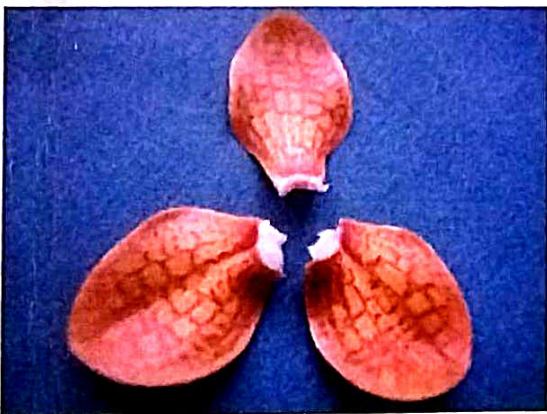


Morphological Characterization in **VANDA SPP.**



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Cover Photographs

Front: Glimpses of Vanda species

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PREFACE

Vanda is widely distributed throughout Australasia from China through the Philippines, Indonesia, Malaysia, New Guinea and Australia, Myanmar, Thailand, India and Sri Lanka. In the world tropical orchid trade, in addition to *Dendrobium*, *Mokara*, *Oncidium*, *Aranthera*, *Aranda*, *Arachnis*, *Renanthera*, *Ascocenda*, *Phalaenopsis*, *Cattleya* and *Paphiopedilum*, *Vandas* are being grown as cut flowers and potted plants.

The present technical publication '*Morphological Characterization in Vanda spp*' under the 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)

Contents

1.	Introduction	1
2.	Botanical description	1
3.	Valuable genetic resources	2
4.	Grouping of species	5
5.	Characteristics and Symbol	5
6.	Table of morphological characteristics	7
7.	Explanation on table of characteristics	17
8.	Digitalization	20

Introduction

The Vanda orchids are totally tropical and are easy to grow. Some species can be exposed to full sun. They are cross compatible with other genera like *Ascocentrum*, *Aerides*, *Rhyncostylis*, *Neofinetia*, *Renanthera* and even *Phalaenopsis*.. All orchids having the same characteristics as the *Vanda* genus is called as a vandaceous orchid and they grouped together to form the *Vanda Alliance*. Genera like *Vandas*, *Aerides*, *Ascocentrum*, *Renanthera*, *Rhyncostylis*, *Aranda*, *Mokara*, *Kagawara* are included in the *Vanda Alliance*. Many of orchids under this group are called as 'Scorpion Orchids' or 'Spider Orchids'. They are ideal for hanging baskets, pots or tree logs. Leaf juice of *Vanda coerulea* is used against diarrhea, dysentery and external application for skin diseases. Leaf paste of *Vanda teres* is applied to reduce temperature in fever. Leaves of *Vanda cristata* are used as tonic and expectorant. In *Vanda tessellata*, paste of leaves is effective against fever. It is ingredient of Rasna Panchaka Quatha. In Ayurvedic medicine, it is used in the treatment of arthritis and rheumatism. The leaf juice extract is used in the treatment of otitis media. The root is an effective against scorpion sting and bronchitis.

Botanical description

Vanda consists of more than 70 species of monopodial epiphytic orchids distributed in India, China, The Himalayas, Sri Lanka, Philippines and throughout South East Asia. These commercial orchids are grown in Thailand, Singapore, Malayasia and Hawaii.

They are diversified in vegetative and reproductive growth. Based on leaf characters they grouped into four categories, e.g., strap shaped, terete, semi-terete and channeled. The tip of strap shaped leaves is very irregular while the terete leaves are of pencil thickness. The inflorescence arise from the axil of the leaves in strap leaved orchids whereas in case of terete leaved orchids inflorescence emerge from on the side of the stem of opposite leaf. The inflorescence is axillary, erect, and simple. The flowers are small to large, few to many , fleshy, heavy textured , long lasting and yellow, brown, purple, magenta, blue, lavender in colour. The flower size varies from 2.5 to 10 cm.

Valuable genetic resources

Vanda amnesiana: This species is distributed in India, Thailand, Vietnam, Laos and Columbia. Plants are short with thick leafy stems and semi-terete cylindrical leaves. The inflorescence is erect, 75cm tall, 15 to 30 flowered. The flowers are pinkish white with purple pink lip and are produced in winter.

Vanda coerulea: This species is native to Arunachal Pradesh, Meghalaya, Nagaland and Manipur. The plants are robust with leathery channelled leaves. The inflorescence is erect or arching, 60cm long and bears more than 12 flowers. The flowers are 10cm across, pale lavender blue in colour and are produced during October-February.



Vanda coerulea

Vanda coerulescens: A floriferous compact strap leafed orchid from China, Myanmar and Thailand. The inflorescence is long bearing flowers of various shades of blue.



Vanda cristata: This species is native to India, Nepal and



Bhutan. It bears short spikes with medium sized greenish flowers with red striped lips during May-June.

Vanda cristata

Vanda tessellata: A strap leafed species from Philippines and Indonesia. It is used as parental material to develop multiflowered hybrids. Flowers are brownish green with darker tessellation. The lip is indigo blue.



Vanda tessellata

Vanda sanderiana: A strap leafed species from Philippines. The inflorescence is erect, bearing 8 to 12 flowers. Flowers are light to rose lavender and produced during August to September.



Vanda teres

Vanda teres: This species is native to India and Burma. The stems are slender, terete, branched from the near base and above. The leaves are cylindrical, 20cm long and well spaced on the stem. The inflorescence is 30cm long, 3 to 20 flowered. The flowers are fragrant, 10cm across, long lasting and

rose white in colour and produced in May-July.

Vanda stangeana: This species is native to Assam and Arunachal Pradesh. The inflorescences develop from the leaf axils with 5 to 10 flowers. The flowers are 4-6cm across, greenish yellow to ochre in colour, tessellated and dark brown and produced in April-May.



Vanda stangeana



Vanda parviflora

Vanda parviflora: Native to Nepal, Sikkim and Bhutan. Flowers are pale yellow with deep lip and produced during April-June.

Vanda tricolor: The plants are robust, 1.2m tall, leafy and freely rooting. Inflorescence is 7 to 12 flowered, stout and 35cm long. The flowers are scented, waxy, long lasting, 7.5cm across and yellow maculated with brown and lip is violet.

Vanda parishii: Native to Indo-Burma. Flowers are fragrant and greenish purple and produced during May-July.

Vanda hookeriana: This species is native to Malayasia, Indonesia and Thailand. Flowers are pink with red spotted lip.

Vanda dearei: It is the chief source of yellow coloured hybrids.

Grouping of species

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

- (a) Leaf type
- (b) Inflorescence length
- (c) Flower number
- (d) Flower: predominant colour
- (e) Sepal ornamentation
- (f) Petal ornamentation
- (g) Lip: mid lobe shape
- (h) Lip: main colour
- (i) Lip: ornamentation
- (j) Spur length

(k) Flowering season

Characteristics and Symbols

1. To assess 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 Characteristics

S. No.	Characteristics	States	Notes	Example Varieties /Species	Type of Assessment
1. QN (a)	Plant Type	Fall (with large internodes)	1	<i>Vanda coerulea</i> , <i>Vanda bicolor</i> , <i>Vanda teres</i>	VG
		Intermediate (leaf closely packed)	3	<i>Vanda tessellata</i> , <i>Vanda coerulescens</i> , <i>Vanda coerulea</i> x <i>Vanda roxburghii</i> ;, <i>Vanda pumila</i> , , <i>Vanda stangeana</i> ,	
		Dwarf (Internodes are not distinct)	5	<i>Vanda alpina</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda Mamo</i> x <i>Thongchai</i> , <i>Vanda parishii</i>	
2. QN (a)	Internode length	Very short (<0.5cm)	1	<i>Vanda parviflora</i> , <i>Vanda parishii</i> , <i>Vanda alpina</i>	MS
		Short (0.5-0.1cm)	3	<i>Vanda cristata</i> ,	
		Medium (1.0-2.0cm)	5	<i>Vanda tessellata</i> , <i>Vanda coerulea</i> , <i>Vanda stangeana</i> ,	
		Long (>2cm)	7	<i>Vanda coerulescens</i> , <i>Vanda teres</i>	
3. QN (a)	Stem diameter	Thin (<1.0cm)	1	<i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda testacea</i> , <i>Vanda alpina</i>	MS
		Thick (> 1.0cm)	9	<i>Vanda stangeana</i> , <i>Vanda coerulescens</i> , <i>Vanda coerulea</i> ,	
4. PQ (a)	Root location	Basal only	1	<i>Vanda cristata</i> , <i>Vanda parviflora</i> ,	VG
		All along stem	3	<i>Vanda coerulea</i> , <i>Vanda coerulescens</i> , <i>Vanda tessellata</i> , , <i>V. stangeana</i> , <i>Vanda alpina</i> , <i>Vanda teres</i>	
5. * (+) PQ (a)	Leaf type	Terete	1	<i>Vanda teres</i>	VG
		Semi -terete	3		
		Channelled	5		
		Strap	7	<i>Vanda alpina</i> , <i>Vanda coerulea</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda coerulescens</i> , <i>Vanda tessellata</i> , <i>V. stangeana</i> , <i>Vanda alpina</i>	
6. QN (a)	Leaf length	Short (<10cm)	3	<i>Vanda alpina</i>	MS
		Medium (10-20cm)	5	<i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda teres</i>	
		Long (>20cm)	7	<i>Vanda coerulea</i> , <i>Vanda tessellata</i> , <i>Vanda coerulescens</i> , <i>V. stangeana</i> ,	
7. QN (a)	Leaf breadth	Narrow (<0.5cm)	3	<i>Vanda teres</i>	MS
		Medium (0.6-1.0cm)	5	<i>Vanda parviflora</i>	
		Broad (>1.0cm)	7	<i>Vanda cristata</i> , <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda tessellate</i> , <i>Vanda alpina</i> ,	
8. (+) PQ (a)	Leaf apex	Acute	1		VG
		Round/Obtuse	2	<i>Vanda teres</i>	
		Emarginate	3	<i>Vanda parishii</i> <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda stangeana</i> ,	
		Retuse	4		
		Tridentate	5	<i>Vanda cristata</i> , <i>Vanda coerulescens</i> ,	
		Praemorse	6		
		Truncate	7	<i>Vanda coerulea</i> , <i>Vanda coerulescens</i> , <i>Vanda alpina</i>	

9. PQ (a)	Leaf orientation	Straight	1	<i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda tessellata</i>	VG
		Arching	3	<i>Vanda alpina</i> , <i>Vanda teres</i>	
		Deflexed	5	<i>Vanda coerulea</i> , <i>Vanda stangeana</i> ,	
10. QL (a)	Leaf colour	Green	1	<i>Vanda alpina</i> , <i>Vanda coerulea</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda coerulescens</i> , <i>Vanda tessellata</i> , <i>V. stangeana</i> , <i>Vanda alpina</i> , <i>Vanda teres</i>	VG
		Purple tinge	3		
		Mottle	5		
11. QL (a)	Leaf's health pigmentation	Absent	1	<i>Vanda coerulea</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda coerulescens</i> , <i>V. stangeana</i> , <i>V. alpina</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i>	VG
		Present	9		
12. * QN (b)	No. of spikes /plant at a time	One	1	<i>Vanda coerulescens</i> , <i>Vanda tessellata</i> , <i>Vanda teres</i>	VG
		Two or more	3	<i>V. stangeana</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda alpina</i>	
13. * QN (b)	No of spikes /year/plant	<Three	1	<i>Vanda tessellata</i> , <i>Vanda coerulescens</i> ,	VS
		Three to Six	3	<i>Vanda alpina</i> , <i>Vanda cristata</i>	
		>Six	5		
14. * QN (b)	Inflorescence length	Short (<15cm)	3	<i>Vanda teres</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda tessellata</i> , <i>Vanda alpina</i>	MS
		Medium (15cm-30cm)	5		
		Long (>30cm)	7	<i>Vanda coerulea</i> , <i>Vanda coerulescens</i> , <i>Vanda alpina</i> , <i>Vanda stangeana</i>	
15. QN (b)	Peduncle length	Short (<10cm)	3	<i>V. stangeana</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda alpina</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i>	MS
		Medium (10cm-20cm)	5	<i>Vanda coerulescens</i> ,	
		Long (>20cm)	7		
16. PQ (b)	Inflorescence orientation	Erect	1	<i>Vanda coerulea</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda coerulescens</i> , <i>Vanda bicolor</i> , <i>V. stangeana</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i>	VG
		Arching	3	<i>Vanda coerulea</i> , <i>V. stangeana</i> , <i>Vanda alpina</i>	
		Pendulous	5	<i>Vanda alpina</i> , <i>Vanda parishi</i> , <i>Vanda pumila</i>	
17. PQ (b)	Inflorescence nature	Dense	1	<i>Vanda cristata</i> , <i>Vanda alpina</i> , <i>Vanda teres</i>	VG
		Lax	3	<i>Vanda alpina</i> , <i>Vanda coerulescens</i> , <i>Vanda coerulea</i> , <i>Vanda stangeana</i> , <i>Vanda parviflora</i> , <i>Vanda tessellata</i> ,	
18. QN (b)	No. of flowers /inflorescence	Few (<5)	1	<i>Vanda tessellata</i> , <i>Vanda teres</i> , <i>Vanda alpina</i> , <i>Vanda pumila</i> ,	VG
		Medium (5-10)	3	<i>Vanda parviflora</i> , <i>Vanda bicolor</i> , <i>Vanda parishi</i> , <i>Vanda stangeana</i> ,	
		Many (>10)	5	<i>Vanda coerulea</i> , <i>Vanda cristata</i> , <i>Vanda coerulescens</i> , <i>V. stangeana</i>	

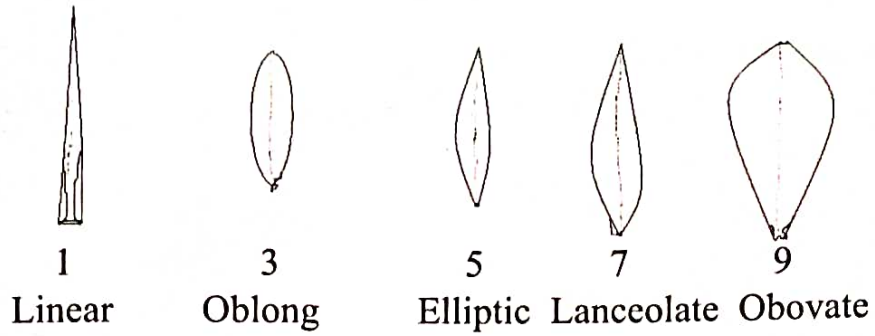
19. PQ (b)	Orientation of flowers	Facing in one direction	1	--	VG
		Facing in all directions	3	<i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> , <i>Vanda alpina</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i>	
20. QN (c)	Flower length	Small (< 3.0cm)	3	<i>Vanda alpina</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i>	MS
		Medium (3.0cm -6.0 cm)	5	<i>Vanda stangeana</i> , <i>Vanda tessellata</i> , <i>Vanda coerulescens</i> , <i>Vanda bicolor</i>	
		Long (>6.0cm)	7	<i>Vanda coerulea</i> , <i>Vanda teres</i>	
21. QN (c)	Flower width	Narrow (< 3.0cm)	3	<i>Vanda alpina</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i>	MS
		Medium (3.0 cm - 6.0cm)	5	<i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda tassellata</i> , <i>Vanda bicolor</i>	
		Broad (>6.0cm)	7	<i>Vanda coerulea</i> , <i>Vanda teres</i>	
22. QL (b)	Flower fragrance	Absent	1	<i>Vanda alpina</i> , <i>Vanda coerulea</i> , <i>Vanda parviflora</i> , <i>Vanda teres</i>	VG
		Present	9	<i>Vanda cristata</i> , <i>Vanda coerulescens</i> , <i>Vanda pumila</i> , <i>Vanda stangeana</i> , <i>Vanda tessellata</i>	
23. * QN (b)	Flower longevity on the plant	Short (<15 days)	3	<i>Vanda alpina</i>	VG
		Medium (15-30 days)	5	<i>Vanda parviflora</i> , <i>Vanda coerulescens</i> , <i>Vanda teres</i>	
		Long (> 30 days)	7	<i>Vanda stangeana</i> , <i>Vanda coerulea</i> , <i>Vanda cristata</i> , <i>Vanda parishii</i> ,	
24. * QL (b)	Flower predominant colour (as per RHS colour chart)	White	1	<i>Vanda pumila</i>	VS
		Pink	2		
		Yellow	3	<i>Vanda cristata</i> , <i>Vanda stangeana</i> , <i>Vanda parviflora</i> , <i>Vanda tessellata</i>	
		Green	4	<i>Vanda alpina</i> , <i>Vanda cristata</i> , <i>Vanda stangeana</i> , <i>Vanda tessellata</i>	
		Red	5		
		Blue	6	<i>Vanda coerulea</i> , <i>Vanda coerulescens</i> , <i>Vanda parishii</i>	
		Violet	7		
		Purple	8	<i>Vanda teres</i>	
25. QN (c)	Dorsal sepal size (length x breadth)	Small (<3cm ²)	3	<i>Vanda alpina</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i>	MS
		Medium (3-12 cm ²) x	5	<i>Vanda teres</i> , <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda pumila</i> , <i>Vanda tessellata</i> , <i>Vanda coerulea</i> , <i>Vanda bicolor</i>	
		Large (>12cm ²)	7		
26. (+) PQ (c)	Dorsal sepal shape	Linear	1		VG
		Oblong	3	<i>Vanda cristata</i> , <i>Vanda parishii</i> , <i>Vanda pumila</i>	
		Elliptic	5	<i>Vanda coerulescens</i> ,	
		Obovate	7	<i>Vanda alpina</i> , <i>Vanda coerulea</i> , <i>Vanda parishii</i> , <i>Vanda stangeana</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i>	
		Others	9		

27. (+) PQ (c)	Dorsal sepal curvature	Incurved with deflex apex	1	<i>Vanda coerulea</i>	VG
		Incurved without deflex apex	3	<i>Vanda parviflora, Vanda alpina, Vanda pumila, Vanda stangeana</i>	
		Straight	5	<i>Vanda coerulescens, Vanda tessellata, Vanda cristata,</i>	
		Deflexed	7	<i>Vanda parishii, Vanda teres</i>	
28. (+) PQ (c)	Dorsal sepal apex	Acute	1		VG
		Obtuse	3	<i>Vanda teres, Vanda coerulea, Vanda cristata, Vanda coerulescens, Vanda stangeana, Vanda parviflora, Vanda alpina</i>	
		Truncate	5		
		Emarginate	7	<i>Vanda tessellata, Vanda coerulea x Vanda roxburghii,</i>	
		Notched	9		
29. QN (c)	Lateral sepal size (length x breadth)	Small (<3cm ²)	3	<i>Vanda alpina, Vanda parviflora, Vanda cristata,</i>	MS
		Medium (3-12 cm ²)	5	<i>Vanda coerulescens, Vanda stangeana, Vanda tessellata, Vanda coerulea, Vanda bicolor, Vanda teres</i>	
		Large (>12 cm ²)	7		
30. (+) PQ (c)	Lateral sepal shape	Linear	1	<i>Vanda cristata</i>	VS
		Oblong	3	<i>Vanda pumila</i>	
		Elliptic	5	<i>Vanda alpina, Vanda coerulescens, Vanda cristata, Vanda teres</i>	
		Obovate	7	<i>Vanda tessellata, Vanda coerulea, Vanda stangeana, Vanda parviflora,</i>	
31. (+) PQ (c)	Lateral sepal curvature	Incurved with deflex apex	1	<i>Vanda coerulescens, Vanda parviflora, Vanda teres</i>	VG
		Incurved without deflex apex	3	<i>Vanda coerulea, Vanda cristata, Vanda alpina, Vanda pumila, Vanda stangeana,</i>	
		Straight	5	<i>Vanda tessellata</i>	
		Deflexed	7		
32. (+) PQ (c)	Lateral sepal apex	Acute	1	<i>Vanda cristata, Vanda alpina, Vanda tessellata</i>	VG
		Obtuse	3	<i>Vanda coerulea, Vanda parviflora, Vanda coerulescens, Vanda stangeana, Vanda teres</i>	
		Truncate	5	<i>Vanda pumila</i>	
		Emarginate	7		
33. QL (d)	Inside sepal colour	Base	1	<i>Vanda coerulescens</i> (Violet blue), <i>Vanda stangeana</i> (red purple), <i>Vanda cristata</i> (green yellow), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (Dor.-red purple; Lat.-white), <i>Vanda tessellata</i> (white)	VS
		Middle	3	<i>Vanda coerulescens</i> (Violet blue), <i>Vanda stangeana</i> (yellow green), <i>Vanda cristata</i> (green yellow), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (Dor.-red purple; Lat.-white), <i>Vanda tessellata</i> (Green white)	

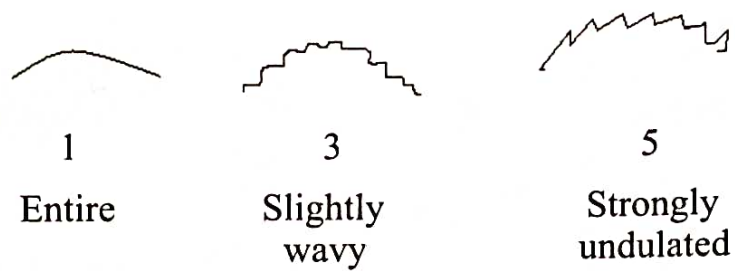
		Apex	5	<i>Vanda coerulescens</i> (Violet blue), <i>Vanda stangeana</i> (Yellow green), <i>Vanda cristata</i> (green yellow), <i>Vanda parviflora</i> (Red purple), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (Dor.-red purple; Lat.-white), <i>Vanda tessellata</i> (grey brown)	
34. QL (d)	Outside sepal colour	Base	1	<i>Vanda coerulescens</i> (white), <i>V. stangeana</i> (green yellow), <i>Vanda cristata</i> (green yellow), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (green white)	VS
		Middle	3	<i>Vanda coerulescens</i> (Violet blue), <i>Vanda stangeana</i> (Yellow green), <i>Vanda cristata</i> (green yellow), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (Dor.-red purple; Lat.-white), <i>Vanda tessellata</i> (grey brown)	
		Apex	5	<i>Vanda coerulescens</i> (purple violet), <i>Vanda stangeana</i> (Yellow green), <i>Vanda cristata</i> (green yellow), <i>Vanda parviflora</i> (Red purple), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (green white)	
35. * QL (d)	Colour ornamentation in sepals	Uniform	1		VS
		Spot	3	<i>Vanda cristata</i> , <i>Vanda coerulescens</i> ,	
		Blotch	5	<i>Vanda parviflora</i> ,	
		Streak/Stripe/shaded	7	<i>Vanda cristata</i> , <i>Vanda coerulescens</i> , <i>Vanda alpina</i> , <i>Vanda teres</i> ,	
		Tessellated /Netted	9	<i>Vanda coerulea</i> , <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda tessellata</i> , <i>Vanda cristata</i>	
36. QN	Petal size x (length breadth)	Small (<3 cm ²)	3	<i>Vanda alpina</i> , <i>Vanda cristata</i> , <i>Vanda parviflora</i> ,	MS
		Medium (3-12 cm ²)	5	<i>Vanda coerulea</i> , <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda tessellata</i> , <i>Vanda bicolor</i>	
		Large (>12 cm ²)	7	<i>Vanda teres</i>	
37. (+) PQ (c)	Petal shape	Linear	1	<i>Vanda cristata</i> , <i>Vanda pumila</i>	VG
		Oblong	3	<i>Vanda cristata</i> , <i>Vanda alpina</i> ,	
		Elliptic	5	<i>Vanda coerulescens</i> , <i>Vanda pumila</i> ,	
		Lanceolate	7		
		Obovate	9	<i>Vanda alpina</i> , <i>Vanda coerulea</i> , <i>Vanda stangeana</i> , <i>Vanda teres</i> , <i>Vanda tessellata</i>	

38. (+) PQ (c)	Petal curvature	Incurved with deflex apex	1	<i>Vanda alpina</i> , <i>Vanda cristata</i>	VG
		Incurved with straight Apex	3		
		Straight	5	<i>Vanda stangeana</i> , <i>Vanda teres</i>	
		Deflex	7	<i>Vanda coerulescens</i> , <i>Vanda bicolor</i> , <i>Vanda parishii</i> , <i>Vanda parviflora</i> , <i>Vanda tessellata</i>	
		Deflexed with incurved apex	9		
39. (+) PQ (c)	Petal apex	Acute	1	<i>Vanda cristata</i> , <i>Vanda pumila</i>	VG
		Obtuse	3	<i>Vanda teres</i> , <i>Vanda coerulea</i> , <i>Vanda parviflora</i> , <i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda tessellata</i>	
		Truncate	5	<i>Vanda alpina</i> ,	
		Emarginate	7		
		Notched	9		
40. (+) PQ (c)	Petal margin	Entire	1	<i>Vanda cristata</i> , <i>Vanda alpina</i> ,	VS
		Slightly undulated/wavy	3	<i>Vanda coerulea</i> , <i>Vanda parviflora</i> , <i>Vanda coerulescence</i> , <i>Vanda teres</i>	
		Strongly undulated/wavy	5	<i>Vanda coerulescens</i> , <i>Vanda stangeana</i> , <i>Vanda tessellata</i>	
41. QL (d)	Inside petal colour	Base	1	<i>Vanda coerulescens</i> (violet blue), <i>V. stangeana</i> (red purple), <i>Vanda cristata</i> (yellow green), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (white)	VG
		Middle	3	<i>Vanda coerulescens</i> (violet blue), <i>V. stangeana</i> (yellow green), <i>Vanda cristata</i> (green yellow), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Purple), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (green white)	
		Apex	5	<i>Vanda coerulescens</i> (violet blue), <i>V. stangeana</i> , <i>Vanda cristata</i> (Yellow green), <i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (red purple), <i>Vanda tessellata</i> (grey brown)	
42. QL (d)	Outside petal colour	Base	1	<i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (white), <i>Vanda tessellata</i> (green white)	VG
		Middle	3	<i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Purple), <i>Vanda teres</i> (purple), <i>Vanda tessellata</i> (grey brown)	
		Apex	5	<i>Vanda parviflora</i> (Yellow orange), <i>Vanda alpina</i> (Yellow green), <i>Vanda teres</i> (purple), <i>Vanda tessellata</i> (green white)	

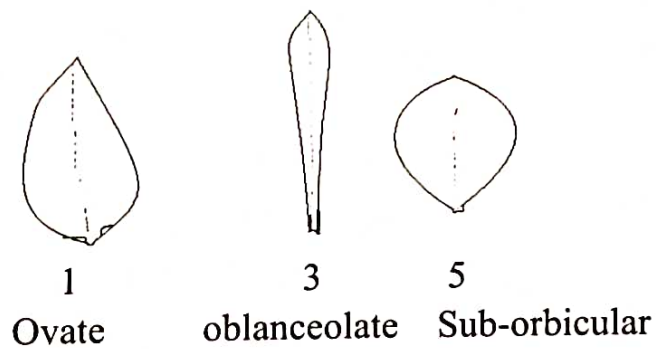
Characteristics 37: Petal shape



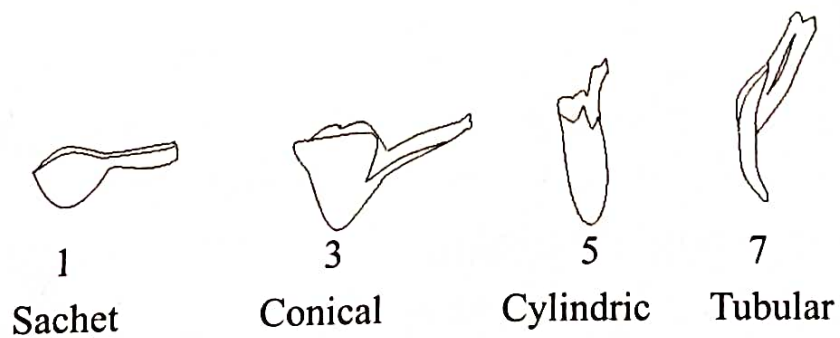
Characteristics 40: Petal margin



Characteristics 47 & 48 : Lip shape



Characteristics 63: Spur type

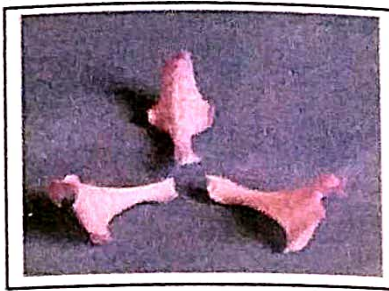


Digitalization

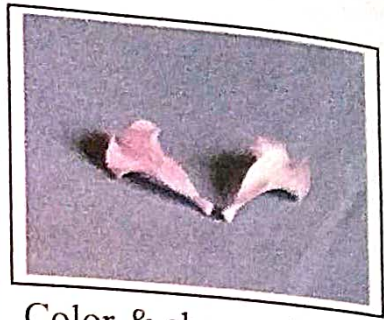
Vanda coerulescens



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 7.3 x 7.2 cm.

Sepal size & color : Dorsal sepal: 3.7 x 1.9 cm; Lateral sepals: 3.6 x 2.2 cm; Inside: violet blue (RHS- 91C) at base & Margins and (RHS- 91A) at apex with yellow-green (RHS-145D) tessellation; Outside: white (RHS-155D) at base, purple violet (RHS- N 81B) & violet blue (RHS -91A) at apex and violet blue (RHS- 91B) at margins.

Petal size & color : 3.5 x 1.9 cm; Inside: violet blue (RHS- 91A ,92A & 91C) at base, apex & margins respectively with yellow-green (RHS-145D) tessellation : Outside: Violet blue (RHS- 91D, 92C & 92B) at base, apex & margins respectively.

Lip size & color : 1.5 x 1.0 cm; Inside: white & violet (RHS- N

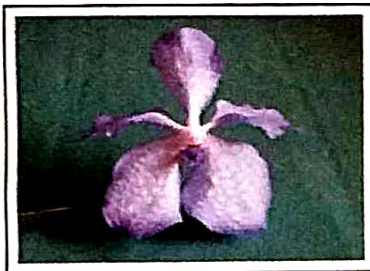
87B) striped at base and apex and violet at (RHS-N87B) margins.

Lip callus : present (7).

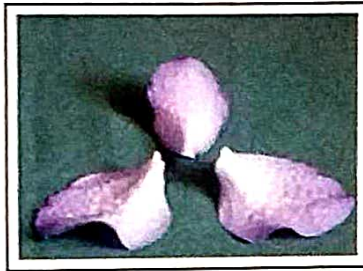
Column length & color : 0.7 cm; Inside: violet (RHS-N 87D) at base, and white at apex and margins; Outside: white at base, purple (RHS- 76 D) at apex . Margins white towards tip and violet (RHS- N 87D) towards base.

Mentum/spur length : 0.9 cm.

Vanda coerulea



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 7.0 x 7.6 cm.

Sepal size & color :Dorsal sepal: 3.8 x 1.7 cm; Lateral sepals: 4.0 x 2.3 cm; Inside: violet-blue (RHS- 91C) at base, (RHS- 91A) at apex and (RHS- 90B) at margins; Outside: violet-blue

(RHS- 91C) at base, violet (RHS- N 87A) at apex and violet-blue (RHS- 91C) at margins with violet-blue (RHS- 91A) netted at both sides.

Petal size & color : 3.8 x 2.0 cm; Inside: violet-blue (RHS- 91D) at base, (RHS- 91B) at apex and (RHS- 91A) at margins with violet blue (RHS- 91A) netted; Outside: violet-blue (RHS- 91C) at base, violet (RHS- N87C) at apex and violet-blue (RHS- 91C) at margins with violet blue (RHS- 92A) netted & violet (RHS- N 87A) stripe.

Lip size & color : 1.9 x 0.8 cm; Inside: violet (RHS- N 87A) at base, apex of apical lobe violet (RHS- N 87A) & apex of lateral lobes violet (RHS – 91D); and margin of apical lobe violet (RHS- N 87C) & margin of lateral lobes violet (RHS – 91D) and base violet-blue (RHS- 91D).

Lip callus : present (3)

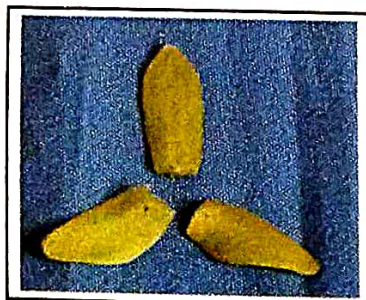
Column length & color : 0.7 cm; Inside: white; Outside: violet (RHS- N 87D) at base and white at apex & margins.

Mentum/spur length : 5.5 cm.

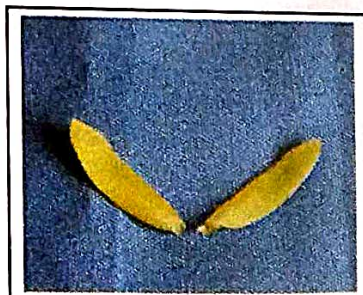
Vanda cristata



General appearance of flower



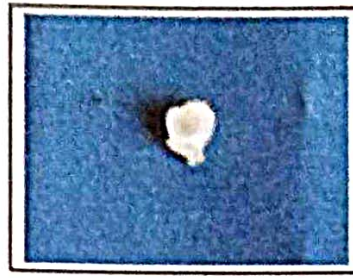
Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 2.2 x 2.6 cm.

Sepal size & color : Dorsal sepal: 1.6 x 0.8 cm; Lateral sepals: 1.8 x 0.8 cm; Inside: green-yellow (RHS-1C) at base & (RHS-1B) at apex & margins; Outside: yellow green (RHS-N 144 D & N 144 A) at base & apex respectively and green-yellow (RHS- 1B) at margins.

Petal size & color : 1.2 X 0.5 cm; Inside: yellow-green (RHS-154D) at base & (RHS- 153C) at apex and green-yellow (RHS – 1C) at margins; Outside: green-yellow (RHS – 1C) at base & margins and yellow-green (RHS- 151B) at apex.

Lip size & color : 1.9 x 0.9 cm; Inside: white (RHS- 155B) & red-purple (RHS- 59A) at base, yellow (RHS- 2D) at apex and margins yellow (RHS- 2D) and red-purple (RHS-59 A); Outside: yellow-green (RHS-145C) at base, yellow (RHS- 2D) at apex. Margins red-purple (RHS- 59A).

Lip callus : absent.

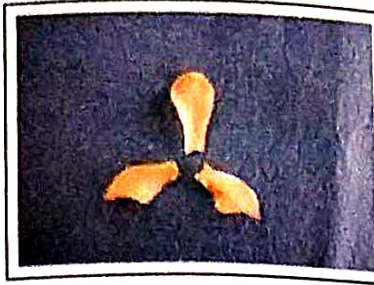
Column length & color : 0.6 cm; white (RHS- 155D).

Mentum/spur length : 0.5 cm.

Vanda testacea (V. parviflora)



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 1.6 x 2.0 cm.

Sepal size & color : Dorsal sepal: 1.1 x 0.5 cm; Lateral sepals: 1.0 x 0.5 cm; Yellow-orange (RHS- 18B) at base and margins and red purple (RHS- 72B) at apex.

Petal size & color : 1.0 x 0.4 cm; yellow orange (RHS- 18B) at base and margins and (RHS- 18A) at apex.

Lip size & color : 0.6 x 0.5 cm; Inside: yellow-orange (RHS 18B) at base and margins and red-purple (RHS- 72B) at apex; Outside: yellow-orange (RHS 18A) at base and margins and red-purple (RHS- 72B) at apex.

Lip callus : Present (3).

Column length & color : 0.2 cm; Inside: yellow-orange (RHS-

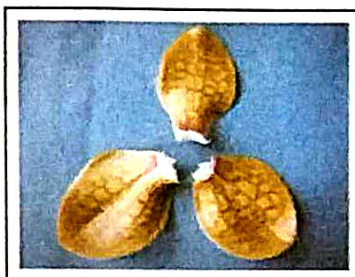
18C); Outside: yellow-orange (RHS- 18B).

Mentum/spur length : 0.2 cm.

Vanda stangeana



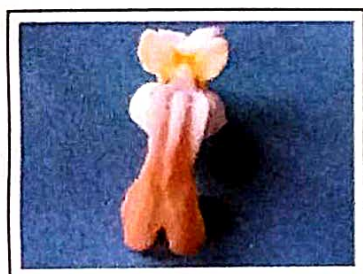
General appearance
of flower



Color & shape of dorsal
& lateral sepals



Color & shape of petal



Color & shape of Lip



Column color &
anther cap

Flower size : 4.7 x 4.8 cm.

Sepal size & color : Dorsal sepal: 2.1 x 1.9 cm; Lateral sepals: 2.3 x 1.8 cm; Inside: red-purple (RHS-59A) at base and yellow-green (RHS- 153C) at apex and margins with red purple (RHS-59A) netted pattern throughout. Outside: green-yellow (RHS 1D) at base and yellow-green (RHS- 153A at apex &153D) at margins.

Petal size & color : 2.2 x 1.5 cm; Inside: red-purple (RHS- 59A) at base, yellow-green(RHS- 153C at apex and 153D at margins with red purple (RHS- 59A) netted pattern throughout. Outside:

green-yellow(RHS-1D) at base and yellow-green (RHS- 153B at apex and 153D at margins).

Lip size & color : 2.3 x 1.5 cm; white (RHS-155B) at base, greyed-purple (RHS- 163C) at apex. Margins white towards base and greyed-orange (RHS- N 170C) towards apex.

Lip callus : Present (3)

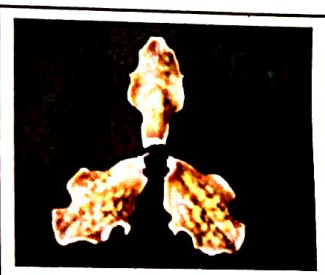
Column length & color : 0.7 cm; white.

Mentum/spur length : 0.6 cm.

Vanda tessellata



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 4.0 x 4.5 cm.

Sepal size & color : Dorsal sepal: 2.3 x 1.2 cm; Lateral sepals: 2.3 x 1.5 cm; Inside: white at base, grey-brown (RHS- N 199 A)

at apex and green-white (RHS- 157A) at margins with grey-brown (RHS- N199A) tessellation throughout; Outside: green-white (RHS- 157D at base & RHS- 157A at apex) and grey-brown (RHS- N199A) at margins.

Petal size & color : 2.2 x 1.2 cm; Inside: white at base, grey-brown (RHS- N 199 A) at apex and green-white (RHS-157A) at Margins with grey-brown (RHS- N199A) tessellation throughout; Outside: green-white (RHS- 157D at base & RHS- 157A at apex) and grey-brown (RHS- N199C) at margins.

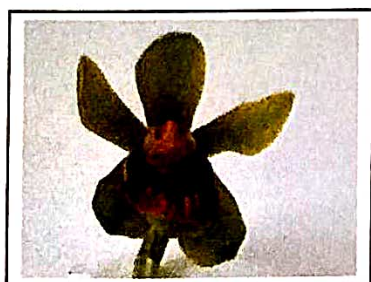
Lip size & color : 1.9 x 1.0 cm; Inside: white with yellow (RHS16A) shade at base, apex white (lateral lobe) violet (RHS- 86B)(mid lobe) and margins white (lateral lobe) violet (RHS- N 87D) mid lobe: Outside: white at base, apex of lateral lobe white & apex of mid lobe violet (RHS- 86D) and margins of lateral lobe white and margins of mid lobe white at base and violet (RHS- N87D) at apex.

Lip callus : Present (2)

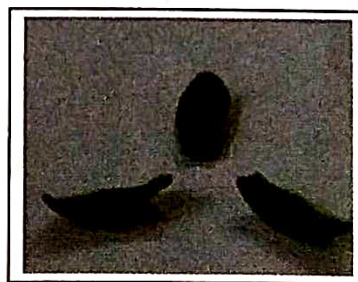
Column length & color : 0.9 cm; white.

Mentum/spur length : 1.0 cm.

Vanda alpina



General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of Lip



Column color & anther cap

Flower size : 1.1 x 1.2 cm.

Sepal size & color : Dorsal sepal: 1.2 x 0.6 cm; Lateral sepals: 1.2 x 0.5 cm; yellow-green (RHS- 144A) at base & apex and yellow-green (RHS- 144B) at margins with purple (RHS-N 79A) shade outside.

Petal size & color : 1.1 x 0.4 cm; yellow-green (RHS 144A) at base and apex, purple (RHS- N79A) at margins with purple (RHS- N79A) shade outside.

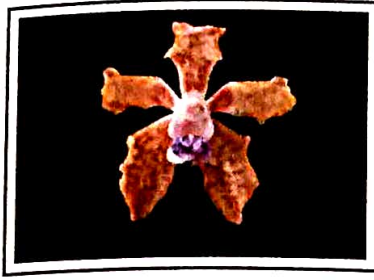
Lip size & color : 0.9 x 0.8 cm; Inside: purple (RHS- N79A) with green (RHS- 143D) at apex; Outside: green (RHS-143C) at base & apex, purple (RHS – N79A) at margins.

Lip callus : absent.

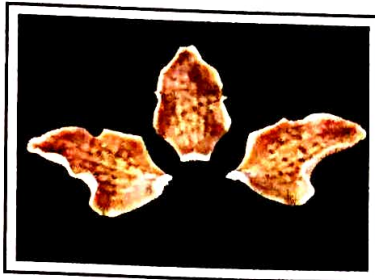
Column length & color : 0.4 cm, white (RHS- 155C).

Mentum/spur length : absent.

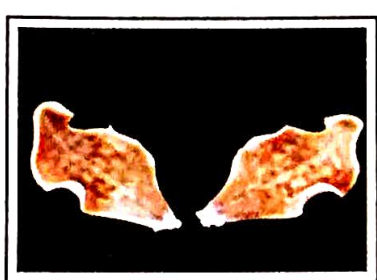
Vanda bicolor



General appearance of flower



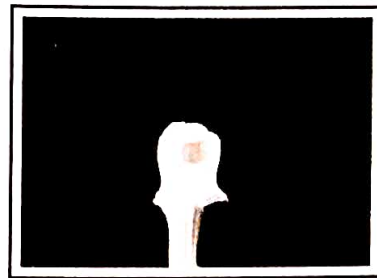
Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 5.1cmX4.5cm

Sepal size & color : 2.4cmX1.4cm (dorsal) &2.6cmX1.5cm (lateral),grayed yellow (RHS-160B) &tasseled color of (RHS-166C) grayed orange

Petal size & color : 2.2cmX1.2 cm,grayed yellow (RHS-160B) &tasseled color of (RHS-166B) grayed orange

Lip size & color : 1.3cmX0.7cm,purple violet (RHS-N82A), white shaded(RHS155D)& red purple striped (RHS60A) & white (RHS155D)

Lip callus : present

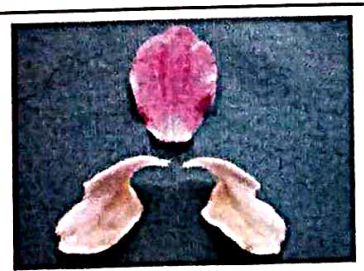
Column length : 0.7cm

Mentum/spur length : 0.7cm

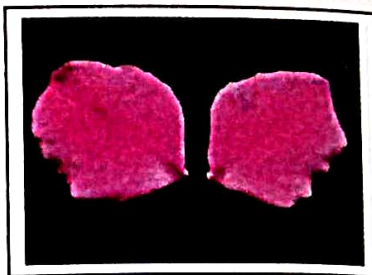
Vanda teres



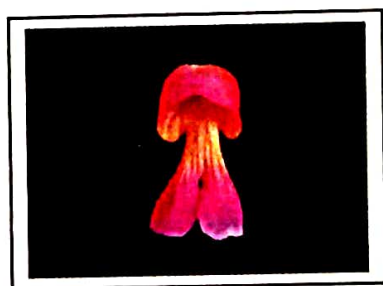
General appearance of flower



Color & shape of dorsal & lateral sepals



Color & shape of petal



Color & shape of Lip



Column color & anther cap

Flower size : 7.5 x 7.6 cm.

Sepal size & color : Dorsal sepal: 3.5 x 2.4 cm; Lateral sepals: 4.0 x 1.7 cm; Dorsal: red purple (RHS- 74C/D) inside & purple (RHS- 77C/D) outside, Lateral: Inside: white (RHS- N155B) with yellow white (RHS-158A) shade at base , Outside: white (RHS- N155B) with red purple (RHS-N74D) at apex.

Petal size & color : 3.7 x 3.4 cm; Inside: red purple (RHS-72B) with red purple (RHS-N74D) base & margins; Outside: purple (RHS- 75A) with white (RHS-N155B) base.

Lip size & color : 4.0 x 4.8 cm; Inside: yellow (RHS 11D) at base, red purple (RHS- 72B) at apex & margins red purple(RHS- 72B) at apex yellow (RHS- 13C) at middle & greyed red (RHS- 179C) at base with yellow (RHS- 13A) stripes & red purple (RHS 59A) spots. Outside: greyed red

((RHS 178B) at base, red purple (RHS 72B) at apex & margins
red purple (RHS 72B) at apical part, yellow (RHS- 13C) at
middle & greyed red (RHS- 179C) at base with yellow (RHS-
13A) stripes.

Lip callus : present (3)

Column length & color : 1 cm. Inside: yellow (RHS- 11D);
Outside: red purple (RHS N74 C/D) with yellow (RHS-11D)
margins.

Mentum/spur length :1.6 cm.

