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CONSERVATION & DOMESTICATION OF ENDANGERED AND THREATENED PLANT SPECIES IN INDIA

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Abstract: India's rich flora, including medicinal plants, is rapidly disappearing due to over-exploitation. To manage this resource, mass propagation of crops using plant tissue culture strategies is necessary. The conservation and domestication of endangered and threatened species is a critical global issue due to habitat destruction, fragmentation, degradation, and human-wildlife conflict. This review provides an overview of the conservation and domestication status of these species, their successes and challenges, and future directions for conservation and domestication. The National Medicinal Plants Board (NMPB) in New Delhi has been instrumental in conservation and cultivation of these species, addressing habitat loss, biotic and abiotic interference, and unsustainable harvesting. The NMPB has funded numerous projects for the conservation and cultivation of endangered and threatened medicinal plants. Future directions for conservation and domestication include technology, community engagement, and policy support.

Keywords: Over-exploitation, Plant Tissue Culture, Conservation, Domestication, Endangered Species, Threatened Species, Habitat Destruction, Fragmentation, Degradation, Human-Wildlife Conflict, Habitat Loss, Biotic Interference, Abiotic Interference, Unsustainable Harvesting, Technology, Community Engagement etc.

Introduction: However, plant species are extremely important for our lives. They provide us with food items, vegetables, shelter and livelihood, along with multiple other usable resources. We have known that India comes out to have very rich biodiversity in plant biology. Hence, it becomes significant to conserve and protect our plant resources for future generations. The flowering plants in India are represented by four major areas that comprise the biodiversity hotspots. Approximately 28% of the plants in this country have their origin in India. Furthermore, in terms of plant representation in their classification, dicotyledonous comes higher at a number of 720 genera with 2984 taxa (74%) in comparison to monocotyledons that come at 255 genera with 1061 taxa (26%). Eastern Himalayas, Northeast India and Andaman Islands (Indo-

Burma), Nicobar Island (Sundaland) and Western Ghats thus contribute to form a collective sum of 34 biodiversity hotspots considered dominant across the globe, since this region includes famous names such as Poaceae, Orchidaceae, Leguminosae, Asteraceae, Rubiaceae, Cyperaceae, Euphorbiaceae and Acanthaceae among others.

These floristically important areas have also been exposed into several threats and dangers, and today, more than ever, they are greatly endangered. Anthropogenic influences, such as pollution from climate change, destruction of habitats, introduction of alien species into the environment and excess use, together with poor seed germination and setting, restricted habitats and limited niche-specific pollinators, act as the explanations for endangerment conditions concerning some species. This is what creates the condition.

Species on Earth: How many species exist in India, and how many does the Earth hold entirely? Though estimated to slightly exceed 1.5 million, plant and animal species currently described according to the IUCN (2004) are not clearly known regarding how many more species yet remain to be discovered and described. The estimates, too, vary widely and are often an educated guess.

Species inventories for many taxonomic groups are more complete in temperate than in tropical countries. Most of the species that await discovery are tropical, and with that in mind, biologists compare the temperate-tropical species richness of a thoroughly known group of insects and extrapolate that ratio to other groups of animals and plants with the aim of estimating the total number of species that exist on earth. From 20 to 50 million, according to some estimates at their extreme points, but a conservative and scientifically sound estimate by Robert May states that the Global Species Diversity is about 7 million. Well, India possesses only 2.4 per cent of the world's land area, but its share of the global species diversity is an impressive 8.1 per cent. This makes our country one of the 12 mega diversity countries of the world accounting for 7-8% of all recorded species. Approximately 45,000 species of plants and twice that number of animals have been recorded from India. If May's global estimates are accepted, it enables the conclusion that only 22 per cent of total species have been recorded so far. Applying this proportion to India's diversity holdings, one can estimate that probably more than 1,00,000 plant species and more than 3,00,000 animal species await discovery and description.

Biodiversity Conservation: India is known to inhabit a myriad species of plants among which many are endangered or threatened by loss of habitat, over-exploitation or climate change. The National Medicinal Plants Board (NMPB) has initiated various activities for conservation and domestication of these species. India also has this history of religious and cultural traditions which cherished nature conservation. In fact, several cultures had tracts of forests set aside, and those trees and wildlife within were venerated and given total protection. Such sacred groves are found in Khasi and Jaintia Hill's in Meghalaya , Aravalli Hills of Rajasthan Hills in Meghalaya, Aravalli Hills, Rajasthan Bestern Ghats of Karnataka and Maharashtra and the Sarguja, Chanda and Bastar areas of Madhya Pradesh. In Meghalaya, the sacred groves are the last refuges for a large number of rare and threatened plants.

Conservation: More than one other organisation, namely the NMPB, Indian Council of Agricultural Research (ICAR), and the Botanical Survey of India (BSI), have jointly initiated active programs for conserving endangered plant species. Such measures include:

- **In situ conservation:** It is done by Protecting plants in their natural habitats through the establishment of protected areas, such as national parks and wildlife sanctuaries.• in India there are -

- 18 Biosphere Reserves
- 104 National Parks
- 500 Wildlife Sanctuaries
- Numerous Reserved and Protected Forests

- **Ex situ conservation:** This is Conserving plants outside their natural habitats, such as in botanical gardens, nurseries, and gene banks.Common forms of ex situ conservation of flora in India are those that involve the preservation of plant species outside their natural habitats, primarily in controlled environments such as botanical gardens, seed banks, and tissue culture banks.

Challenges and Future Directions: But unfortunately, recent attempts have not proven useful in combating the ex situ conservation of the flora of India. This is because, aside from their limited availability of resources and inadequate infrastructure, ex situ conservation of flora poses several other challenges, which all seem to require greater community involvement. For that reason, there is still a need to develop effective conservation strategies, improve stakeholder collaboration, and create awareness about preserving the rich floral diversity of India. Biotechnological Approaches for Conservation of Flora in India

1. MicropropagationMicropropagation involves multiplication of plant species in vitro by tissue culture technique. This technique is especially applied to endangered species that have a limited amount of seeds available.

2. Cryopreservation Cryopreservation is the process of putting the plant cells, tissues, or seeds into preservation by extremely low temperature. This helps to maintain genetic stability and viability of the preserved plant material.

3. Somatic Embryogenesis Plant mass production can be achieved using somatic embryogenesis because embryos develop from somatic cells. This method is excellent for species that cannot be easily propagated by the conventional methods.

4. Protoplast Culture Isolation and culturing of plant cells without their cell walls are performed in protoplast cultures. This paves the way for production of somatic hybrids and transfer of de-Domestication of flora in India The domestication process of flora in India remains ongoing, with established initiatives and research projects directed toward conservation and utilization of the abundant plant diversity of the country. Institutions such as the Botanical Survey of India (BSI) and the National Bureau of Plant Genetic Resources (NBPGR) have been initiated by the Indian government to oversee such activities on the conservation and domestication of plant species [1].

Conclusion: Multi-billion multi-faceted intervention in the conservation and domestication of endangered and threatened plant species. This will involve governments, local stakeholders, and other stakeholders. The adoption of in situ and ex situ conservation strategies coupled with domestication practices will ensure not only the long-term survival of these plants but also the foundation of a sustainable development on them.

This variety has a very narrow endemic zone of distribution in Westerm Uttar Pradesh including Saharanpur forest division. This variety has very restricted dispersal; and it has developed some morphological traits that are different from its type species Derris scandens. It is in decline and needs to be monitored. The probability of colonization of this variety is almost stable and is imminently in danger of extinction. No effort is yet made for increasing the number of individuals belonging to this species. Immediate efforts must ensure, through in situ conservation measures, the protection of its population in its type locality for its survival. Besides these, tissue culture studies can be used for propagating and reintroducing the woody climber into other localities of similar ecological conditions.

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