



# LABELLUM DIVERSITY IN SELECTED EPIPHYTIC ORCHIDS FROM WESTERN GHATS, GOA, INDIA.

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## Abstract

Orchidaceae is one of the largest and most diverse family in angiosperms with 850 genera and about 20,000 species. Orchids are mostly known for their colorful and impressive flowers. They are the most pampered and occupy top position amongst the flowering plants. Labellum is the part of flower in orchid. Labellum can be easily distinguished from other sepals and petals by its irregular shape. Present work is an attempt to study the labellum diversity in ten selected epiphytic orchids from Western Ghats, Goa. All the selected species showed distinct variation in size, shape, colour and mode of construction of labellum.

**Key words:** Western Ghats, epiphytic orchids, labellum.

## Introduction

Western Ghats forms a large belt that receives high rainfall and show different types of vegetation. In Western Ghats epiphytic orchids constitute the major group and shows great variation in their morphological features. This morphological feature enables them to cope with the environmental conditions for their survival. Epiphytic orchids are the most fascinating group. Their habitat is mainly at the top of gigantic tropical trees. They have modified aerial roots, clasping roots, pseudobulbs and succulent leaves. They show lot of adaptations to the diverse ecological and climatic conditions.

Orchids are widely distributed and occur mainly in the tropical, subtropical and temperate regions. Taxonomically, they represent the most highly evolved family among monocotyledons. They are easily distinguished from other plants, as they share some very evident derived characteristics *viz.*, bilateral symmetry of the flower (zygomorphism), highly modified petal (labellum), fused stamens and carpel's, and extremely small seeds. Orchidaceae are well known for many structural variations in their flowers. Some orchids have single flowers, but most have a racemose inflorescence, sometimes with a large number of flowers.

The labellum is a modified median petal and can be distinguished from the other petals and sepals by its large size and its irregular shape and, stands out as distinct structure (Bailey, 1923). Orchids have developed highly specialized pollination systems, thus the chances of being pollinated are often scarce, so orchid flowers usually remain receptive for very long periods, rendering unpollinated flowers long-lasting in cultivation. The orchid flower flaunts before the insect a variety of temptations like the bright colours, a safe landing strip in the form of the lip, a nourishing drink or a snack, tantalizing odours and even sex.

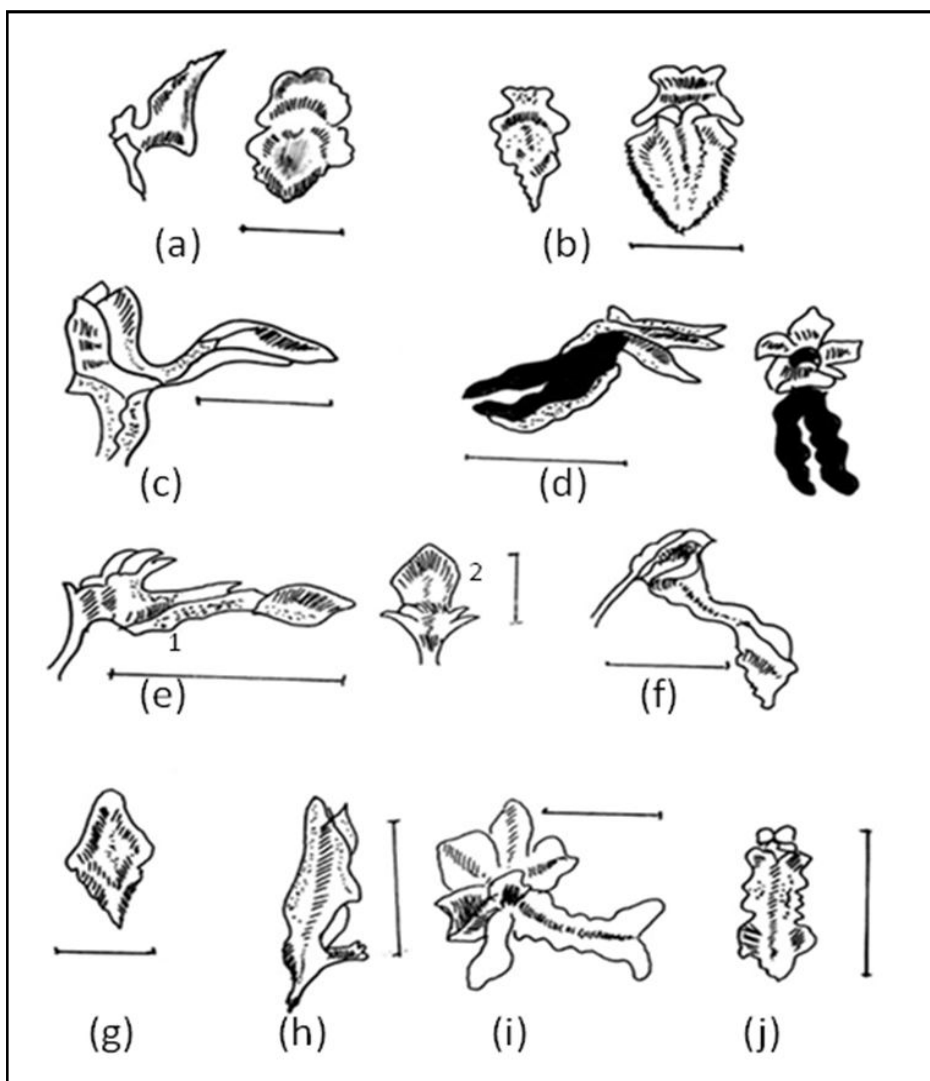
The Distribution of orchids in Goa is concentrated mainly in the Western Ghats region, which accounts for 86% of the total orchid diversity of the state (Jalal, 2019). The present research is an attempt to study the labellum diversity in selected epiphytic orchids from Goa.

## Materials and Methods

### Study AREA

Geographically, the State of Goa is located along the mid-west coast of India. It covers an area of about 3702 sq.km from North to South. The state is sub – divided into two districts, North & South Goa district. South Goa district lies in the southern part of Goa state. The

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**Fig. 1: Labellum diversity in selected epiphytic orchids from Western Ghats, Goa.**

(a) *Acampe praemorsa* (b) *Aerides crispa* (c) *Bulbophyllum sterile* (d) *Cottonia peduncularis* (e) *Dendrobium ovatum* (f) *Eria dalzellii* (g) *Porpax jerdoniana* (h) *Porpax reticulata* (i) *Rhynchosstylis retusa* (j) *Vanda testacea*  
 (Scale bar: a=0.5cm; b=1cm; c=0.3cm; d=1.2cm; e (1)=1.3 cm e (2)=0.5cm; f=0.5cm; g-h =0.2cm; i=0.9cm; j=0.5cm)

**Table 1: Occurrence and distribution of epiphytic orchids from Western Ghats, Goa.**

SN.	Name of the orchid	Host	Flowering period	Locality
1	<i>Acampe praemorsa</i>	<i>Mangifera indica</i> , <i>Carea arborea</i>	March - June	Dabal, Quepem,
2	<i>Aerides crispa</i>	<i>Mangifera indica</i> , <i>Tamarindus indica</i> ,	May – June	Balli, Dabal, Dharbandora
3	<i>Bulbophyllum sterile</i>	<i>Anacardium occidental</i> , <i>Areca catechu</i> .	Dec-January	Rivona
4	<i>Cottonia peduncularis</i>	<i>Mangifera indica</i> , <i>Artocapus heterophyllus</i> ,	April— Sept	Dharbandora , Canacona
5	<i>Dendrobium ovatum</i>	<i>Carea arborea</i> , <i>Mangifera indica</i> , <i>Artocarpus heterophyllus</i>	Oct-March	Rivona, Balli, Quepem
6	<i>Eria dalzellii</i>	<i>Areca catechu</i> , <i>Mangifera indica</i>	July- Sept	Paroda, Dabal
7	<i>Porpax jerdoniana</i>	<i>Mangifera indica</i>	April-May	Kevona, Rivona
8	<i>Porpax reticulata</i>	<i>Anacardium occidentale</i>	June-Sept	Canacona
9	<i>Rhynchosstylis retusa</i>	<i>Mangifera indica</i> , <i>Anacardium occidentale</i>	June-August	Balli, Quepem, Dharbandora, Rivona
10	<i>Vanda testacea</i>	<i>Carea arborea</i> , <i>Artocarpus heterophyllus</i>	March-April	Dabal, Quepem, Dharbandora

geographical area of the district is 1966 sq.km, and is situated between North latitudes 14° 54' 00" & 15° 29' 30" and between East longitudes 73° 47' 00" & 74° 20' 30". The district is bounded by Tiswadi, Ponda and Satari talukas of North Goa district in the North, Uttara Kannada district of Karnataka in the East & South, and in the West by the Arabian Sea. The present study was carried out at various localities from South Goa viz., Dabal, Dharbandora, Rivona, Tilamol, Balli, Paroda, Quepem and Canacona (Table 1).

### Sampling

The selected epiphytic species were *Acampe praemorsa* (Roxb.) Blatt. & McCann, *Aerides crispa* Lindl., *Bulbophyllum sterile* (Lam.) Suresh., *Cottonia peduncularis* (Lindl.) Rchb.f; *Dendrobium ovatum* (L.) Kranzl; *Eria dalzellii* Lindl., *Porpax jerdoniana* (Wight) Rolfe, *Porpax reticulata* Lindl., *Rhynchostylis retusa* L. Bl., and *Vanda testacea* (Lindl.) Reich. f. Fresh and preserved flowers parts were screened and examined for morphological studies. The selected species were worked out for their morphology with the help of dissecting microscope. Diagrams were drawn taking into account their measurements.

### Plant Identification

Plants collected in the present study were identified using flora of Goa (Rao, 1985 & 86); and Abraham and Vatsala, (1981).

### Results and discssion

Present study revealed distinct morphological variation among the studied epiphytic orchids. The results on the occurrence and distribution of orchids along with the period of flowering and the locality has been depicted in Table 1. In the present study labellum in *Acampe praemorsa* was white, fleshy, caruncled, speckled sparsely with magenta colour, in *Aerides crispum* labellum was 1 cm, with finely serrate margins, *Bulbophyllum sterile* labellum was deep purple, or orange in colour, with two auricles at the base. *Cottonia peduncularis* showed labellum which is 1.1 cm long, resembling the female wasp, and is maroon in appearance. *Dendrobium ovatum* the labellum is of green in colour, but as the flower matures the labellum turns yellow- creamy in colour. In *Eria dalzellii* labellum was creamy yellow in colour, 0.5 cm long. In *Porpax jerdoniana* and *Porpax reticulata* flowers are very small about 0.7 to 0.8 cm long and 0.5 cm wide, reddish in colour. The lip in both these species

shows tongue like projection and is about 0.2cm in length. *Rhynchostylis retusa* labellum is 0.7 cm long, laterally compressed and saccate, continuous with the foot, purple in colour, in *Vanda testacea* labellum was yellow with violet flush and 0.5 cm long (Fig. 1 a-j).

In the present investigation of the ten epiphytic species studied for their labellum diversity some of the species viz., *Bulbophyllum sterile* and *Dendrobium ovatum* were reported to be endemic to Western Ghats (Jala, 2019). Present study exhibited distinct peculiarities in the floral construction which are helpful in promoting insect pollination. Flowers of *Cottonia peduncularis* show mimicry with the insect which is an indication of a deceitful pollination mechanism in the form of insects (Tan and Nishida, 2000). The labellum is the most prominent of all the perianth parts, being endowed with arresting colours, unusual forms and peculiar marking, ridges and grooves. As Arditti (1966) has described, the lip of *Ophrys speculum* assumes the exact shape, contours and pigmentation of the female of the insect *Scolia ciliate*, in order to tempt the male.

The labellum studies in the present study will enable us to understand the most fascinating aspect of the lip in its habit of mimicry which serves to promote pollination by insects. The mode of construction of flowers as well as the efficiency in successfully carrying out the function, for which they are intended, renders them as wonders of nature's creation.

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