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Evaluation of orchid species from Mahabaleshwar plateau of western Ghat

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Abstract

Western ghat region is well recognized biodiversity hot spot. Several orchid species exist in this region. The Orchidaceae family is diverse and widespread with colourful blooms that are often fragrant. It is also one of the largest family of the flowering plants. Orchid species in Mahabaleshwar plateau includes high altitude epiphytes as well as terrestrial (ground) orchids. The purpose of this study was to evaluate the vegetative and floral attributes of the orchid species from the Mahabaleshwar plateau of the western ghat. An orchid germplasm collection at Regional Wheat Rust Research Station, Mahabaleshwar was evaluated during the year 2019-20. Observations regarding vegetative and floral characters were recorded. Among the evaluated species *Epidendrum radicans* recorded maximum plant height, maximum number of leaves and highest spike length. More inter-nodal length was recorded in the species *Dendrobium crepidatum*. The species *Eulophia herbacea*, *Spathoglottis plicata* and *Oberonia recurva* do not possess internodes. The species *Oberonia recurva* recorded maximum number of flowers per spike. Orchids species in Mahabaleshwar plateau of the western ghats have diversity in their habitat adaptation along with vegetative and floral characters. It is necessary to conserve this orchid biodiversity. These orchids can play a vital role in uplifting the floriculture, herbal, pharmaceutical and tourism industry of the western ghat.

Keywords: Orchids, western ghat, biodiversity

Introduction

The Mahabaleshwar plateau is wide plateau on Sahyadri mountain ranges which lies between 17° 15'N to 17° 59'N latitude and 73° 37'E and 73° 47'E longitude. Plateau is surrounded by deep rivers and their basins (Patil *et al.* 2007) [6]. It is part of a western ghats which is well recognized biodiversity hot spot. Conservative estimates place the number of species of microorganisms, plants and animals in the Western Ghats in the range of 10,000-15,000. Roughly 40% of these could be endemic. Such a magnitude of biodiversity and the array of threats faced by the various components of biodiversity have together ranked the Western Ghats amongst the 25 biodiversity hot-spots in the world (Daniels, 2001) [2].

Orchids are flagship species in plant conservation, but many species are being driven to extinction by either direct or indirect human activities. They also serve as indicators of ecological changes in ecosystem (Adhikari *et al.* 2016) [1]. The state of Maharashtra harbours 101 orchid species. Out of these 101 species 25 are endemic to Western Ghats. Many species are threatened with extinction either directly through loss of habitat or due to reasons such as degradation, fragmentation, over collection etc. (Jalal and Singh 2015) [3].

The Orchidaceae family is diverse and widespread with colourful blooms that are often fragrant. Shape, size and colour of Orchids flowers display a diversified range. It is also one of the largest family of the flowering plants. Orchid species in Mahabaleshwar plateau includes high altitude epiphytes as well as terrestrial (ground) orchids.

Material and Methods

Study Area- Extensive survey of the Mahabaleshwar plateau was made and orchids were collected from Old Mahabaleshwar, Nakinda and nearby villages. Collected orchids were conserved at Regional Wheat Rust Research Station, Mahabaleshwar (Fig. 1). The summer temperature of Mahabaleshwar ranges between 16 °C to 30 °C and the winter temperature ranges between 10 °C to 20 °C (Patil *et al.* 2009). The mean annual rainfall (50 year normal) of Mahabaleshwar is 6226.3 mm (Nandargi and Mulye, 2012). The elevation, hilly topography, river valleys, ridges and plateaus with dense forests makes it a unique destination for natural beauty and ecology.

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Data Collection-Evaluation was done during the year 2019-20. Observations regarding vegetative and floral characters were recorded. Host trees were determined and noted down for epiphytic orchids.

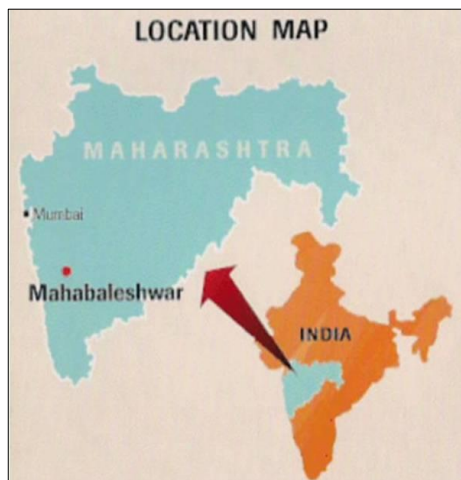


Fig 1: Location

Result and Discussion

The data presented in table no. 1 revealed that the species *Epidendrum radicans* recorded maximum plant height (64 cm), maximum number of leaves (12) and highest spike length (52 cm). More inter-nodal length was recorded in the species *Dendrobium crepidatum* (4.3 cm). The species *Eulophia herbacea*, *Spathoglottis plicata* and *Oberonia recurva* do not possess internodes. The species *Oberonia recurva* recorded maximum number of flowers (38) per spike. The host plants for epiphytic orchids were recorded. The common hosts were Jamun, Hirda, Mango, Anjan, UMBER and PISLA trees. Collected germplasm of *Dendrobium crepidatum* Land *Rhynchostylis retusa* did not flower during the study year. Hence only vegetative and host observations were recorded for them.

Curled Aeride
Botanical name: *Aerides crispa* (Fig. 2)
Local name: पानशिग
Vegetative characters: It is a robust plant with channelled leaves. Stem is elongate and branching
Floral characters: Inflorescence is panicle of racemes. Flowers are fragrant, white coloured and tinged with pink. Midlobe of lip is large, triangular and crenulated. The spur is pointed forward
Use: Ornamental

Shoe-Lip Dendrobium

Botanical name: *Dendrobium crepidatum* L (Fig. 2)

Local name: उन्हाप

Vegetative characters: Stem is sympodial with elongated or pseudobulbous shoots. Leaves are deciduous and alternating on shoot or terminal on pseudobulbous.

Floral characters: Cleistogamy is common and many flowers pass from bud stage to fruiting stage without blooming (Sankara Rao *et al.* 2019).

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Table 1: Evaluation of orchid species for different characters (2019-20)

Sr. No.	Species	Habit	Plant height (cm)	Leaves			Number of Internodes	Inter-nodal Length (cm)	Number of Spikes	Spike Length (cm)	Flowers/spike	Flowering season	Flower colour	Flower Fragrance	Host Plants
				Number	Length (cm)	Breadth (cm)									
1.	Curled Aerides (<i>Aerides crispa</i>) (पान शिंग)	Epiphyte	32	11	18	3.4	7	2.4	01	28	16	Summer	White Purple	Fragrant	Jamun, Mango, Hirda,
2.	Shoe-Lip Dendrobium (<i>Dendrobium crepidatum</i> L) (उन्हाप)	Epiphyte	26.2	6	12	4.1	6	4.3	-	-	-	-	-	-	Jamun, Hirda
3.	Crested Orchid (<i>Eulophia herbacea</i>) (कुकुडकंद)	Terrestrial	52	5	33	5.9	-	-	01	48	05	Winter	Reddish Purple	-	-
4.	Devils Fingers (<i>Dendrobium aqueum</i> L) (सैतानाची बोट)	Epiphyte	56	10	10.2	3.1	17	3.1	1	23	5	Summer	Yellowish White	-	Jamun, Hirda, UMBER
5.	Red Crucifix Orchid (<i>Epidendrum radicans</i>)	Terrestrial & Epiphyte	64	12	10.5	2.5	18	3.6	2	52	8	Winter	Red, Yellow	-	-
6.	Green Trident Orchid (<i>Oberonia recurva</i>) (त्रिशूल अमरी)	Epiphyte	5.8	3.1	7.8	2.0	-	-	1	13	38	Sept- Oct	Greenish Yellow	-	Jamun, Hirda, Anjan
7.	Ground Orchid (<i>Spathoglottis plicata</i>)	Terrestrial	32	4	31	5.1	-	-	1	33	5	Winter	Purple	-	-
8.	Fox Tail Orchid (<i>Rhynchostylis retusa</i>) (सीतेचीवेणी)	Epiphyte	46	10	17.8	4.4	9	3.4	-	-	-	-	-	-	Jamun, Hirda

Crested Orchid

Botanical name: *Eulophia herbacea* (Fig. 2)

Local name: कुकुडकंद

Vegetative characters: Narrowly lanceolate leaves. Corms are obconical with several velamenous roots.

Floral characters: Inflorescence is lax racemose, arise from the base of corm. It is stout with several tubular sheaths below middle. Flowers are distant. Bract is lanceolate, acuminate, entire, curved towards flower and shorter than ovary. Capsule is formed.

Use: Many workers have reported that corms have medicinal value (Jalal *et al.*, 2014)^[4].

Devils Fingers

Botanical name: *Dendrobium aqueum* L (Fig. 2)

Local name: सैतानाची बोट

Vegetative characters: Stem is clavoid, leafy during flowering. Leaves are alternate, bifarious, ovate-lanceate, base rounded and apex is acuminate.

Floral characters: Flowers are yellowish white, emerge from leaf-axils. Petals are broader than sepals. Lip is rhombic, faintly 3-lobed, tinged with yellow, margin erose, mid-lobe triangular, mentum short, incurved.

Use: Ornamental

Red Crucifix Orchid

Botanical name: *Epidendrum radicans* (Fig. 3)

Vegetative characters: Reed stem, freely branching with lateral branches and aerial roots. Leaves are scattered around the stem.

Floral characters: It bears a densely flowered head of red/orange flowers, throats are yellow. Inflorescence arises from the top of the cane. The flowers open sequentially and are very long lasting.

Use: Ornamental

Green Trident Orchid

Botanical name: *Oberonia recurva* (Fig. 3)

Local name: त्रिशूल अमरी

Vegetative characters: Mini-miniature sized epiphyte orchid. Leaves with a fan of 3 to 4, ensiform-lanceolate, tapering to an acute apex, straight to weakly falcate, imbricate basally.

Floral characters: Inflorescence is long, densely many flowered, terete, grooved with oblong-lanceolate to elliptic, subacute, crenulate to entire floral bracts.

Ground Orchid

Botanical name: *Spathoglottis plicata* (Fig. 3)

Vegetative characters: It forms tall clumps. It has crowded pseudobulbs, each with 3-4 pleated leaves on a long stalk.

Floral characters: Flowers are borne on a hairy flowering stem. The dorsal sepal is long and the lateral sepals are slightly narrower. The petals are about the same length as the sepals but significantly wider. The lip is T-shaped with three lobes and the side lobes close to vertical.

Use: Ornamental

Fox Tail Orchid

Botanical name: *Rhynchostylis retusa* (Fig. 3)

Local name: सीतेचीवेणी, पणस केळी

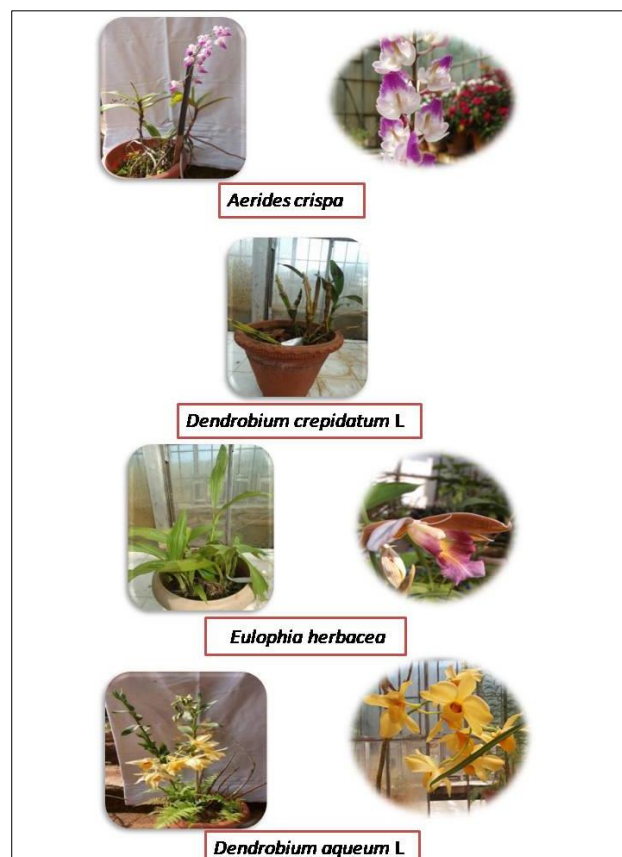


Fig 2: Collection, maintenance and evaluation of orchid germplasm

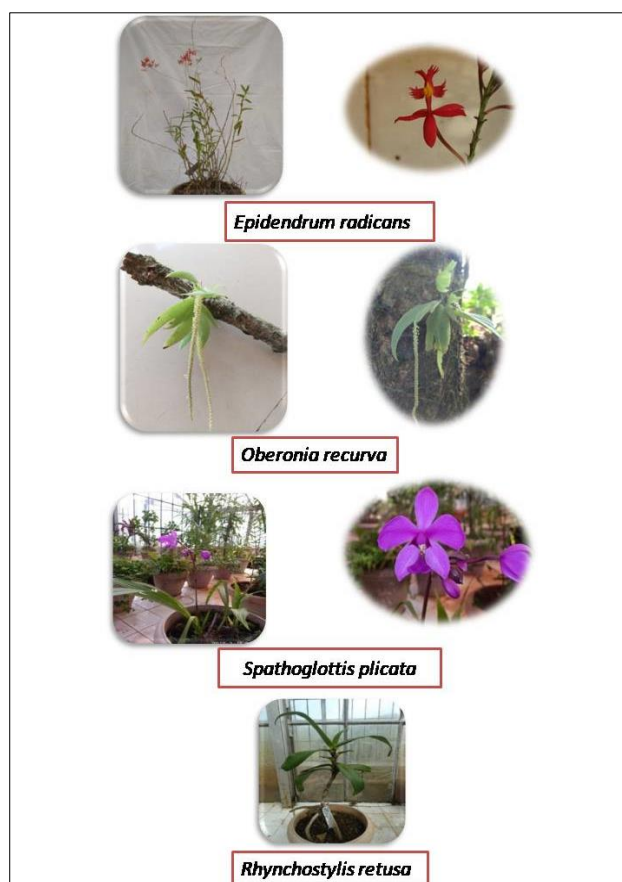


Fig 3: Collection, maintenance and evaluation of orchid germplasm

Vegetative characters: It has stout, repent, short stem carrying up to 12 leaves. Leaves are curved, fleshy, deeply Channeled, Keeld, Retuse apically.

Use: Ornamental

Conclusion

Orchids are very important plants of the Western Ghat flora. They have botanical as well as economical values. State is the home of 101 species; among them 50 species are endemic to Western Ghats. Orchids species in Mahabaleshwar plateau of the Western Ghat have diversity in their habitat adaptation along with vegetative and floral characters. It is necessary to conserve this orchid biodiversity. These orchids can play a vital role in uplifting the floriculture, herbal, pharmaceutical and tourism industry of the western ghat. The efforts for *in situ* conservation should be taken by government agencies.

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