CONSERVATION OF ORCHIDS AT WAGHAI BOTANICAL GARDEN, DANGS, GUJARAT

Final report

submitted by

Consultant

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1. INTRODUCTION

Orchidaceae are the most diverse of all angiosperm families, with estimates of 28,484 species (Govaerts et al., 2017). Orchids comprise five subfamilies and about 870 genera, and are considered almost ubiquitous, occurring on all vegetated continents and even some Antarctic islands (Dressler, 1981; Chase et al., 2003). Orchid distribution and abundance are distinctly skewed towards the tropics. Orchid-rich areas include the northern Andes of South America, Madagascar, Sumatra and Borneo for mostly epiphytic species, Indochina for both epiphytic and terrestrial species, and southwestern Western Australia as a center of terrestrial orchid richness (Cribb et al., 2003). Two-thirds of orchid species are epiphytes and lithophytes, with terrestrial species comprising the remaining third, yet almost half of the extinct species according to The World Conservation Union (IUCN, 1999) are terrestrial herbaceous perennials.

Orchids can be divide into two groups - monopodial or sympodial depending upon their growth habit. Monopodial orchids such as *Acampe*, *Vanda* have a main stem which continues to grow year after. Sympodial orchids have a main Stem which terminates growth at the end of each season eg. *Dendrobium*. A new shoot then grows from the base forming it's own bulbous stem called pseudo-bulb which eventually flowers. In addition to the epiphytic orchids, there are also terrestrial orchids which grow like ordinary plants with their roots in soil. Most of the temperate zone orchids are terrestrial and tropical orchids are epiphytes.

Orchids exhibit an incredible range of diversity in size, shape and color of their flowers. They are the most indulged of the plants and occupy top most position among all the flowering plants. They are valued for cut flower production and as potted plants. Orchids are well known for their long lasting and bewitchingly stunning flowers which fetch a very high price in the international market. In the Indian Vedic scriptures there is a mention of these group of plants under the name "VANDA", which has been adapted as a generic name in one of the most beautiful group of orchids.

Most of the orchids are perennial herbs with great a variation in vegetative parts, a large number of them being epiphytes, or terrestrial and a few saprophytes and leafless in nature. The flowers of orchids are irregular with extreme variation in the size and shape. The flower is trimerous with 3 sepals and 3 petals collectively called as tepals due to their

resemblance in texture and color, similar to each other and sub similar to sepals. However, the third petal which is different and distinctive and is called labellum or the lip. The lip is highly polymorphous and responsible for the different shapes of orchids like `Frog orchid', `Dove orchid', `Spider orchid', `Lady slipper orchid' etc. The reproductive organs (stamens and pistils) in orchids are condensed and form a consolidated complex body, the column the male and female part being separated by a flap or projection of a tissue called rostellum.

Orchids are cross pollinated by various insects, butterflies, moths and birds as the flower mimic them. A fine example of mimicry is shown by a Mediterranean orchid *Ophyrus*. The flower resembles to a female wasp and emits the similar odour to attract the male wasp. In this attempt to mate with the plant, the male wasp picks up the pollinia and eventually deposits it on the other flower. Due to cross pollination large number of interspecific and intergeneric natural hybrids like *Odontoglossum*, *Phalaenopsis*, *Cattleya*, *Laelia*, *Miltonia* and *Oncidium* have been reported from the family Orchidaceae.

India has a very large variety of orchids and hilly regions have one or the other orchid flowering almost throughout the year. The diversity is so large that there are large- flowered, terrestrial, epiphytic and also saprophytic orchids. In general terrestrial orchids are more common in North-Western India, epiphytic orchids in North-Eastern India and small flowered orchids in Western Ghats.

Orchids are economically important group of plants for their uses in floriculture, medicine and food industries. The diversity and population of orchid is decreasing due to human activities such as habitat destruction, degradation and fragmentation and over harvesting of selected orchids for commercial trade (Pant et al., 1999). All the species of family Orchidaceae are listed in the Endangered Species of Wild Fauna and Flora in Appendix II of the Convention of International Trade (CITES, Chughet al., 2009). This necessitates the Ex-situ conservation of orchids.

In the present study wild orchids of the Dangs district of Gujarat were collected and grown in an Orchidarium.

2. OBJECTIVES

1. Survey of Orchids in the various areas of Dangs.
2. Collection and Identification of Orchids.
3. Conservation in Waghai Botanical Garden

3. MATERIALS AND METHODS

Collection of Orchids

Field survey and live plant collection of the orchids of our locality and various parts of Kerala have been undertaken. Collected flowering Orchids were identified using standard literature.

Planting of Orchids in the Orchidarium and Open area

Terrestrial Orchids: Individual plots of 10 × 10 ft were made for each species and 3-4 individuals of each species were introduced.

Epiphytic Orchids: Epiphytic species were tied directly on trunk of suitable host tree or portion of branches of trees with the patch of coconut husk.

4. RESULTS

Humans exploited natural resources for their benefit from centuries. Due to increasing encroachment, the habitat of orchids is facing the threat. The constant rise in demand for large land area, agriculture as well as timbers leads to the destruction of many forests.

The extensive devastation of forests leads to extinction of many floral species that became endangered. Orchids are one of the species whose population and availability are gradually disappearing from the forests either due to deforestation, over collection by the amateurs, by the professional orchidist's and even also by the lay-man. Furthermore, the ravaging of the forests for excessive demands of timber, particularly 'teak' in Gujarat has destroyed the substantial number of epiphytic orchids growing on the forest trees as well as the terrestrial orchids. As the economic and medicinal values of orchids are very high, the conservation of orchids is primarily indispensable from scientific point of view.

In the present study an effort has been made for *Ex-situ* conservation of Orchids of Dangs district. The orchidarium was established for conservation, public education and also to provide awareness to locality. The foremost goal in establishing the Orchidarium was to represent the diversity of Orchidaceae in the Dangs region.

A total of 25 species representing 13 genera were recorded from Dangs (Plate 1 and 2) of which, 21 species were successfully conserved at Waghai Botanical Garden, Dangs (Plate 4). Among 21 collected species, 9 were epiphytic and 12 were terrestrial in habit. The list of orchid diversity of Dangs and its conservation status was given in Table 1. Majority of the accumulation of orchids species were done during the field surveys in month of September to

November and March from various regions of Gujarat. The species which are very rare were not disturbed but they are allowed to grow in their natural habitat. It is the first dedicated effort of orchid *ex situ* conservation in Gujarat.

Table - 2.5: List of Orchids occurring in Dangs

Sr. No.	Orchid Name	Habit	E	WG
1.	*Acampe praemorsa* (Roxb.) Blatt. & McC.	E	-	WG
2.	*Aerides maculosum* Lindl.	E	E	WG
3.	*Crepidium mackinnonii* (Duthie) Szlach.	T	-	WG
4.	*Dendrobium barbatulum* Lindl.	E	E	WG
5.	*D.microbulbon* A.Rich.	E	E	WG
6.	*D. peguanum* Lindl.	E	-	WG
7.	*Eulophia ochreata* Lindl.	T	E	WG
8.	*Geodorum laxiflorum* Griff.	T	E	WG
9.	*Habenaria furcifera* Lindl.	T	-	WG
10.	*H. gibsonii* Hook. f.	T	E	WG
11.	*H. grandifloriformis* Blatt. & McCann	T	E	WG
12.	*H. longicorniculata* J. Graham	T	-	-
13.	*H. marginata* Colebr.	T	-	WG
14.	*H. plantaginea* Lindl.	T	-	WG
15.	*H. rariflora* A. Rich.	T	E	-
16.	*Nervilia concolor* (Blume) Schltr.	T	-	WG
17.	*N. plicata* (Andrews) Schltr.	T	-	WG
18.	*Oberonia falconeri* Hook.f.	E	-	-
19.	*O. mucronata* (D.Don) Ormerod & Seidenf.	E	-	WG
20.	*Peristylus lawii* Wight	T	-	WG
21.	*P. plantagineus* (Lindl.) Lindl.	T	-	WG
22.	*Rhynchostylis retusa* (L.) Blume	E	-	WG
23.	*Vanda tessellata* (Roxb.) Hook. ex G.Don	E	-	WG
24.	*V. testacea* (Lindl.) Rchb.f.	E	-	WG
25.	*Zeuxine strauteumatica* (L.) Schltr.	T	-	-

E - Epiphytic; **T** - Terrestrial; **WG** - Species maintained in Waghai Botanical Garden, Dangs

Orchid Diversity of Dangs

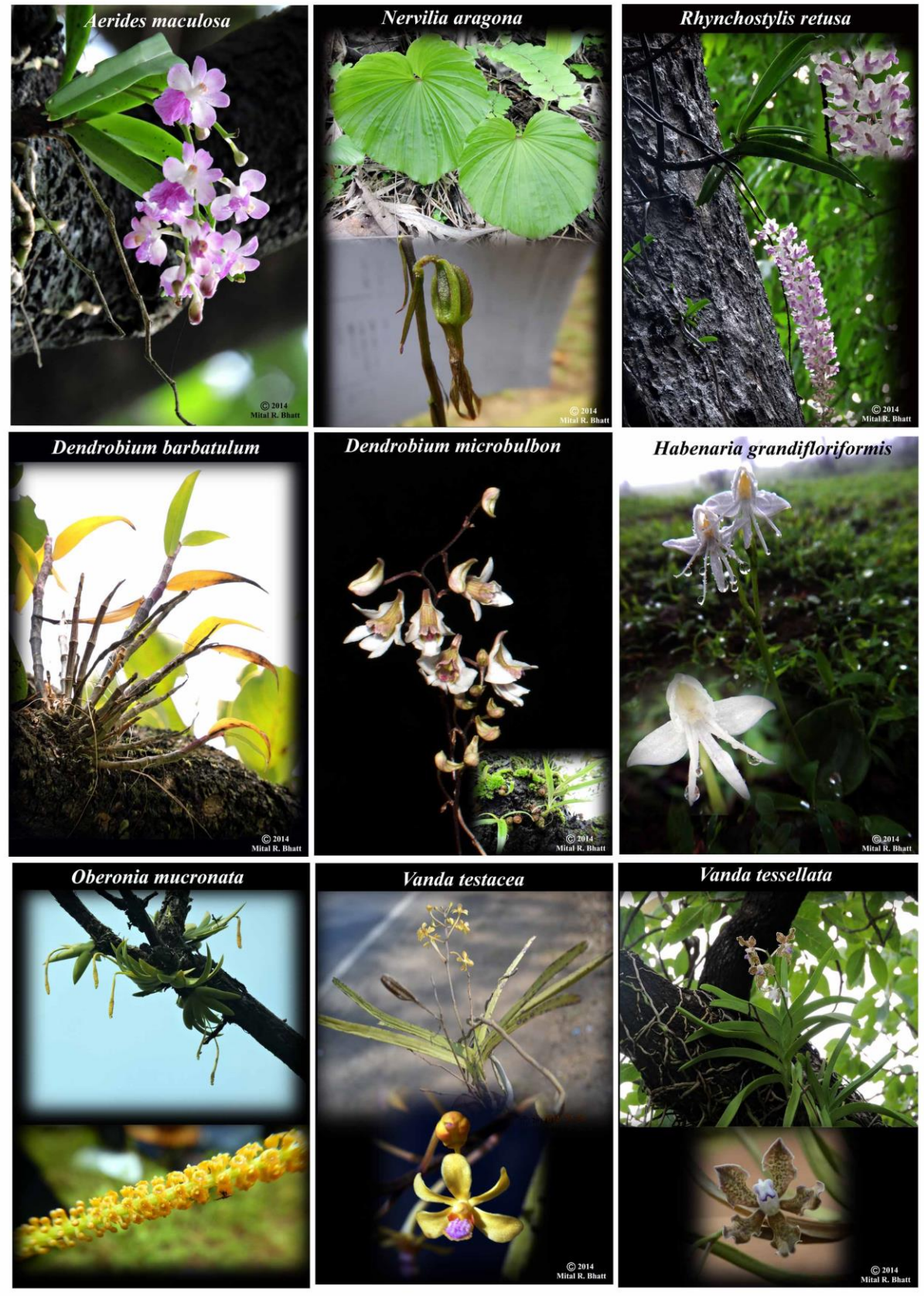

Plate 1


Vanda testacea
Habenaria foliosa
Habenaria plantaginea
Habenaria grandifloriformis
Habenaria marginata
Crepidium mackinnonii
Peristylus plantagineus
Peristylus lawii
Nervilia aragona
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Plate 2

Plate 4: Conservation of A. Terrestrial and B. Epiphytic Orchids at Waghai Botanical Garden, Dangs

Estimated Financial Budget for 6 months

S.N.	Items	Estimated Expenditure (₹)
		6 months
Recurring		
1	Orchid Expert @ Rs. 28000/month	1,68,000/-
2	Field Work and Travel	80,000/-
3	Contingency and Labour charges 30 * 300	1,20,000/-
4	Consultancy and University Charges (30%)	78,000/-
Total estimated expenditure		**4,46,000**