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RESEARCH ARTICLE

A Review on Orchids in India and their Conservation

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Abstract

Orchids are amongst the most advanced flowering plants, highly specialized in many ways. They are distributed all over the world except the Antarctica. The North-East region of India has the highest representation of orchid genera. Some of these genera are not found in any other parts of the world. Unfortunately, the orchid diversity of India as a whole is being threatened for reasons such as increased biotic influences, socio-economic development and uncontrolled commercial exploitation of forest wealth. Therefore concrete efforts have to be made to conserve the declining population of orchids in the region.

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Introduction

India is recognised as a significant producer of orchids in the world. Near about 1,300 species of orchids are found in India which constitutes almost 10 percent of the world orchid flora with Himalayas as their main home (Medhi and Chakrabarthi, 2009). Orchids are the most fascinating and beautiful flowering plants belonging to family orchidaceae. Orchidaceae is a cosmopolitan family distributed throughout the world. Orchids is most highly evolved family among monocotyledons with near about 1000 genera and 25,000-35,000 species which exhibit an incredible range of diversity in size, shape and of the colour of their flowers. About 200 orchid species are found in North-Western Himalayas, 800 in North-Eastern India while as 300 orchids occur in Western Ghats. North-Eastern India owing to its peculiar gradient and varied climatic conditions contains largest group of temperate, sub-tropical orchids (Rao, 2004). India has a very large variety of orchids and hilly regions have one or the other orchid species flowering almost throughout the year. The diversity is so large that there are large-flowered, terrestrial, epiphytic and also saprophytic orchids. The largest terrestrial genus is *Habenaria* (100 spp.) and the largest epiphytic genus is *Dendrobium* (70 spp.).

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Most of the *Paphiopedilum* (lady's slipper) species are restricted to N.E Himalayas except for *P. druryi* which has been reported from Kerala but now is almost extinct from its original habitat. Some orchids endemic to India are in such a tremendous demand that their natural populations have been over exploited. Some of the endemic species include *Aenhenrya rotundifolia*, *Anoectochilus elatus*, *Arundina graminifolia*, *Brachycorythis splendida*, *Bulbophyllum elegantulum*, *Bulbophyllum fischeri*, *Coelogyne nervosa*, *Dendrobium diodon kodayarensis*, *Dendrobium herbaceum*, *Dendrobium heterocarpum*, *Dendrobium heyneanum*, *Dendrobium wightii*, *Disperis neilgherrens*, *Epipogium roseum*, *Eria pauciflora*, *Eria pseudoclavicaulis* (Ganesh et al., 1996).

Orchid conservation

Unfortunately, the orchid diversity in the country as a whole is being threatened for various reasons such as the increased biotic influences, socio-economic development and uncontrolled commercial exploitation of forest wealth. Almost all the epiphytes, because of their habitat destruction pressures, and all of them figure prominently in the list of endangered plants. Although the decline in the population of orchids has been attributed to ruthless

Table 1. Sacred groves of Northeastern region to conserve orchids

State	Local term	No. of documented sacred grove
Arunachal Pradesh	Gumpa Forests (<i>Sacred Groves attached to Buddhist monasteries</i>)	65
Assam	Than, Madaico	40
Manipur	Gamkhap, Mauhak (<i>sacred bamboo reserves</i>)	365
Meghalaya	Law Lyngdhoh	83
Sikkim	Gumpa Forests	56

Table 2. List of some orchids propagated through *in vitro* seed germination

Name	Status	References
<i>Coelogyne punctulata</i>	Endemic, overcollection	Sharma and Tandon (1986)
<i>Cattleya dowiana</i>	Rare	Marlow and Butcher (1987)
<i>Dendrobium spectatissimum</i>	Rare	Marlow and Butcher (1987)
<i>Spiranthes parvifolia</i>	Less than 2000 in the wild	Christenson (1988)
<i>Disa uniflora</i>	Rare	Ronse (1990)
<i>Hetaeria cristata</i>	Propagation for reintroduction and horticulture	Yam and Weatherhead (1990)
<i>Dendrobium fimbriatum</i> var. <i>oculatum</i>	Overcollection, threatened	Kumaria and Tandon (1991)
<i>Spiranthes magnicamporum</i>	Rare, Propagation for horticulture	Anderson (1991)
<i>Cypripedium calceolus</i>	Rare	Malmgren (1992)
<i>Cypripedium debile</i>	Rare	Hoshi <i>et al.</i> (1994)
<i>Habenaria radiata</i>	Rare	Nagayoshi <i>et al.</i> (1996)
<i>Cypripedium reginae</i>	Rare	Faletta <i>et al.</i> (1997)
<i>Dendrobium lindleyi</i>	Rare	Kaur and Sharma (1997)
<i>Platanthera praeclara</i>	Rare	From and Read (1997)

commercial exploitation, by the Convention on International Trade in Endangered Species (CITES) of wild flora and fauna, it is observed that habitat destruction is the major factor involved.

Orchids prefer to grow in undisturbed forests area either on tree trunks (epiphytes) or on the forests floor (terrestrial or semi terrestrial). Community based wild orchid has a long history as orchids are closely associated with the socio economic culture of the local people. The people of North Eastern region conserve orchids in their natural habitats in sacred groves or shrine forests or in the form of village forest reserves based on their religious beliefs (Medhi and Chakrabarti, 2009). The former can be seen in Meghalaya and Manipur while the latter is common in Mizoram (Darlong and Barik, 1998). Sacred groves or shrine forests are the forest patches rich in biodiversity and represent a long tradition of environmental conservation by the tribal communities of north eastern India. A range of traditions and cultural values of the local people helps in protecting the groves/forests with the beliefs in nature worship inherited from their ancestors, generation after generations. For instance, the Nagas believe that destruction of forests in close proximity

of villages will bring a loss of prosperity and disease outbreak (Gupta and Guha, 2002). There are a large number of sacred groves in the states of Arunachal Pradesh, Meghalaya, Manipur, Sikkim and Karbi-Anglong area of Assam (Table 1). These sacred groves are in existence in the region from the ancient time and are considered to be the relic of the original forest vegetation of the region.

The modern tools of biotechnology can be utilized for the propagation and conservation of plant genetic resources. In general these could be accomplished both by *in situ* and *ex situ* methods. These techniques were initially introduced on the plant species having agricultural or horticultural importance, but are now rapidly being applied for the collection, propagation, preservation and evolution of rare and endangered plant germplasm. For conservation of plants, the seeds are in general, preferred for propagation as they maintain maximum genetic diversity. The *in vitro* seed germination techniques have ensured germination in the hard to germinate taxa and have offered possibilities to study the morphogenetic changes occurring in course of seedling development. The mass propagation of orchids through asymbiotic seed germination is a tool for the conservation of the

declining orchid population in nature. The orchid seeds are minute in nature and are very difficult to germinate because they do not possess endosperm and the embryo is immature (Zeigler *et al.*, 1967). Because of their particular fungal requirement less than 5% of the orchid seeds germinate in nature. A number of rare species of orchids have been germinated *in vitro* through seeds (Table 2). During the last few years, tissue culture techniques using seeds and appropriate explants have been developed for large scale propagation of orchids.

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