>Cym. iridioides</i>   |    |
|                       |   | Brown                          | 6 |   |    |
|                       |   | Maroon                         | 7 |   |    |
| 25.<br>QN<br>(c)      | Dorsal sepal size (length x breadth)              | Small (<4cm x <1.5cm)          | 3 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> , <i>Cym. aloifolium</i> , <i>Cym. tigrinum</i> , <i>Cym. dayanum</i>   | MG |
|                       |   | Medium (4cm-8cm) x (1.5-3.0cm) | 5 | <i>Cym. lowianum</i> , <i>Cym. iridioides</i> , <i>Cym. erythraeum</i> , <i>Cym. hookerianum</i>  |    |

|                         |                                       |                                |   |  |    |
|-------------------------|---------------------------------------|--------------------------------|---|--|----|
|                         |                                       | Large (>8cm x > 3.0cm)         | 7 |  |    |
| 26.<br>(+)<br>PQ<br>(c) | Dorsal sepal shape                    | Linear                         | 1 | <i>Cym. pendulum, Cym. aloifolium,</i>   | VG |
|                         |                                       | Oblong                         | 3 | <i>Cym. hookerianum, Cym. tigrinum</i>   |    |
|                         |                                       | Elliptic                       | 5 | <i>Cym. devonianum</i>   |    |
|                         |                                       | Obovate                        | 7 | <i>Cym. lowianum, Cym. gammiaeanum, Cym. erythraeum,</i>   |    |
| 27.<br>(+)<br>PQ<br>(c) | Dorsal sepal curvature                | Incurved with deflex apex      | 1 | <i>Cym. gammiaeanum, Cym. elegans, Cym. pendulum, Cym. tigrinum</i>                                | VG |
|                         |                                       | Incurved without deflex apex   | 3 | <i>Cym. lowianum</i>   |    |
|                         |                                       | Straight                       | 5 |  |    |
|                         |                                       | Deflexed                       | 7 | <i>Cym. dayanum, Cym. aloifolium, Cym. devonianum, Cym. iridioides</i>                             |    |
|                         |                                       |                                |   |  |    |
| 28.<br>(+)<br>PQ<br>(c) | Dorsal sepal apex                     | Acute                          | 1 | <i>Cym. hookerianum, Cym. devonianum, Cym. tigrinum, Cym. dayanum, Cym. irridoides,</i>            | VG |
|                         |                                       | Obtuse                         | 3 | <i>Cym. pendulum, Cym. aloifolium,</i>   |    |
|                         |                                       | Truncate                       | 5 | <i>Cym. truncata, Cym. pendulum,</i>   |    |
|                         |                                       | Emarginate                     | 7 |  |    |
| 29.<br>QN<br>(c)        | Lateral sepal size (length x breadth) | Small (<4cm x < 1.5cm)         | 3 | <i>Cym. pendulum, Cym. devonianum, Cym. aloifolium, Cym. tigrinum, Cym. dayanum, Cym. elegans,</i> | MG |
|                         |                                       | Medium (4cm-8cm) x (1.5-3.0cm) | 5 | <i>Cym. lowianum, Cym. erythraeum,</i>   |    |
|                         |                                       | Large (>8cm x > 3.0cm)         | 7 |  |    |
| 30.<br>(+)<br>PQ<br>(c) | Lateral sepal shape                   | Linear                         | 1 | <i>Cym. pendulum, Cym. aloifolium, Cym. tigrinum</i>   | VG |
|                         |                                       | Oblong                         | 3 |  |    |
|                         |                                       | Elliptic                       | 5 |  |    |
|                         |                                       | Obovate                        | 7 | <i>Cym. erythraeum, Cym. concerto, Cym. gammiaeanum,</i>   |    |
| 31.<br>(+)<br>PQ<br>(c) | Lateral sepal curvature               | Incurved with straight apex    | 1 | <i>Cym. elegans,</i>   | VG |
|                         |                                       | Incurved without deflex apex   | 3 | <i>Cym. devonianum, Cym. lowianum,</i>   |    |
|                         |                                       | Straight                       | 5 | <i>Cym. pendulum,</i>  |    |
|                         |                                       | Deflexed                       | 7 | <i>Cym. tigrinum, Cym. aloifolium,</i>   |    |

|   |                                |                                  |   |   |    |
|---|--------------------------------|----------------------------------|---|---|----|
| 32.<br>(+)<br>PQ<br>(c)                         | Lateral sepal apex             | Acute                            | 1 | <i>Cym. lowianum</i> ,  | VG |
|   |                                | Obtuse                           | 3 | <i>Cym. tigrinum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. devonianum</i> ,   |    |
|   |                                | Truncate                         | 5 | <i>Cym. pendulum</i>  |    |
|   |                                | Emarginate                       | 7 |   |    |
| 33.<br>QL<br>(d)                                | Colour ornamentation in sepals | Absent                           | 1 |   | VG |
|   |                                | Uniform                          | 2 | <i>Cym. hookerianum</i> , <i>Cym. tigrinum</i> , <i>Cym. lancifolium</i> ,<br>(Green), <i>Cym. eburneum</i> (White),<br><i>Cym. aloifolium</i> (Yellow), <i>Cym. erythraeum</i> (Green) |    |
|   |                                | Spotted                          | 3 |   |    |
|   |                                | Blotch                           | 4 |   |    |
|   |                                | Streak/striped                   | 5 | <i>Cym. erythraeum</i> , <i>Cym. tracyanum</i> , <i>Cym. irridoides</i> , (Red brown), <i>Cym. pendulum</i> (Red),<br><i>Cym. devonianum</i> , <i>Cym. pendulum</i> ,(Purple)           |    |
|   |                                | Mottled                          | 6 | <i>Cym. devonianum</i> (Pale yellow to green with purplish brown)   |    |
| Colour of ornamentation as per RHS colour chart |                                |                                  |   |   |    |
| 34.<br>QN<br>(c)                                | Petal size ( length x breadth) | Small (<4cm x <1.5cm)            | 3 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. dayanum</i> , <i>Cym. elegans</i> ,<br><i>Cym. lancifolium</i> , <i>Cym. tigrinum</i>               | MG |
|   |                                | Medium(4 cm-8cm) x (1.5 - 3.0cm) | 5 | <i>Cym. lowianum</i> , <i>Cym. eburneum</i> ,   |    |
|   |                                | Large (>8cm x >3.0cm)            | 7 |   |    |
| 35.<br>*<br>PQ<br>(c)                           | Petal shape                    | Linear                           | 1 | <i>Cym. pendulum</i> , <i>Cym. dayanum</i> ,<br><i>Cym. concerto</i> , <i>Cym. irridoides</i> ,   | VG |
|   |                                | Oblong                           | 3 | <i>Cym. hookerianum</i> , <i>Cym. erythraeum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. tigrinum</i>   |    |
|   |                                | Elliptic                         | 5 | <i>Cym. lancifolium</i> , <i>Cym. devonianum</i> , <i>Cym. gammieanum</i> ,   |    |
|   |                                | Lanceolate                       | 7 | <i>Cym. lowianum</i> ,  |    |
|   |                                | Obovate                          | 9 | <i>Cym. hookerianum</i> ,   |    |
| 36.<br>(+)<br>PQ<br>(c)                         | Petal curvature                | Incurved with deflex apex        | 1 |   | VG |
|   |                                | Incurved with straight Apex      | 3 | <i>Cym. dayanum</i> ,   |    |
|   |                                | Straight                         | 5 | <i>Cym. pendulum</i> , <i>Cym. elegans</i> ,  |    |
|   |                                | Deflexed                         | 7 | <i>Cym. devonianum</i> , <i>Cym. lowianum</i>   |    |
|   |                                | Deflexed with incurved apex      | 9 |   |    |

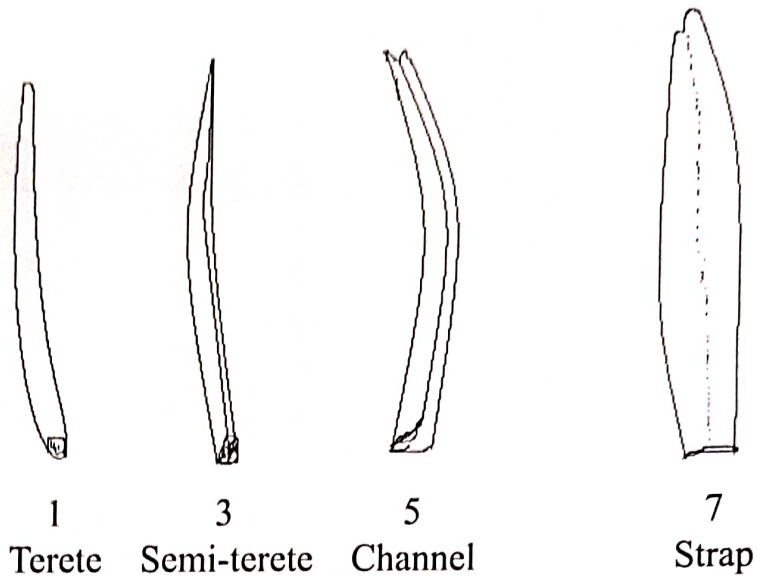
|   |                             |                             |   |   |    |
|---|-----------------------------|-----------------------------|---|---|----|
| 37.<br>(+)<br>PQ<br>(c)                         | Petal apex                  | Acute                       | 1 | <i>Cym. lancifolium</i> , <i>Cym. lowianum</i> ,<br><i>Cym. tigrinum</i> , <i>Cym. dayanum</i> ,<br><i>Cym. erythreum</i> , <i>Cym. irridoides</i> ,<br><i>Cym. elegans</i>                   | VG |
|   |                             | Obtuse                      | 3 | <i>Cym. pendulum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. elegans</i>  |    |
|   |                             | Truncate                    | 5 | <i>Cym. devonianum</i>  |    |
|   |                             | Emarginate                  | 7 |   |    |
| 38.<br>(+)<br>PQ<br>(c)                         | Petal margin                | Entire                      | 1 | <i>Cym. pendulum</i> , <i>Cym. tigrinum</i> ,<br><i>Cym. dayanum</i> ,  | VG |
|   |                             | Slightly undulated/<br>wavy | 3 | <i>Cym. lowianum</i> , <i>Cym.</i><br><i>devonianum</i> , <i>Cym. gammieanum</i>  |    |
|   |                             | Strongly undulated/<br>wavy | 5 |   |    |
| 39.<br>QL<br>(d)                                | Inside petal colour         | Base                        | 1 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i><br>(Red Purple)   | VG |
|   |                             | Margin                      | 3 | <i>Cym. elegans</i> , <i>Cym. gammieanum</i> ,<br><i>Cym. iridoides</i> , <i>Cym. pendulum</i> ,<br>(Yellow), <i>Cym. erythraeum</i> ,<br>(White), <i>Cym. devonianum</i> ,<br>(Yellow green) |    |
|   |                             | Apex                        | 5 | <i>Cym. pendulum</i> , <i>Cym.</i><br><i>devonianum</i> , (red purple)  |    |
| 40.<br>QL<br>(d)                                | Outside petal colour        | Base                        | 1 | <i>Cym. pendulum</i> , <i>Cym.</i><br><i>devonianum</i> , (red purple),   | VG |
|   |                             | Margin                      | 3 | <i>Cym. devonianum</i> (Yellow green),<br><i>Cym. pendulum</i> (purple)   |    |
|   |                             | Apex                        | 5 | <i>Cym. pendulum</i> , <i>Cym.</i><br><i>devonianum</i> , (Red purple),   |    |
| 41.<br>QL<br>(d)                                | Inside petal ornamentation  | Absent                      | 1 |   | VG |
|   |                             | Spotted                     | 3 |   |    |
|   |                             | Blotch                      | 5 |   |    |
|   |                             | Streaked/S<br>triped        | 7 | <i>Cym. devonianum</i> (purple), <i>Cym.</i><br><i>pendulum</i> (red purple)  |    |
| 42.<br>QL<br>(d)                                | Outside petal ornamentation | Absent                      | 1 |   | VG |
|   |                             | Spotted                     | 3 |   |    |
|   |                             | Blotch                      | 5 |   |    |
|   |                             | Streaked/S<br>triped        | 7 | <i>Cym. pendulum</i> <i>Cym. devonianum</i><br>(red purple),  |    |
| Colour of ornamentation as per RHS colour chart |                             |                             |   |   |    |
| 43.<br>QN<br>(c)                                | Lip length<br>(Spread out)  | Small (<<br>3cm)            | 3 | <i>Cym. devonianum</i> , <i>Cym.</i><br><i>aloifolium</i> , <i>Cym. pendulum</i> , <i>Cym.</i><br><i>dayanum</i> , <i>Cym. tigrinum</i>   | MG |
|   |                             | Medium<br>(3cm-<br>5cm)     | 5 | <i>Cym. lowianum</i>  |    |
|   |                             | Large<br>(>5cm)             | 7 |   |    |
| 44.<br>QN<br>(c)                                | Lip width                   | Small<br>(<3cm)             | 3 | <i>Cym. pendulum</i> , <i>Cym. aloifolium</i> ,<br><i>Cym. devonianum</i> , <i>Cym. tigrinum</i> ,<br><i>Cym. dayanum</i>   | MG |
|   |                             | Medium<br>(3cm-<br>5cm)     | 5 | <i>Cym. lowianum</i>  |    |
|   |                             | Large<br>(>5cm)             | 7 |   |    |

|                              |                           |                             |   |  |    |
|------------------------------|---------------------------|-----------------------------|---|--|----|
| 45.<br>*<br>(+)<br>PQ<br>(c) | Lip shape (Spread out)    | Ovate                       | 1 | <i>Cym. iridioides</i>   | VG |
|                              |                           | Oblong-lanceolate           | 2 |  |    |
|                              |                           | Sub-orbicular               | 3 |  |    |
|                              |                           | Circular                    | 4 |  |    |
|                              |                           | Obovate                     | 5 | <i>Cym. eburneum, Cym. devonianum</i>  |    |
|                              |                           | Others                      | 6 | <i>Cym. pendulum</i>   |    |
| 46.<br>(+)<br>PQ<br>(c)      | Lip apex                  | Acute                       | 1 | <i>Cym. devonianum, Cym. iridioides,</i>   | VG |
|                              |                           | Obtuse                      | 3 | <i>Cym. pendulum</i>   |    |
|                              |                           | Notched                     | 5 |  |    |
| 47.<br>(+)<br>PQ<br>(c)      | Lip curvature             | Straight                    | 1 |  | VS |
|                              |                           | Reflexed with straight apex | 3 | <i>Cym. lowianum, Cym. devonianum, Cym. aloifolium, Cym. pendulum, Cym. dayanum,</i>   |    |
|                              |                           | Reflexed with curved apex   | 5 | <i>Cym. Pendulum, Cym. iridioides,</i>   |    |
| 48.<br>PQ<br>(c)             | Lip lobation              | Absent                      | 1 | <i>Cym. pendulum, Cym. aloifolium, Cym. dayanum, Cym. elegans.</i>   | VS |
|                              |                           | Present                     | 9 | <i>Cym. concerto, Cym. erythraeum, Cym. iridioides, Cym. devonianum, Cym. tigrinum, Cym. hookerianum, Cym. lowianum,</i>                 |    |
| 49.<br>PQ<br>(c)             | Shape of lip lateral lobe | Auricular                   | 1 | <i>Cym. devonianum, Cym. pendulum, Cym. tigrinum, Cym. lancifolium,</i>  | VG |
|                              |                           | Triangular                  | 3 | <i>Cym. hookerianum, Cym. lowianum,</i>  |    |
| 50.<br>PQ<br>(c)             | Shape of middle lobe      | Ovate                       | 1 | <i>Cym. hookerianum, Cym. iridioides</i>   | VS |
|                              |                           | Orbicular                   | 3 | <i>Cym. iridioides, Cym. tigrinum,</i>   |    |
|                              |                           | Triangular                  | 5 | <i>Cym. devonianum, Cym. pendulum,</i>   |    |
| 51.<br>*<br>QN<br>(c)        | No of lobes/keels per lip | Absent                      | 1 | <i>Cym. devonianum</i>   | VS |
|                              |                           | Two                         | 3 | <i>Cym. pendulum, Cym. erythraeum, Cym. tigrinum, Cym. lancifolium, Cym. lowianum, Cym. aloifolium, Cym. dayanum</i>                     |    |
|                              |                           | Three                       | 5 | <i>Cym. eburneum</i>   |    |
|                              |                           | Four                        | 7 |  |    |
| 52.<br>PQ<br>(c)             | Lip surface texture       | Glabrous (Smooth)           | 1 | <i>Cym. devonianum, Cym. pendulum</i>  | VS |
|                              |                           | Pubescent (Hairy)           | 9 | <i>Cym. erythraeum, Cym. hookerianum, Cym. lowianum, Cym. eburneum,</i>  |    |
| 53.<br>(+)<br>QL<br>(d)      | Inside lip colour         | Base                        | 1 | <i>Cym. gammaeum, Cym. iridioides, Cym. pendulum, Cym. devonianum, (Red Purple), Cym. hookerianum (Yellow),</i>                          | VG |
|                              |                           | Middle                      | 3 | <i>Cym. aloifolium, Cym. dayanum, Cym. elegans, (Yellow), Cym. iridioides, Cym. devonianum (Red Purple), Cym. pendulum (grey yellow)</i> |    |
|                              |                           | Apex                        | 5 | <i>Cym. pendulum, Cym. devonianum, (red purple)</i>  |    |

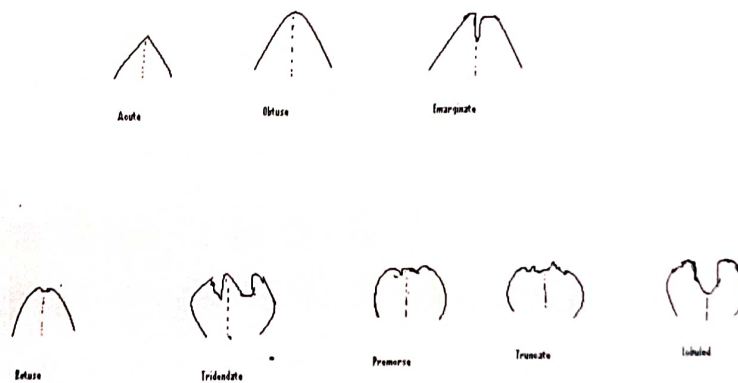
|   |                              |                         |   |   |    |
|---|------------------------------|-------------------------|---|---|----|
| 54.<br>QL<br>(d)                                | Outside lip colour           | Base                    | 1 | <i>Cym. pendulum</i> (grey yellow) <i>Cym. devonianum</i> (red purple)  | VG |
|   |                              | Middle/<br>Margin       | 3 | <i>Cym. pendulum</i> (grey yellow)<br><i>Cym. devonianum</i> , (purple)   |    |
|   |                              | Apex                    | 5 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> , (purple)  |    |
| 55.<br>QL<br>(d)                                | Inside lip ornamentation     | Absent                  | 1 |   | VG |
|   |                              | Spotted                 | 3 | <i>Cym. pendulum</i> (red purple), <i>Cym. hookerianum</i> (red), <i>Cym. tigrinum</i> (brown red), <i>Cym. devonianum</i> (red purple) |    |
|   |                              | Blotch                  | 5 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> (red purple)  |    |
|   |                              | Streaked/S<br>triped    | 7 |   |    |
| 56.<br>QL<br>(d)                                | Outside lip ornamentation    | Absent                  | 1 |   | VG |
|   |                              | Spotted                 | 3 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> (red purple),   |    |
|   |                              | Blotch                  | 5 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> (red purple)  |    |
|   |                              | Streaked/S<br>triped    | 7 |   |    |
| Colour of ornamentation as per RHS colour chart |                              |                         |   |   |    |
| 57.<br>QN<br>(c)                                | Column length                | Short<br>(<2cm)         | 3 | <i>Cym. devonianum</i> , <i>Cym. pendulum</i> , <i>Cym. aloifolium</i> , <i>Cym. dayanum</i>  | MS |
|   |                              | Medium<br>(2cm-<br>4cm) | 5 | <i>Cym. erythraeum</i> , <i>Cym. hookerianum</i> , <i>Cym. lowianum</i> ,<br><i>Cym. tigrinum</i>                                       |    |
|   |                              | Long<br>(>4cm)          | 7 |   |    |
| 58.<br>QL<br>(d)                                | Inside column colour         | Base                    | 1 | <i>Cym. devonianum</i> (purple), <i>Cym. pendulum</i> (red purple)  | VG |
|   |                              | Margin                  | 3 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> (Yellow green)  |    |
|   |                              | Apex                    | 5 | <i>Cym. erythraeum</i> (purple), <i>Cym. pendulum</i> (Red Purple), <i>Cym. devonianum</i> (Yellow green)                               |    |
| 59.<br>QL<br>(e)                                | Outside column colour        | Base                    | 1 | <i>Cym. pendulum</i> (Red Purple) <i>Cym. devonianum</i> (Yellow Green),  | VG |
|   |                              | Margin                  | 3 | <i>Cym. pendulum</i> (Red purple),  |    |
|   |                              | Apex                    | 5 | <i>Cym. pendulum</i> , <i>Cym. devonianum</i> (Red Purple)  |    |
| 60.<br>QL<br>(e)                                | Inside column ornamentation  | Absent                  | 1 |   | VG |
|   |                              | Spotted                 | 3 | <i>Cym. pendulum</i> (Red Purple),  |    |
|   |                              | Blotch                  | 5 | <i>Cym. devonianum</i> (purple), <i>Cym. pendulum</i> (red purple),   |    |
|   |                              | Streaked<br>/Striped    | 7 |   |    |
| 61.<br>QL<br>(e)                                | Outside column ornamentation | Absent                  | 1 |   | VG |
|   |                              | Spotted                 | 3 | <i>Cym. pendulum</i> , (Red Purple),  |    |
|   |                              | Blotch                  | 5 |   |    |
|   |                              | Streaked/s<br>triped    | 7 | <i>Cym. devonianum</i> (purple)   |    |

## Explanations for individual characteristics

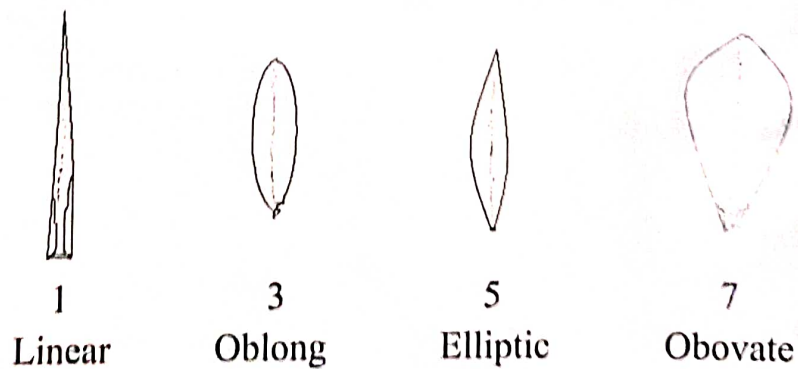
### Characteristics 5: Leaf type



### Characteristics 8, 28, 32, 39, 50: Apexes for leaf, dorsal sepal, lateral sepal, petal and lip



### Characteristics 26 & 30 : Sepal shape



## **Explanations on the Table of Characteristics**

### **For recording the observations of vegetative and flowering characteristics**

Characteristics indicated with (a), (b), (c), (d) and (e) in the first coloumn of the Table of characteristics should be examined as indicated below:

(a) Observations on the leaf, pseudobulb and internode length should be made on the flowering pseudobulb.

(b) Observations on the inflorescence and the flower should be made at the time when 50% of the flowers on the inflorescence have opened, on the most recently fully opened flower on the inflorescence before the color starts to fade.

(c) Observations on the length and width of the flower and parts of the flower should be made on the extended organ.

(d) Observations on the color of the sepal, the petal and the lip should be made on the outer side and inner side at apex, mid and base portion.

(e) Observations on the colour of column should be made on the outer side and inner side at apex, mid and basal region.



|                              |   |                                |   |  |    |
|------------------------------|---|--------------------------------|---|--|----|
| 61.<br>QL<br>(c)             | Outside column ornamentation                    | Uniform/Absent                 | 1 | <i>Vanda stangeana</i> , <i>Vanda cristata</i> ,<br><i>Vanda alpina</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i>   | VS |
|                              |   | Spotted                        | 3 | <i>Vanda parviflora</i> (red purple)   |    |
|                              | Blotch  | 5                              |   |  |    |
|                              | Colour of ornamentation as per RHS colour chart | Streaked/striped/Shaded        | 7 | <i>Vanda coerulescens</i> (violet),  |    |
| 62.<br>QN<br>(c)             | Pedicellate ovary Length                        | Small (<2cm)                   | 3 |  | MS |
|                              |   | Medium (2-4cm)                 | 5 | <i>Vanda alpina</i> , <i>Vanda cristata</i> ,<br><i>Vanda parviflora</i> , <i>Vanda teres</i>  |    |
|                              |   | Large (>4cm)                   | 7 | <i>Vanda coerulea</i> , <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> ,<br><i>Vanda tessellata</i>  |    |
| 63.<br>*<br>(+)<br>PQ<br>(c) | Spur type                                       | Saccate                        | 1 | <i>Vanda alpina</i>  | VG |
|                              |   | Conical                        | 3 | <i>Vanda coerulea</i> , <i>Vanda parviflora</i> ,<br><i>Vanda coerulescens</i> , <i>Vanda pumila</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i> |    |
|                              |   | Cylindric                      | 5 | ---  |    |
|                              |   | Tubular                        | 7 | <i>Vanda parviflora</i>  |    |
|                              |   |                                |   |  |    |
| 64.<br>QN<br>(c)             | Spur length                                     | Short (<0.5cm)                 | 3 |  | MS |
|                              |   | Medium (0.5-1.0cm)             | 5 | <i>Vanda coerulea</i> , <i>Vanda cristata</i> ,<br><i>Vanda pumila</i> , <i>Vanda tessellata</i> ,<br><i>Vanda stangeana</i> , <i>Vanda coerulescens</i> , <i>Vanda parviflora</i>                   |    |
|                              |   | Long (>1.0cm)                  | 7 | <i>Vanda teres</i>   |    |
| 65.<br>*<br>PQ               | Flowering season                                | Winter season (Nov - January)  | 1 | <i>Vanda coerulea</i>  | VG |
|                              |   | Spring season (February-April) | 3 | <i>Vanda coerulescens</i> , <i>Vanda bicolor</i> , <i>Vanda cristata</i> , <i>Vanda stangeana</i>  |    |
|                              |   | Summer season (May-July)       | 5 | <i>Vanda teres</i> , <i>Vanda cristata</i> ,<br><i>Vanda parishii</i> , <i>Vanda stangeana</i> ,<br><i>Vanda pumila</i> , <i>Vanda parviflora</i> ,<br><i>Vanda alpina</i> , <i>Vanda tessellata</i> |    |
|                              |   | Rainy season (August-Oct)      | 7 | <i>Vanda alpina</i> , <i>Vanda coerulescens</i> , <i>Vanda parishii</i> ,<br><i>Vanda stangeana</i> , <i>Vanda tessellata</i>  |    |

|                  |  |                        |   |   |    |
|------------------|--|------------------------|---|---|----|
| 56.<br>QL<br>(d) | Outside lip<br>ornamentation<br>(As per RHS<br>colour chart) | Absent                 | 1 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda alpina</i>  | VG |
|                  |  | Spotted                | 2 | <i>Vanda parviflora</i> (Red purple)  |    |
|                  |  | Blotch                 | 3 | <i>Vanda cristata</i> ,   |    |
|                  |  | Streaked/Striped       | 4 | <i>Vanda cristata</i> (red purple), <i>V. teres</i> (red purple),   |    |
|                  |  | Tassellated            | 5 | <i>Vanda tessellata</i> (purple violet)   |    |
|                  |  | Netted                 | 6 |   |    |
| 57.<br>QN<br>(c) | Column length  | Short (<0.5cm)         | 3 | <i>Vanda alpina</i> , <i>Vanda parviflora</i> , <i>Vanda pumila</i>   | MS |
|                  |  | Medium (0.5cm - 1.0cm) | 5 | <i>Vanda coerulea</i> , <i>Vanda cristata</i> , <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i> , <i>Vanda bicolor</i>  |    |
|                  |  | Long (>1.0cm)          | 7 |   |    |
| 58.<br>QL<br>(e) | Inside column<br>colour                                      | Base                   | 1 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> (white), <i>Vanda parviflora</i> (yellow orange), <i>Vanda alpina</i> (white), <i>Vanda teres</i> (yellow), <i>Vanda tessellata</i> (white)                                    | VG |
|                  |  | Middle                 | 3 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> , (white), <i>Vanda parviflora</i> (yellow orange), <i>V. 'Sansai Blue'</i> (white), <i>Vanda alpina</i> (white), <i>Vanda teres</i> (yellow), <i>Vanda tessellata</i> (white) |    |
|                  |  | Apex                   | 5 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> (White), <i>Vanda parviflora</i> (yellow orange), <i>Vanda alpina</i> (white), <i>Vanda teres</i> (yellow), <i>Vanda tessellata</i> (white)                                    |    |
| 59.<br>QL<br>(e) | Outside<br>column colour                                     | Base                   | 1 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> (white), <i>Vanda parviflora</i> (yellow orange), <i>Vanda alpina</i> (white), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (white)                                | VG |
|                  |  | Middle/margin          | 3 | <i>Vanda coerulescens</i> (Violet-white), <i>V. stangeana</i> , <i>Vanda cristata</i> , (white), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (white), <i>Vanda teres</i> (yellow), <i>Vanda tessellata</i> (white)                       |    |
|                  |  | Apex                   | 5 | <i>Vanda coerulescens</i> (Purple),), <i>Vanda stangeana</i> , <i>Vanda cristata</i> (white), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (white), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (white)                      |    |
| 60.<br>QL<br>(e) | Inside column<br>ornamentation                               | Uniform                | 1 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> , <i>Vanda alpina</i> , <i>Vanda tessellata</i>  | VS |
|                  |  | Spotted                | 3 | <i>Vanda parviflora</i> , <i>Vanda teres</i> (red purple)   |    |
|                  |  | Blotch                 | 5 |   |    |
|                  |  | Streaked/Striped       | 7 |   |    |

|                       |   |                   |   |  |    |
|-----------------------|---|-------------------|---|--|----|
| 51.<br>PQ<br>(c)      | Keels/Callus<br>No.   | Absent            | 1 | <i>Vanda alpina</i> , <i>Vanda cristata</i>  | VG |
|                       |   | Two               | 3 | <i>Vanda tessellata</i>  |    |
|                       |   | Three             | 5 | <i>Vanda stangeana</i> , <i>Vanda parviflora</i> , <i>Vanda teres</i>  |    |
|                       |   | More than three   | 7 | <i>Vanda coerulescens</i> ,  |    |
| 52.<br>PQ<br>(c)      | Lip surface   | Glabrous (Smooth) | 1 | <i>Vanda alpina</i> , <i>Vanda coerulescens</i> , <i>Vanda tessellata</i> , <i>Vanda stangeana</i> ,   | VS |
|                       |   | Pubescent (Hairy) | 3 | <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda teres</i>   |    |
| 53.<br>QL<br>(d)      | Inside lip<br>colour  | Base              | 1 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> (white), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (purple), <i>Vanda teres</i> (yellow), <i>Vanda tessellata</i> (white yellow)                       | VG |
|                       |   | Middle            | 3 | <i>Vanda coerulescens</i> (yellow), <i>Vanda cristata</i> (yellow), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (purple), <i>Vanda teres</i> (yellow), <i>Vanda tessellata</i> (white violet)                                       |    |
|                       |   | Apex              | 5 | <i>Vanda coerulescens</i> (white), <i>Vanda stangeana</i> (grey orange), <i>Vanda cristata</i> (yellow), <i>Vanda parviflora</i> (red purple), <i>Vanda alpina</i> (purple), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (white violet) |    |
| 54.<br>QL<br>(d)      | Outside lip<br>colour                                       | Base              | 1 | <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> (white), <i>Vanda cristata</i> (yellow green), <i>Vanda parviflora</i> (yellow orange), <i>Vanda alpina</i> (green), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (white)             | VG |
|                       |   | Middle            | 3 | <i>Vanda coerulescens</i> (violet), <i>Vanda cristata</i> (purple), <i>Vanda stangeana</i> (grey orange), <i>Vanda parviflora</i> (yellow orange), <i>Vanda alpina</i> (purple), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (white)    |    |
|                       |   | Apex              | 5 | <i>Vanda coerulescens</i> (violet), <i>Vanda stangeana</i> (grey orange), <i>Vanda cristata</i> (yellow), <i>Vanda parviflora</i> (Red purple), <i>Vanda alpina</i> (purple), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (white)       |    |
| 55.<br>*<br>QL<br>(d) | Inside lip<br>ornamentation<br>(As per RHS<br>colour chart) | Uniform           | 1 |  | VG |
|                       |   | Spotted           | 2 | <i>Vanda parviflora</i> (Red purple), <i>Vanda teres</i> (red purple)  |    |
|                       |   | Blotch            | 3 | <i>Vanda cristata</i> (red purple),  |    |
|                       |   | Streaked/Striped  | 4 | <i>Vanda alpina</i> , <i>Vanda cristata</i> (red purple), <i>Vanda coerulescens</i> (white), <i>Vanda alpina</i> (green), <i>Vanda teres</i> (red purple),   |    |
|                       |   | Tassellated       | 5 | <i>Vanda tessellata</i> (purple violet),   |    |
|                       |   | Netted            | 6 |  |    |

|                              |  |                             |   |  |    |
|------------------------------|--|-----------------------------|---|--|----|
| 43.<br>*<br>QL<br>(d)        | Inside petal ornamentation (As per RHS colour chart) | Uniform                     | 1 | <i>Vanda cristata</i> , <i>Vanda parviflora</i> ,<br><i>Vanda alpina</i> , <i>Vanda teres</i>  | VG |
|                              |  | Spotted                     | 2 |  |    |
|                              |  | Blotch                      | 3 |  |    |
|                              |  | Streaked/Striped            | 4 |  |    |
|                              |  | Tassellated                 | 5 | <i>Vanda coerulescens</i> (yellow green), <i>Vanda tessellata</i> (grey brown)   |    |
|                              |  | Netted                      | 6 | <i>V. stangeana</i> (red purple),  |    |
| 44.<br>QL<br>(d)             | Outside petal ornamentation                          | Uniform                     | 1 | <i>Vanda coerulescens</i> , , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda tessellata</i>  | VG |
|                              |  | Spotted                     | 1 |  |    |
|                              |  | Blotch                      | 3 |  |    |
|                              |  | Streaked/Striped/shaded     | 5 | <i>Vanda alpina</i> (purple shaded) ,<br><i>Vanda teres</i> (purple shaded)  |    |
|                              |  | Tassellated                 | 7 | <i>Vanda stangeana</i>   |    |
|                              |  | Netted                      | 9 |  |    |
| 45.<br>QN<br>(c)             | Lip length (Spread out)                              | Small (<1.5cm)              | 3 | <i>Vanda alpina</i> , <i>Vanda parviflora</i> ,<br><i>Vanda tessellata</i> , <i>Vanda bicolor</i>  | MG |
|                              |  | Medium (1.5cm - 3.0cm)      | 5 | <i>Vanda coerulea</i> , <i>Vanda cristata</i> ,<br><i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda pumila</i> ,  |    |
|                              |  | Large (>3.0cm)              | 7 | <i>Vanda teres</i>   |    |
| 46.<br>QN<br>(c)             | Lip width  | Small (<1cm)                | 3 | <i>Vanda alpina</i> , <i>Vanda coerulea</i> ,<br><i>Vanda cristata</i> , <i>Vanda parviflora</i> , ,<br><i>Vanda pumila</i> , <i>Vanda coerulescens</i> , <i>Vanda bicolor</i> | MG |
|                              |  | Medium (1cm-2cm)            | 5 | <i>Vanda stangeana</i> ,   |    |
|                              |  | Large (>2cm)                | 7 | <i>Vanda teres</i>   |    |
|                              |  |                             |   |  |    |
| 47.<br>*<br>(+)<br>PQ<br>(c) | Lip: mid - lobe shape                                | Ovate                       | 1 | <i>Vanda alpina</i> , <i>Vanda pumila</i>  | VG |
|                              |  | Oblong-lanceolate           | 3 | <i>Vanda coerulea</i> , <i>Vanda parviflora</i> ,<br><i>Vanda coerulescens</i> ,   |    |
|                              |  | Sub-orbicular               | 5 |  |    |
|                              |  | others                      | 7 | <i>Vanda cristata</i> , <i>Vanda stangeana</i> ,<br><i>Vanda teres</i> , <i>Vanda tessellata</i>   |    |
| 48.<br>(+)<br>PQ<br>(c)      | Lip: lateral lobe shape)                             | Ovate                       | 1 | <i>Vanda teres</i>   | VG |
|                              |  | Oblong-lanceolate           | 3 | <i>Vanda pumila</i> , <i>Vanda alpina</i> ,<br><i>Vanda tessellata</i>   |    |
|                              |  | Sub-orbicular               | 5 | <i>Vanda bicolor</i> , <i>Vanda parviflora</i>   |    |
|                              |  | Others                      | 7 | <i>Vanda alpina</i> , <i>Vanda coerulea</i> ,<br><i>Vanda cristata</i> , <i>Vanda coerulescens</i> ,   |    |
| 49.<br>(+)<br>PQ<br>(c)      | Lip curvature  | Straight                    | 1 | <i>Vanda cristata</i> , <i>Vanda coerulescens</i> , <i>Vanda alpina</i> ,<br><i>Vanda tessellata</i>   | VG |
|                              |  | Deflexed with straight apex | 3 | <i>Vanda teres</i>   |    |
|                              |  | Deflexed with curved apex   | 5 | <i>V. stangeana</i> , <i>Vanda parviflora</i>  |    |
| 50.<br>(+)<br>PQ<br>(c)      | Lip apex   | Acute                       | 1 |  | VG |
|                              |  | Obtuse                      | 3 |  |    |
|                              |  | Notched                     | 5 | <i>Vanda pumila</i> , <i>Vanda parviflora</i>  |    |
|                              |  | Lobuled                     | 7 | <i>Vanda tessellata</i> , <i>Vanda cristata</i> ,<br><i>Vanda coerulescens</i> , <i>Vanda bicolor</i> , <i>Vanda stangeana</i> , <i>Vanda alpina</i> , <i>Vanda teres</i>      |    |

| Colour of ornamentation as per RIIS colour chart |                  |                                  |   |   |    |
|--|------------------|----------------------------------|---|---|----|
| 62.<br>QN<br>(c)                                 | Pedicel length   | Short (<4cm)                     | 3 | <i>Cym. pendulum, Cym. elegans, Cym. erythraeum, Cym. devonianum, Cym. erythraeum, Cym. hookerianum,</i>            | MS |
|  |                  | Medium (4cm-8cm)                 | 5 | <i>Cym. iridioides, Cym. concerto, Cym. lowianum,</i>   |    |
|  |                  | Long (>8cm)                      | 7 |   |    |
| 63.<br>*<br>PQ                                   | Flowering season | Winter season (November-January) | 1 | <i>Cym. elegans, Cym. lowianum, Cym. erythraeum, Cym. iridioides, Cym. tracyanum, Cym. giganteum Cym ensifolium</i> | VG |
|  |                  | Spring season (February-April)   | 3 | <i>Cym. hookerianum, Cym. eburneum, Cym. pendulum, Cym. devonianum, Cym. lowianum, Cym. tigrinum</i>                |    |
|  |                  | Summer season (May-July)         | 5 | <i>Cym. devonianum, Cym. eburneum,</i>  |    |
|  |                  | Rainy season (August-October)    | 7 | <i>Cym. lancifolium Cym. elegans, Cym. erythraeum, Cym. iridioides</i>  |    |

## Explanations on the Table of Characteristics

### For recording the observations of vegetative and flowering characteristics

Characteristics indicated with (a), (b), (c), (d) and (e) in the first column of the Table of characteristics should be examined as indicated below:

(a) Observations on the leaf, pseudobulb and internode length should be made on the flowering pseudobulb.

(b) Observations on the inflorescence and the flower should be made at the time when 50% of the flowers on the inflorescence have opened, on the most recently fully opened flower on the

inflorescence before the color starts to fade.

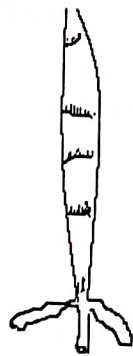
(c) Observations on the length and width of the flower and parts of the flower should be made on the extended organ.

(d) Observations on the color of the sepal, the petal and the lip should be made on the outer side and inner side at apex, mid and base portion.

(e) Observations on the colour of column should be made on the outer side and inner side at apex, mid and basal region.

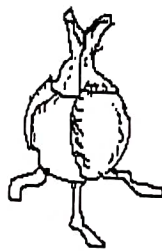
## Explanations for individual characteristics

### Characteristic 2: Pseudobulb shape



1

Narrow  
Cylindrical



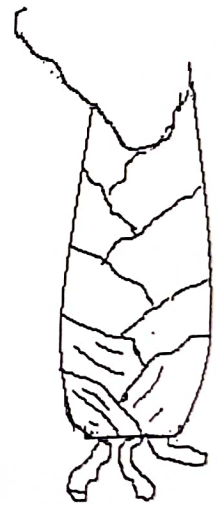
3

Round



5

Ovoid



7

Conical

## Characteristics 6: Leaf shape



1  
Linear



3  
Linear-oblong



5  
Lanceolate

## Characteristics 8, 28, 32, 37 & 46: Apexes for leaf, dorsal sepal, lateral sepal, petal and lip



Acute



Obtuse



forked

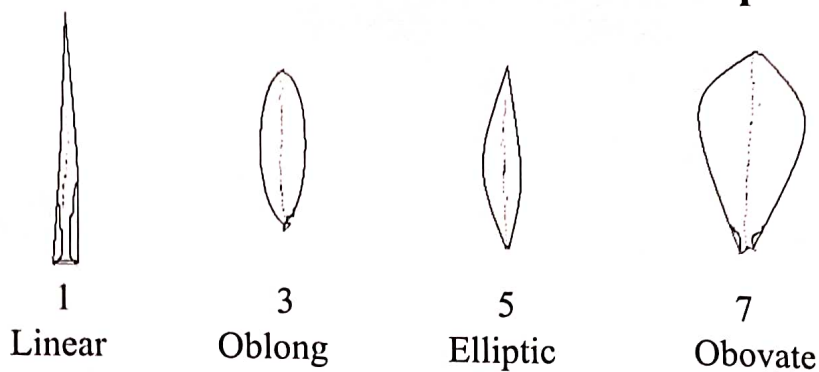


Truncate

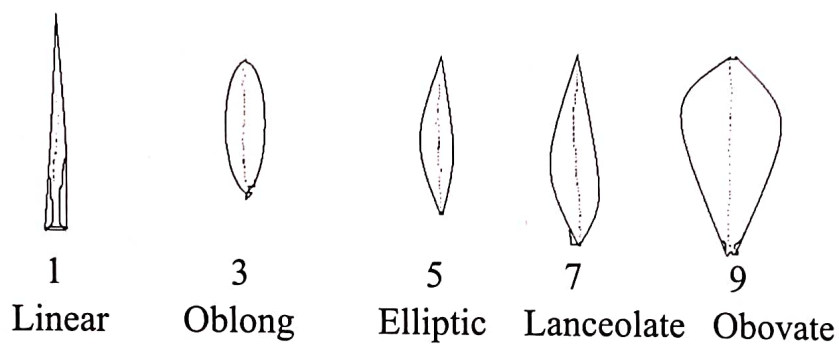


Emarginate

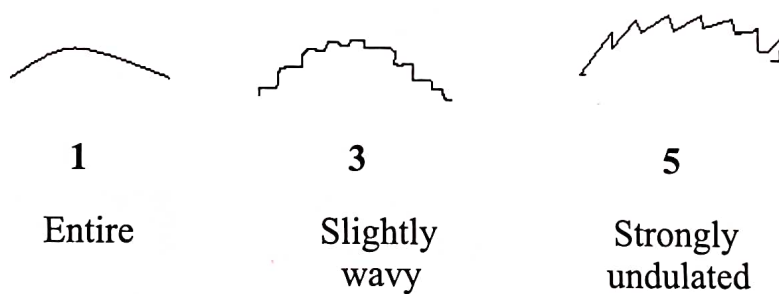
**Characteristics 26 & 30 : Dorsal and lateral sepal shape**



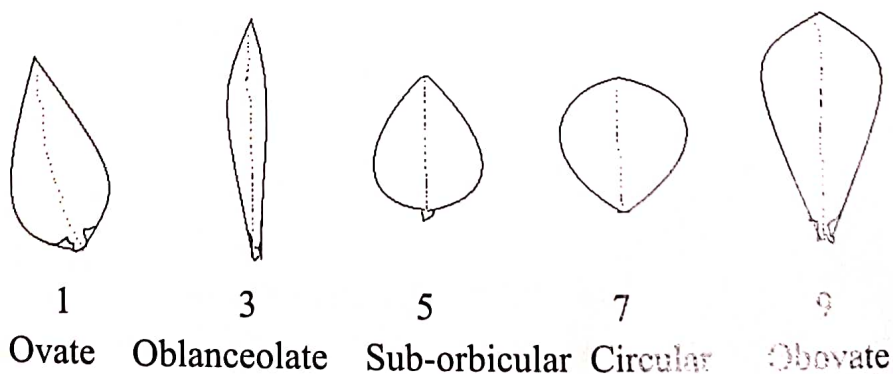
**Characteristics 35: Petal shape**



**Characteristics 38: Petal margin**



**Characteristics 45: Lip shape**



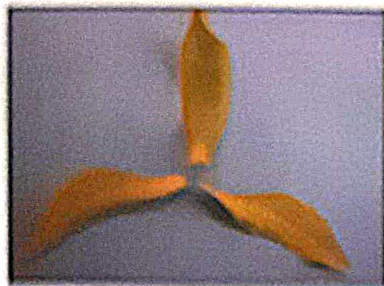


# Digitalization

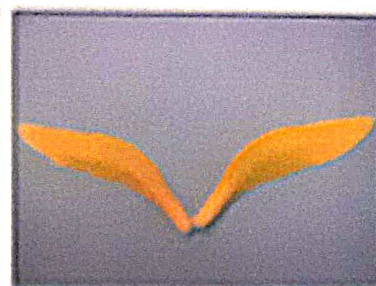
## 1. *Cym. lowianum*



General appearance of flower



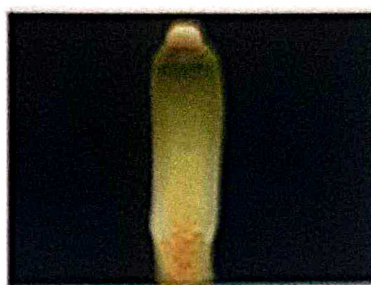
Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 3.5 x 12.0 cm.

Sepal size & color : Dorsal sepal: 6.5 x 1.7 cm; Lateral sepals: 5.8 x 1.8 cm; Inside: yellow-green (RHS-152 B) at base & apex & (RHS- 152C) at margins; Outside: yellow-green (RHS-152C) at base & margins, (RHS- 152A) at apex with yellow-green (RHS- 152A) stripes both inside & outside.

Petal size & color : 5.5 x 1.2 cm: yellow-green (RHS- 152C) at base, (RHS- 153A) at apex & margins with yellow-green (RHS- 152A) stripes both inside & outside.

Lip size & color : 3.8 x 3.5 cm; Inside: yellow-orange (RHS- 17A) at base, red-purple (RHS- 59B) at apex and yellow-green (RHS- 153D) at margins with red-purple (RHS- 59B) spots at

base & blotch at apex & yellow (RHS-2B) stripes at lateral lobes; Outside: yellow-orange (RHS- 17D) at base, greyed-purple (RHS- 184B) at apex and yellow-green (RHS- 153D) at margins with yellow (RHS- 2B) stripes at lateral lobes.

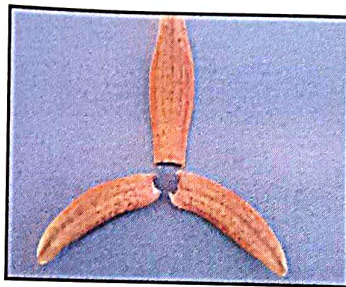
Lip callus : Present (2).

Column length & color : 3.9 cm; Inside: yellow (RHS- 2D) at base & margins and yellow-green (RHS144B) at apex with red-purple (RHS- 59A) spots; Outside: yellow (RHS- 2C & 2D) at base & margins respectively and yellow-green (RHS-144A) at apex.

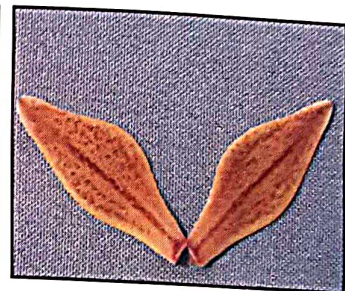
## 2. *Cym. devonianum*



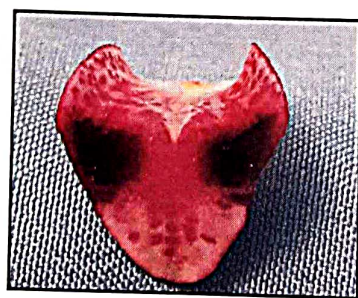
General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 3.7 x 2.5 cm.

Sepal size & color : Dorsal sepal: 2.8 x 0.9 cm; Lateral sepals: 2.5 x 0.9 cm; Inside: yellow-green (RHS- 152D) at base &

margins & purple (RHS- N 79B) at apex; Outside: purple (RHS- N 79B) at base & apex, yellow-green (RHS152D) at margins with purple (RHS- N 79B) stripes.

Petal size & color : 2.3 x 0.8 cm; Inside: purple (RHS- N77D & N 79B) at base & apex respectively, yellow –green (RHS 145 C) at margins with purple (RHS- N 79A) stripes; Outside: purple (RHS- N 79B) at base & apex, yellow-green (RHS- 145C) at margins with purple (RHS- N 79A) streaks.

Lip size & color : 1.7 x 1.4 cm; Inside: purple (RHS- 76D, N 79D & N 79B ) at base, apex & margins respectively; Outside: purple (RHS- N 79A) at base and (RHS- N 79 B) at apex & margins with purple (RHS- N 77B) spots & purple (RHS- N 79A) blotch both inside & outside.

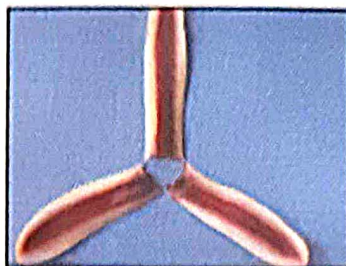
Lip callus : Absent.

Column length & color : 1.6 cm; Inside: purple (RHS- N 79A) at base, yellow-green (RHS- 145B & 145C) at apex & margins respectively with purple (RHS- N 79A) blotch at base; Outside: purple (RHS- 145C & 145D) at base & margins respectively and red-purple (RHS- 64A) at apex with purple (RHS- N 79B) stripe at two sides and red-purple (RHS- 64A) streak at apex.

### 3. *Cym. pendulum*



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 2.2 x 3.8 cm.

Sepal size & color: Dorsal sepal: 1.7 x 0.4 cm; Lateral sepal: 1.7 x 0.4 cm; Inside: red-purple (RHS- 59A) at base & apex and yellow (RHS-11C) at margins with red-purple (RHS- 59A) stripes; Outside: purple (RHS- N 79A & N 79B) at base & apex respectively and greyed-yellow (RHS-162C) at margins.

Petal size & color: 1.6 x 0.5 cm; Inside: red-purple (RHS- 59A) at base & apex and yellow (RHS-11C) at margins with red-purple (RHS- 59A) stripes; Outside: purple (RHS- N 79A & N 79B) at base & apex respectively and yellow (RHS-11C) at margins with purple (RHS- N 79A) stripes.

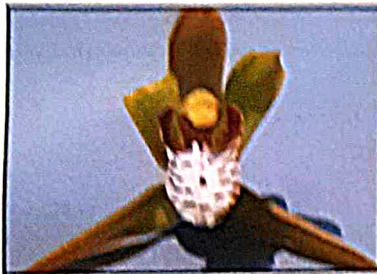
Lip size & color : 1.5 x 1.3 cm; purple (RHS- N 79B) at apex and greyed-yellow (RHS- 261D) at margins of both inside & outside, red-purple (RHS- 59B) at inside base and purple (RHS-

N 79B) at outside base with red-purple (RHS- 59B) spots & purple (RHS- N 79B) blotch both inside & outside.

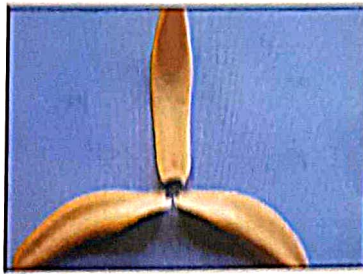
Lip callus : Present (2).

Column length & color: 1.1 cm; Inside: red-purple (RHS- 59A); Outside: red-purple (RHS- 59B) at base & apex and (RHS-59A) at margins with red-purple (RHS- 59B) spots both inside & outside.

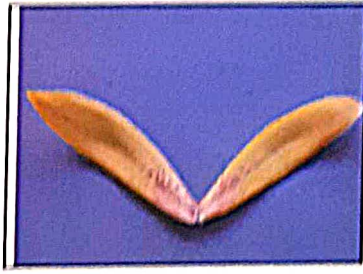
#### 4. *Cym. tigrinum*



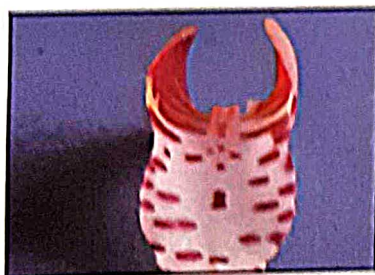
General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 6.0 x 7.0 cm.

Sepal size & color : Dorsal sepal: 4.0 x 1.0 cm; Lateral sepal: 3.7 x 1.0 cm; Inside: yellow –green (RHS- 152C); Outside: yellow –green (RHS- 152B, 152C & 152D) at base, apex & margins respectively with greyed-red (RHS- 178A) spots & streaks inside and similar shades outside

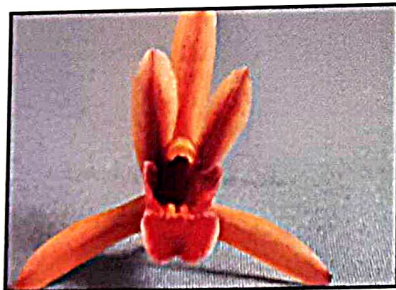
Petal size & color : 3.8 x 0.9 cm; yellow-green (RHS- 152C) with red-purple (RHS-59A) spots at inside base and similar shades at outside.

Lip size & color : 2.6 x 2.5 cm; yellow-green (RHS- 152D) at base, yellow-white (RHS- 158B) at apex, margins of apical lobe yellow-white (RHS- 158B) & margins of lateral lobes greyed-red (RHS- 178A) with purple (RHS- N 79B) spots & streaks inside & similar spots at outside base.

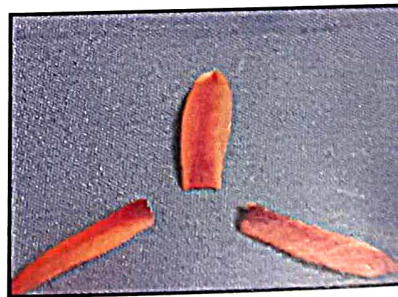
Lip callus : Present (2).

Column length & color : 3.2 cm; white (RHS- 155A) at base, yellow-green (RHS- 144A) at apex & purple (RHS- N 79C) at margins with purple (RHS- N 79C) streaks inside.

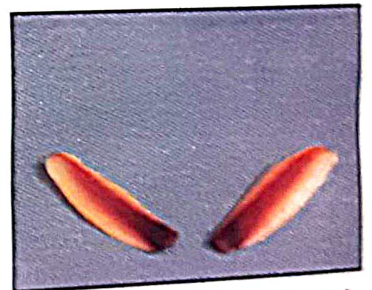
### 5. *Cym. aloifolium*



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 4.5 X 4.1 cm

Sepal size & color : Dorsal sepal: 2.4 X 0.7cm; Lateral sepals: 2.4 X 0.8 cm; red purple (RHS-59A) at base and yellow (RHS-7C) at apex and margins.

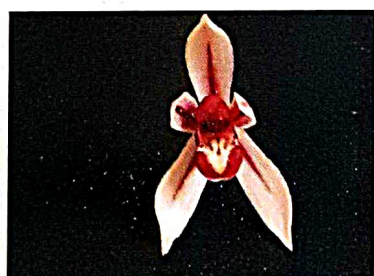
Petal size & color : 2.2 X 0.6 cm; red purple (RHS-59A) at base and yellow (RHS-7D) at apex and margins.

Lip size & color : 1.9 X 1.3 cm; Inside: yellow (RHS- 12C) at base red purple (RHS-59B) at apex and red purple (RHS-69D) at margins; Outside: red purple (RHS-59A) at base, purple (RHS-N79B) at apex and red purple (RHS-69D) at margins.

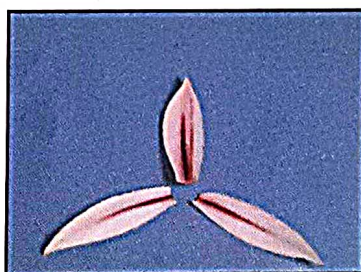
Lip callus : present (2)

Column length & color: 0.8 cm; red purple (RHS-59A).

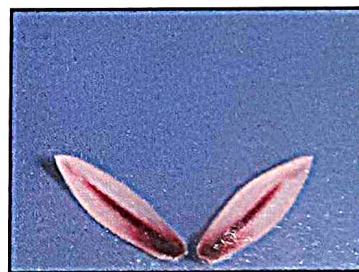
## 6. *Cym. dayanum*



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 6.0 X 3.2 cm

Sepal size & color : Dorsal sepal: 3.4 X 0.8 cm; Lateral sepals: 3.3 X 0.7 cm, white (RHS-N155D) with red purple (RHS-59A) stripe.

Petal size & color : 2.5 X 0.6 cm, red- purple (RHS-59A) at base and white (RHS-N 155D) at base and apex.

Lip size & color : 2.0 X 1.5 cm; Inside: white (RHS- N 155C) at base & apex and red purple (RHS- 59A) at margins; Outside: red purple (RHS- 59A) at base & margins and white (RHS- N 155 C) at apex with red purple (RHS-59A) striped.

Lip callus : present (2)

Column length & color : 1.2 cm; Inside: white (RHS-N155 C) at base, violet blue (RHS-N 92A) at apex and violet blue (RHS-N79 A) at margins; Outside: violet blue (RHS-N79 B) at base, violet blue (RHS-N 92A) at apex and purple (RHS- N79 B) at margins.



