



## EX-SITU CONSERVATION STUDIES ON ETHNO- MEDICINAL RARE, ENDEMIC PLANT SPECIES FROM WESTERN GHATS OF MAHARASHTRA

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### ABSTRACT

Due to various factors such as changing environmental conditions, biotic factors, destruction of habitat etc. some ethno-medicinal rare endemic plant species are facing threats for their existence. Conservation, enhancement and sustainable utilization of plant resources are recognized as one of the vital segment in the natural resource management. The present work deals with the experience and efforts of promoting propagation and conservation of some selected plant species from of Western Ghats Maharashtra. Western Ghats region is one of the important Hot-spot of the world, situated in Sahyadri ranges of Maharashtra. The forest has great potentiality both from economic and botanical point of view. The endemic and medicinal plant species were abundant in this region and can be exploited due to improper management. Harvesting, grazing, shifting cultivation and uprooting of plant species for the purpose of food, fodder and medicines by tribal and local people are found the major cause for their threats. An extensive survey of Western Ghats region was carried out from ex-situ conservation point of view. Taxonomic, ecological and conservation aspects of selected ethno-medicinal rare, endemic plant species were studied. *Ceropegia* L., *Dioscoria* L., *Gloriosa* L. became rare due to habitat destruction and local consumption of tubers for food and medicine by rural communities. The endemic species of genus *Smithia*, *Pinda*, *Pimpinella*, *Momordica* and some important medicinal species of genus *Chlorophytum*, *Rubia*, *Rauvolfia*, *Abrus*, *Hemidesmus*, *Mundulea* and *Cullen* were identified with the help of standard literature and was studied. Seeds and propagating material were collected and propagated. Propagation through seed shows successful results. Transplantation through tubers requires similar ecological conditions. Well-drained soil, rich organic matter and sunny positions are good for *Dioscoria* L. Seeds of *Gloriosa* L. germinate well in wet and dumpy soil. Plants require rich organic soil and sunny situation. Live plants of all these species are maintained in healthy condition in botanical garden. Reasons for their threats and conservation measures were suggested.

### KEY WORDS

Ex-situ conservation, Rare, Endemic Ethno-medicinal plant, Western Ghats.

### INTRODUCTION

Conservation of biological diversity is one of the essential needs to save our natural wealth. The local inhabitants are custodians and maintaining diversity of wild plants, crop and medicinal plants etc. with their indigenous traditional knowledge. Due to modern impact of civilization, changing environmental conditions,

destruction of habitat has been created problems to their existence. More and more plant species therefore are getting in to red data book of threatened plant species. It deals directly to conserve wild plants in their natural habitat as well as in botanical gardens.

The present work deals with the experience of efforts of promoting conservation and cultivation of some selected plant species. An



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extensive survey of some part of Western Ghats region was carried out. Some important ethno-medicinal rare, endemic plant species were listed. Taxonomic, ecological aspects and reasons for their threats of selected plant species were studied. Conservation measures were discussed.

Western Ghats is a hot-spot of plant biodiversity. The Western Ghats of Maharashtra are called 'Sahyadri', the mountains vary in height from 20 to 2000 M above sea level. The climate and rain fall pattern here have led to a variety of unique plant species. It is also recognized as a center for origin of several cultivated plants and houses a variety of medicinal plants. The forest has great potentiality both from economical and botanical point of view. Many endemic as well as threatened plants are found growing naturally in this area. A large number of these plants being used to cure illnesses by traditional healers. However due to lack of proper documentation the uses of these plants have remained unknown to the science. The rare endemic and medicinal plant species are abundant in this region and can be exploited due to improper management. Harvesting, grazing, shifting cultivation and uprooting of plant species for the purpose of food, fodder and medicines by tribal and local people are found the major cause for their threats.

In past few years some reports have been appeared on the floristic studies (Santapau 1951, Santapau and Irani 1962, Wadhawa and Ansari 1968, Wadhawa 1970, Ansari 1971, 1982, 1984, Ansari and kulkarni 1982, Shirke 1984, Mahabale and Chaudhari 1987, Yadav et.al. 1990, Pradhan and Singh 1999, Sharma et. al 2001, Yadav and Serdesai 2002, Jagtap and Singh 2002, Singh and Singh 2002.) of the Western Ghats region. Some work has been done on their conservation and propagation. But an extensive survey and more

work are needed. Some of the species may be lost without receiving any attention. Hence there is an urgent need to propagate and conserve each and every plant species.

### MATERIALS AND METHODS

The present work is based on ex-situ conservation of some ethno- medicinal rare, endemic plant species. An extensive survey of selected plant species was made according to their preliminary information of status, regeneration and conservation strategy. The selected plant species were collected and identified with the help of standard floras and books (Cooke 1967, Nayar and Sastry 1988, Pradhan and Singh 1999, Sharma et al 2001, Yadav and Serdesai 2002). Photographs of the important plant species were taken. Collected seeds were labeled and stored in laboratory. Seeds and vegetative propagating materials were collected and propagated. Seedlings were planted in botanical garden and maintained in healthy condition. They were transplanted under similar ecological conditions. Conservation measures were studied and suggested. Ex-situ conservation mode was designed in certain pockets by involving local people.

### OBSERVATIONS AND DISCUSSION

The ex-situ conservation efforts were found to be highly successful. Collected species of genus *Ceropegia* L., *Dioscoria* L., *Gloriosa* L becomes rare due to habitat destruction and local consumption for food and medicine by rural communities. Investigation includes their status, morphological features and conservation measures.



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**Table.1**  
*Plants selected for ex-situ conservation.*

Botanical name	Family	Parts used	Status
<i>Ceropegia mahabalei</i>	Asclepidaceae	Tubers	Endangered /endemic
<i>C. sahyadrica</i>	Asclepidaceae	Tubers	Rare/ endemic
<i>C. oculata</i> , Hook F.	Asclepidaceae	Tubers	Rare/ endemic
<i>C. hirsuta</i> Wt. Et. An.	Asclepidaceae	Tubers	Locally rare /endemic
<i>C. media</i> (Hub) Ansari	Asclepidaceae	Tubers	Rare/ endemic
<i>C. bulbosa</i> Roxb.	Asclepidaceae	Tubers	Locally rare/ endemic
<i>Dioscoria belophylla</i>	Dioscoriaceae	Tubers	Rare
<i>D. oppositifolia</i> L.	Dioscoriaceae	Tubers	Locally rare
<i>D. pentaphylla</i> L.	Dioscoriaceae	Tubers &Flow.	Locally rare/ endemic
<i>D. bulbifera</i> L.	Dioscoriaceae	Tubers &bulbs	Locally rare
<i>Gloriosa superba</i> L.	Liliaceae	Tubers	Locally rare/ endemic
<i>Abrus precatorius</i> L.	Fabaceae	Seeds & leaves	Medicinal
<i>Asparagus racemosus</i> Willd	Liliaceae	Tubers	Medicinal
<i>Capparis spinosa</i> L.	Capparaceae	Fruits & seeds	Medicinal
<i>Chlorophytum tuberosum</i> (Rox) Baker	Liliaceae	Roots	Medicinal
<i>Cullen corylofolia</i> (L.) Medik	Fabaceae	Fruits	Medicinal
<i>Hemidesmus indicus</i> L.	Periploaceae	Roots	Medicinal
<i>Momordica dioica</i> Rox. et Willd	Cucurbitaceae	Fruits	Medicinal
<i>Mucuna pruriens</i> (L.)	Fabaceae	Fruits and seeds	Endemic/medicinal
<i>Mundulea sericea</i> (Willd) A. Chev.	Fabaceae	Fruits	Medicinal
<i>Physalis minima</i> L.	Solanaceae	Fruits	Medicinal
<i>Pimpinella rollae</i> Billore et Hem.	Apiaceae	Seeds	Endemic
<i>Pinda concanensis</i> (Dalza.) Mukh.	Apiaceae	Seeds	Endemic/ rare
<i>Rauwolfia serpentina</i> L.	Apocynaceae	Roots	Rare/ Medicinal
<i>Rubia cordifolia</i> L.	Rubiaceae	Leaves	Medicinal
<i>Smithia purpurea</i> Hook.	Fabaceae	Seeds	Endemic
<i>Thalictrum dalzelli</i> Hook	Rannunculaceae	Fruits	Rare/ endemic

*Ceropegia* L., is the genus of over 200 succulent plant species with worldwide distribution.

The genus becomes rare due to habitat destruction and consumption of tubers as food and medicine by



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rural communities. Six species of *Ceropegia* L. were collected from different parts of the study area. Investigations include their present position, location and morphological features.

Transplantation and propagation through tubers and seeds under ex-situ conservation shows successful results. It requires similar ecological condition and climate. Soil is also an important factor. *C. mahabalei* Hem. et. Ansari and *C. media* (Huber) Ansari, surviving well under similar soil. *C. bulbosa* Roxb. can be grown in every type of soil.

*Dioscoria* L. named after the Greek physician Dioscorides. This is very large genus of about 700 species is found through the tropics as well as in temperate region. Many species produce poisonous tubers. But there are about 30 species that are edible after being cooked. These are slender climbing plants and the tubers can be formed below and above ground. The alternate leaves are heart shaped and spike of tiny flower are either solitary or cluster. The fruits are capsules containing winged seeds. Local people use the tubers as a food after cooking. Inflorescence of *D. pentaphylla* L. is known for nutritious vegetable.

Four species were identified from the study area. Seeds and tubers were collected. Propagation through tubers and seeds were found successful. The tender plants require good drainage and fertile soil with high organic content. *Dioscoria bulbifera* L. having aerial bulbils in the axis of leaves. After flowering and fruiting, the plants die back to a perennial root system every year. Plants require support, as it is climber.

*Gloriosa* L. is commonly known as glory lily or climbing lily. It is herbaceous with underground cylindrical tubers rhizome. Leaves are sessile, alternate; flowers are showy, solitary, at first greenish becoming yellow and finely scarlet; fruit capsule containing many seeds. Plants climb over low shrubs and through long grass by means of coiled tendril like tips of the leaves. They are widely grown for their decorative, brightly colored

flowers, which make long lasting and most attractive cut flowers. In autumn or in tropical dry season the plant die back to dormant tubers.

The species of genus *Smithia*, *Pimpinella*, *Momordica*, *Thalictrum* and *Pinda* are endemic to Western Ghats while *Rauwolfia*, *Thalictrum* and *Pinda* are rare. Seeds and tubers of these rare, endemic and medicinal plants were collected and propagated. Seeds show successful results in germination (60 to 70%). They grow well in drained, red sandy loam soil. Germination requires hot and humid climate. Seedlings may transplant in the suitable forest area. Plants raised from tubers were planted in the bed during rainy season. Plants require support, as it is climber. Plants should grow without using chemical fertilizer.

The species of genus *Ceropegia* L., *Dioscoria* L., *Gloriosa* L. was found locally rare due to habitat destruction and local consumption of tubers for food and medicine by rural communities. Transplantation and propagation through tubers and seeds shows successful results. It requires similar ecological conditions and climate. Soil is an important factor for their growth. Seasonal variations showed marked effect.

## RESULTS AND CONCLUSION

Changing environmental conditions, biotic factors, destruction of habitat improper harvesting of natural resources, shifting cultivation are the main causes for their existence. Efforts of promoting conservation and cultivation are the only remedies. It deals directly to conserve wild plants in the natural habitat and in botanical gardens.

Present work has involved three important components. Identification of rare, endemic and medicinal plants for conservation through ethno-botanical studies, standardization of propagation practices by nursery studies and the transfer of propagation, cultivation and conservation knowledge to different local communities.

Towards the conservation point of view, tissue culture technique should be tried for



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multiplication. Plants should conserve in protected areas. They can be transplanted under similar ecological condition. Uprooting of plants should be prohibited. Local communities should inform and motivated for conservation and cultivation. Some of the species may incorporate in crop plant as a commercial crop.

It is a fact that plants and human beings are closely related to each other. Man's need from the nature, utility of plant resources and environmental degradation due to various factors cause a great damage to the floristic diversity. It is necessary to evolve effective conservation strategies of plants so that they can be conserved and used sustainable in the interest of humanity. In this point of view, botanical gardens have important role in conservation. Basic knowledge about the threatened, endemic, medicinal species is very much essential for their conservation.

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