



Ex-Situ Conservation of Some Threatened Species from Divergent Sources

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Introduction

In India many plants are fast moving towards the threat of rare, endangered and threatened (RET) category. The loss of habitat, over-exploitation, difficult propagation, damage by biotic and abiotic agencies, etc. are the major reasons for the decline. If the present situation continues many such plants will vanish from the earth's surface forever.

From biodiversity conservation point of view, twenty-six "hot spot" have been identified in India where there are high rates of deforestation and endemism, which need priority attention. One of these is the Himalayan belt as a whole. At present, several of the Himalayan species are under ecological threat due to geological evolution, global climatic changes and human interference. These factors have adversely affected the floral wealth in the Himalayas. According to IUCN criteria about 121 species have been recorded in Red Data Book of Indian plants from Himalayan region. There are many rare and endangered species whose populations are fast decreasing indicating them as threatened for future. The current cultivation practices of identified rare, endangered and threatened plants in the country are still in primitive stage due to lack of suitable cultivation technology and poor marketing facilities.

By merely confining species in their natural habitats and imposing ban on their exploitation cannot serve the purpose. There must be a scientific approach towards *in-situ* and *ex-situ* conservation of the species in question. This may help a lot to the conservationists engaged in such tasks, researchers for developing cultivation technologies, progressive farmers who are interested to commercially cultivate them in their farms, etc.

A number of neglected species at present are on the verge of becoming endangered and many have even reached the point of extinction. Cultivation of such neglected plants has great scope in the mountain areas. But the bottleneck in this context is the unavailability of germplasm of such neglected species. No organised agencies or research organisations produce or supply sufficient planting material required for the purpose. Hence the present study was conducted for establishment of germplasm of threatened plants of *Catamixis baccharoides*, *Ulmus wallichiana*, *Rauvolfia serpentina*, and *Mahonia jaunsarensis*, so that plants for the larger *ex-situ* conservation in areas of their endemism can be produced in the Garhwal Himalayas. This issue was addressed and the plant material was assembled in a germplasm garden at Forest Research Institute, Dehradun in Uttarakhand.

Catamixis baccharoides

Catamixis baccharoides Thoms., family Compositae, is a chasmophyte shrub and is endemic to Garhwal and Nepal only. It is 3-5 ft. high and its branches are silky to tomentose. It is restricted to sandy cliffs in Siwalik (Kanjilal and Gupta, 1969). This species is a rare occurrence (Hosetti, 2006). This species is included in Red Data Book of Indian Plants and 1997 IUCN Red List of Threatened Plants in Vulnerable category (Nayar and Ahmedullah, 1985).

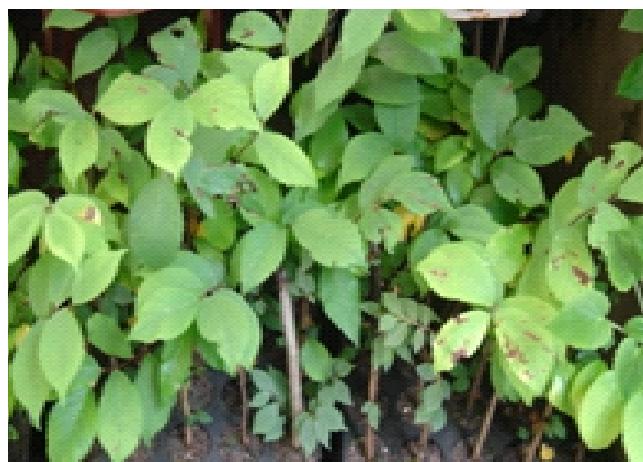
Ulmus wallichiana

Ulmus wallichiana Planch. (vern. Imroi, elm) belongs to family Ulmaceae and grows from Kashmir to Uttarakhand from 1200 m to 3000 m altitude. It is a large deciduous tree and is fairly





Catamixis baccharoides



Ulmus wallichiana



Rauvolfia serpentina



Mahonia jaunsarensis

common in ravines. Its timber is good for making furniture, planking, reels, packing cases, light construction work. Bark fibre is used for cordage. It is also used for igniting explosives. The bark also finds use in tanning (Agarwal, 2005). It is included as a vulnerable plant in IUCN Red List of Vulnerable plants (IUCN, 2010).

Rauvolfia serpentina

Rauvolfia serpentina (L). Benth. ex Kurz. (Apocynaceae) (vern. Sarpagandha, Candrabhaga, Chhota chand, *Serpentina* root, Chandrika) is an important medicinal plant distributed in the foothills of Himalayan range, up to the elevation of 1300-1400 m and is found in forests almost throughout the country. In the Himalayas, it occurs in lower hills of Himachal Pradesh,

Uttarakhand, Uttar Pradesh, Jammu & Kashmir. The roots possess high alkaloid concentration. It is much valued for its medicinal properties. (NMPB, 2012). A large number of alkaloids have been isolated from the roots of the plant, but reserpine is the main active principle of *Rauvolfia serpentina*. Extracts from *Rauvolfia serpentina* have been recommended for the treatment of a great variety of diseases.

Mahonia jaunsarensis

Mahonia jaunsarensis belongs to family Berberidaceae. It is an erect evergreen shrub with soft corky bark. Bark and roots are substitute of berberine alkaloid (Agarwal, 2005). It is found at 1800-2400 m altitude. Literature on its cultivation or utilization is not available.





Methodology

The methodology comprised the following:

- **Survey of plants species and identification of plants and localities**

Survey of species under the study viz. *Catamixis baccharoides*, *Ulmus wallichiana*, *Rauvolfia serpentina* and *Mahonia jaunsarensis* was carried out in Garhwal Himalaya on the basis of information about distribution of different species available in literature. Sites where the plants were found were recorded.

- **Collection of plants and their multiplication**

Cuttings were collected from different districts (covering states of Uttarakhand, Himachal Pradesh and J & K) during March month for three of the target species (except *Rauvolfia serpentina*) due to more favourable response of temperate species during this season in comparison with other seasons (Hartmann *et al.*, 1997, Bhatt and Todaria, 1991). The germplasm was collected from different states different districts.. Cuttings of *Rauvolfia serpentina* and a related species viz. *Rauvolfia canescens* were also received from Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow. The material was used for development of plant materials and

establishment of germplasm garden.

Results

Plants material procured were used for establishing of germplasm garden in Forest Research Institute campus situated at 30° 20'40" latitude, 77° 52' 12" longitude and at 640.08 a.m.s.l altitude. The germplasm garden consisting of the four threatened species was established. The number of plants per accessions was kept as 10 for *Catamixis baccharoides*, *Ulmus wallichiana*, and *Mahonia jaunsarensis* while 30 plants per accessions were planted for *Rauvolfia serpentina*. In addition to plants from vegetative propagation, 30 wildings each of three accessions were also planted. The number of accessions of various species is as follows: *Catamixis baccharoides* (2), *Ulmus wallichiana* (9), *Rauvolfia serpentina* (8) and *Mahonia jaunsarensis* (5). The germplasm bank covers an area of about 0.25 acre and has 20 plants of *Catamixis baccharoides*, 90 plants of *Ulmus wallichiana*, 330 plants of *Rauvolfia serpentina* and 50 plants of *Mahonia jaunsarensis*.

Acknowledgements

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