

A Glimpse of the Ecology and Conservation Strategies of Orchids of Odisha, India

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ABSTRACT

Odisha is endowed with very rich and diverse floristic wealth. Its unique geographic location and varied topography enables it to harbor different types of plant communities of which the orchids deserve special mention due to its horticultural as well as commercial importance. Nevertheless, the orchid flora of Odisha is moderately rich but on the other hand it emphasizes upon some important ecological niches. Many rare and endemic orchid species have been reported from the Odisha state like *Habenaria panigrahiana* var. *parviloba*, *Cirrhopetalum panigrahianum* and *Eria meghasaniensis* which are new to the science. In the endemic category, *Pomatocalpa decipiens* and *Malaxis purpurea* are important being recorded only from Odisha in India. The orchids of Odisha have undergone severe biotic pressure resulting in rapid shrinkage of this rare and interesting plant group. Hence the conservation of Orchid flora of Odisha is need of the hour. Field studies revealed that for effective conservation of the species, conservation of the habitats in which the species dwell is most vital as well as a pre-requisite. Keeping in view the above mentioned facts, the present communication highlights about the ecology of the orchids of Odisha which act as a baseline data before planning any conservation measure and cultivation of orchids as well. Concurrently some conservational strategies have also been suggested.

Key words : Orchids, Ecology, Conservation strategies, Odisha

Introduction

Orchids belong to the largest family of flowering plants recording around 22,000 species world over. In the remote past, least attention is given to this interesting plant community due to which many important facets have remained unrevealed. However due to its high commercial value with beautiful flowers in an incredible range of forms, it has attracted the attention of both the general and scientific populace. Realising this, now active research is

under progress on different aspects of the orchids in several parts on the country viz. Tamilnadu, Arunchal Pradesh, Sikkim, West Bengal and Odisha etc. By this, the plant group will be popularized and their commercial and economic value can be exploited for the socio-economic upliftment of the country in general and Odisha in particular. Despite a moderately rich orchidaceous flora of Odisha, the botanization of this group has not attained a satisfactory level. The orchid flora of the state could not be explored thoroughly by the earlier workers

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(Gamble, 1892; Haines, 1921-25; Henderson, 1929; Kapoor, 1964; Mooney, 1950; Mukherjee, 1935; Panigrahi *et al.*, 1966; Saxena and Brahmam, 1978). Despite, recently some significant contributions were made to the orchidaceous flora of the state (Misra, 1987; Misra, 1982a; Misra, 1982b; Misra, 1994; Misra, 1989b; Misra, 1989c; Misra, 1990a).

Realising the importance of this plant group and sporadic works, an extensive survey programme has been launched to collect and document the relevant information on the orchids of Eastern Ghats in general and Odisha in particular.

Ecology of Odisha Orchids

In Odisha 137 species of orchids under 50 genera have been recorded so far out of which 100 species are found exclusively in Similipal Biosphere Reserve (Misra, 1997; 2014 and 2022). The 140 taxa of the state represent 11 tribes, 15 subtribes under 4 sub-families (Averyanov, 1991; Dressler, 1981; Szlachetko, 1995). The orchids of Odisha are found in varied ecological niches. The grasslands (which exclude both the tree cover and water bodies) are represented only by some terrestrial species. *Spiranthes sinensis* and *Zeuxine strateumatica*, the grass orchid are found in the coastal plains along with the grasses in the swampy areas. These are also found in moist soil usually adjacent to water. The coastal forest of Odisha spreading over a large area are poorly represented by the orchids. The mangrove forest of Odisha in general and Bhitarkanika wild life sanctuary in particular are represented by epiphytic orchid flora very poorly. *Acampe praemorsa* and *Vanda tessellata* are occasionally met with in the tidal forests of Bhitarkanika (Panda *et al.*, 2014).

The open forest of the state are represented by a number of terrestrial species like *Geodorum densiflorum*, *Geodorum recurvum*, *Habenaria commelinifolia*, *Habenaria gibsoni* var. *foetida*, *Habenaria panigrahiana* var. *panigrahiana*, *Habenaria panigrahiana* var. *parviloba*, *Eulophia graminea*, *Habenaria spectabilis*, *Nervilia aragoana*, *Peristylus constrictus*, *Peristylus slawii* etc. Among the epiphytes of this region *Acampe carinata*, *Acampe praemorsa*, *Aerides multiflora*, *Aerides odorata*, *Cymbidium aloifolium*, *Dendrobium macrostachyum*, *Luisia trichorhiza*, *Oberonia falconeri*, *Pelantetheria insectifera*, *Rhyncostylis retusa*, *Vanda tessellata*, *Vanda testacea* etc. records high occurrence.

The montane forests of Similipal, Rebena, Koira, Topadihi, Gobindpali, Ramgiri, Deomali, Karlapatetc are the ideal abode for the orchids of

Odisha as they contribute significantly to the state's orchid flora. The major taxa of this region are *Bulbophyllum umbellatum*, *Dendrobium herbaceum*, *Luisiattrichorhiza*, *Flikingeriamacraei*, *Cymbidium aloifolium*, *Lipariselliptica*, *Eria bambusifolia*, *Rhyncostylis retusa* etc. *Eria meghasaniensis* is the epiphytic species found only in the Similipal forests which is endemic to Odisha (Misra, 1989a). The terrestrial orchids of this locality are *Habenaria furcifera*, *Geodorum densiflorum*, *Liparisdeflexa*, *Nervilia crociformis*, *Seidenfiarheedii*, etc. *Bulbophyllum polyrhizum*, *Bulbophyllum triste*, *Dendrobium bicameratum*, *Eria meghasaniensis*, *Gastrochilluscaulis*, *Liparisviridiflora*, *Oberoniaproudlockii*, *Polystachea concreta* and *Thunia bracteata* etc are found in the high hill forests of Koraput, Gajapati, Kandhamal, Keonjhar, Rayagada, Mayurbhanj, Sundargarh etc.

The orchid vegetation along the water courses are represented by the species like *Acanthephippium sylhetense*, *Zeuxine affinis*, *Z. gracilis*, *Calanthe triplicata*, *Goodyeraprocera*, *Tainia hookeriana*, *Tropidia*



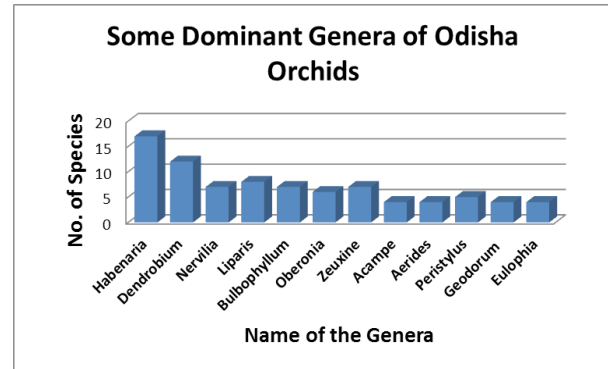
Plate 1. A. *Bulbophyllum guttulatatum*; B. *Cottonia peduncularis*; C. *Liparis deflexa*; D. *Dendrobium regium*; E. *Pomatocalpa decipiens*; F. *Rhyncostylis retusa*; G. *Kingidium deliciosum*; H. *Habenaria furcifera*

angulosa, *Phaius tankervilleae*. The stream sides are also inhabited by a few epiphytic orchid species like *Micropera pallida*, *Diploprora championi*, *Bulbophyllum macraei* and *Pomatocalpa decipiens*. These species are found to grow on slender branches or twigs over hanging the streams. The species close to the water courses are *Eria bambusifolia*, *Cirrhopetalum panigrahianum*, *Kingidium deliciosum* etc. *Oberonia gammiei*, *Lipariselliptica*, *Staurochilus ramosus* grow on the trees or on rocks on the edges of streams.

In the highland forests, especially on the foothills of Similipal, Kalahandi, Sunabedha a few genera such as *Habenaria*, *Pecteilis*, *Peristylus* are met with. In these ecological niches, members of few genera such as *Eulophia*, *Liparis*, *Zeuxine* etc. have also found inhabiting.

In open areas a few terrestrial orchids are found to be growing especially in the meadows on top or on hill slopes or highlands between 600-1600m. The species are *Habenariacommelinifolia*, *H. crassifolia*, *H.*

grandifloriformis, *H. longicorniculata*, *H. marginata*, *H. reniformis*, *Pachystoma pubescens*, *Pecteilis gigantea*, *P. henryi*, *Zeuxine lindleyana*. *Habenaria commelinifolia* is seems to be growing on edges of rice fields occasionally. Species like *Peristylus constrictus*, *Liparis odorata*, *Geodorum recurvum* are found as forest undergrowths; rarely found in meadows of higher eleva-



Graph 1. Some dominant genera of Orchids of Odisha

Table 1. Dominant Orchid rich habitats of Odisha

Sl. No.	Name of the Area	No. of orchid species		Total no. of Genera	Total no. of orchid species	Remarks
		Epiphytes	Terrestrial			
1	Similipal, Mayurbhanja	53	40	41	93	Endemic species found (<i>Cirrhopetalum panigrahianum</i> , <i>Dendrobium regium</i> , <i>Odisha cleistantha</i> , <i>Eriameghasaniensis</i>) New record for India (<i>Goodyerathailandica</i>)
2	Rebana	23	29	29	52	Endemic species found (<i>Cirrhopetalum panigrahianum</i> , <i>Dendrobium regium</i> , <i>Liparisespeevijii</i> , <i>Zeuxinemooneyi</i>)
3	Koira and Toda	25	17	27	42	Endemic species found (<i>Liparisudaii</i>) New record for India (<i>Goodyera thailandica</i>)
4	Mahendragiri and Singaraja	14	23	21	37	Endemic species found (<i>Habenaria panigrahiana</i> , <i>Odisha cleistantha</i>)
5	Brahmanigaon, Daringbadi and Paniganda	18	19	19	37	Endemic species found (<i>Dendrobium regium</i> , <i>Odisha cleistantha</i>)
6	Niyamgiri hills	23	14	17	37	Endemic species found (<i>Dendrobium regium</i>) New record for India (<i>Geodorum attenuatum</i>)
7	Govindpalli- Gupeswar	23	7	19	30	—
8	Karlapat- Thuamul Rampur	11	17	17	28	—
9	Kuldiha	16	6	20	22	—
10	Kapilas	15	6	16	21	New record for India (<i>Pomatocalpa decipiens</i>)

tion. *Didymoplexis pallens* is the single saprophytic orchid having the subterranean life form so far reported from Odisha which dwells in humus rich soil of moist deciduous forests of Barbara Reserve forest.

Conservation

Due to habitat destruction, there is a perceptible depletion in plant bio-diversity in general and orchid diversity in particular. Due to rapid urbanization, forest clearing and over-exploitation of natural resources the indigenous orchid germplasm is in great threat. The increasing demand of wild orchids in the International arena has lead to the indiscriminate exploitation of the native orchids. Taxon data sheets for each species have to be prepared for easy understanding of the status of the species. Consequently, the areas acting as hot spots and well known for thriving populations of orchids are in a sorry state today. However, in view of growing awareness about aesthetic values of orchids and possibilities of their sustainable exploitation for

commercial cultivation, conservation strategies assume importance. In conserving the orchids, special emphasis needs to be paid to rare, endangered and endemic species as well as those of economic importance. Hence, *in-situ*, *ex-situ*, *in-vitro*, on farm conservation, cryo-preservation, botanic garden (orchidarium), Bio-sphere reserve, gene sanctuaries, community efforts assume great importance to save the dwindling orchid wealth of the state.

Plantation of host trees in orchid habitats which is proven to be a very effective conservation measure should be under taken for providing the germination ground of orchids. The forest personnel should undergo basic training on the biology and field management of orchids. Measures should be under taken to check forest fires and soil erosions from the bank of perennial streams. Orchid farming near the forests should be encouraged among the local inhabitants and un-planned/un-judicious exploitation of local flora should be banned. Initiatives should be made for both natural and artificial regeneration of

Table 2. List of some Endangered, Vulnerable and Rare species.

Sl. No.	Name of Species	Locality	Altitudinal range	Flowering Time	Status
1.	* <i>Habenaria panigrahiana</i> var. <i>panigrahiana</i> S. Misra	Mohana (Gajapati)	400-900	October-December	Endangered
2.	* <i>Liparisespeevijii</i> S. Misra	Rebana (Keonjhar)	700	April-May	Endangered
3.	<i>Pecteilis henryi</i> Schltr.	Similiguda (Koraput)	900	September	Endangered
4.	<i>Pecteilis gigantea</i> (J.E. Sm.) Rafin.	Kirikuti (Kandamal)	500-1000	August-October	Vulnerable
5.	* <i>Cirrhopetalum panigrahianum</i> (S. Misra) S. Misra	Rebana (Keonjhar); Bhuduka, Similipal (Mayurbhanj)	600-800	June	Vulnerable
6.	* <i>Eria meghasaniensis</i> (S. Misra) S. Misra	Meghasani, Similipal (Mayurbhanj)	1100	September-October	Endemic and Rare
7.	<i>Gastrochilus acaulis</i> (Lindl.) O. Kze.	Mahendragiri (Gajapati)	1000	March-April	Vulnerable
8.	<i>Tainia hookeriana</i> King. & Pantl.	Jenabil, Similipal (Mayurbhanj)	700-900	January-March	Vulnerable
9.	<i>Didymoplexis pallens</i> Griff.	Kulada (Ganjam)	June	Rare	
10.	<i>Pomatocalpa decipiens</i> (Lindl.) J.J. Sm.	Barbara (Khordha); Kapilas (Dhenkanal)		January-March	Rare

Note: Species with asterisk are endemic to Odisha

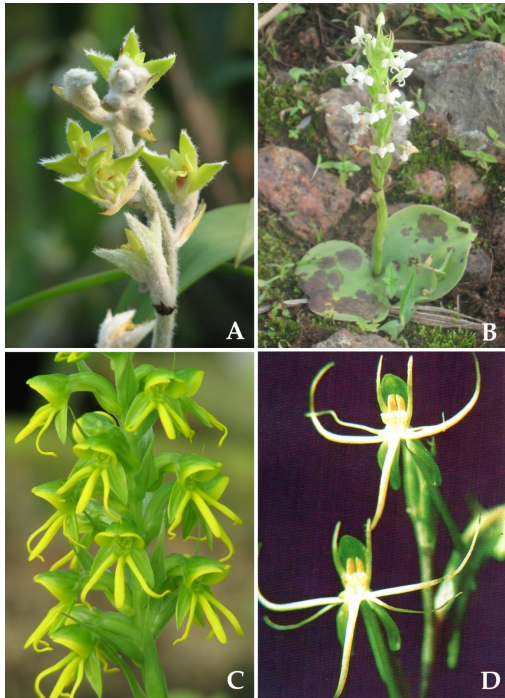


Plate 2. A. *Eria lasiopetala*; B. *Habenaria crassifolia*; C. *Habenaria marginata*; D. *Habenaria panigrahiana* var. *panigrahiana*

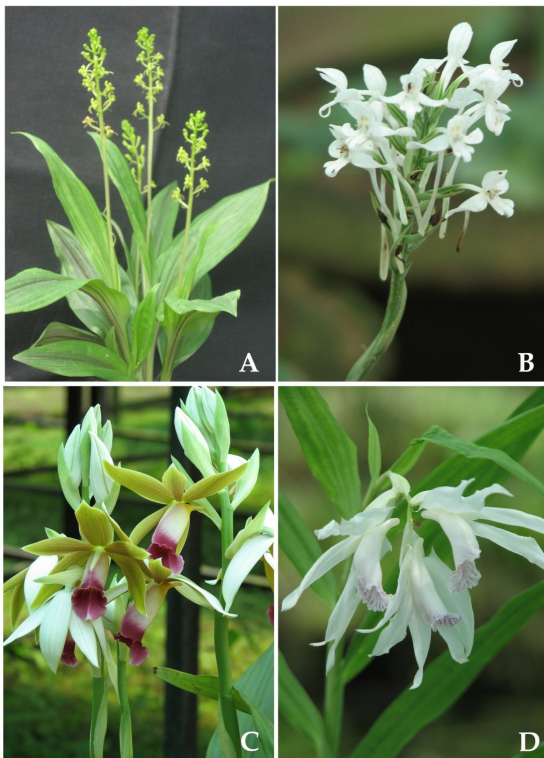


Plate 3. A. *Liparis udai*; B. *Habenaria roxburghii*; C. *Phaius tankervilleae*; D. *Thunia bracteata*.

rare and endangered species. Natural orchid habitats should be developed into well maintained natural orchidariums with proper labeling of the species in order to promote or generate interest among tourists and naturalists. Extensive collection of seeds and vegetative parts of rare orchids from the wild for propagation purposes should be carried out besides preparing a checklist of endemic and rare orchid species

Conclusion

Orchids have recorded a special place among the ornamental plants of the world due to its varied range of curious flowers. The incredible range of diversity in size, shape, structure and colour of their flowers records their position as 'Botanical Jewels' in the plant kingdom. The long vase-life of the flowers have further enhanced their value among the horticulturist and garden enthusiasts the world over. They are used in decorative purposes in the hotels, houses, educational institutions etc. Besides their ornamental value many orchids have therapeutic importance containing ingredients of flavonoides, glucosides etc. Some have commercial value being used in spices. As like other states, the orchids of Odisha also have under gone severe biotic pressure. Orchids of Odisha live in a delicately balanced equilibrium with their ecosystem. They are highly vulnerable and serve as excellent indicators of environmental degradation. Hence, conservation, restoration and rehabilitation of this unique and rare plant community are the need of the hour.

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