

# Studies on floristic diversity of some endangered plant species from Western Ghats of Nasik district, Maharashtra

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## ABSTRACT

The present study deals with floristic diversity and taxonomy along with the observations with respect to precise locations, flowering, fruiting period and potential threats of some endangered plant species of Western Ghats in Nasik district of Maharashtra. Total 30 endangered plant species belonging to 14 families; were recorded during an extensive field surveys and botanical excursions; conducted from 2018 to 2020 at several places mainly forest pockets and hilly regions from Nasik tehsils like Sinnar, Trymbakeshwar, Igatpuri, Chandwad, Kalwan etc. The occurrence of endangered plant species focusing their floristic and taxonomical aspects were monitored continuously so as know the current status of these species in the study area. It was observed that the probable reasons for consistent decrease in number of endangered plant species in the study area; are destruction of natural habitats due to increasing illegal acquisition of forest land, massive deforestation and urbanization. The present study thus highlights an effective monitoring and conservation strategy to be adopted for the sustainable use of endangered plants.

**Keywords :** Endangered Plants, Nasik, Western Ghats.

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## I. INTRODUCTION

Western Ghats is a hot-spot of plant biodiversity. Many endangered and threatened plants are found growing naturally in this area. The Western Ghat has 6% of India's landmass with 30% of plants and animals. There are specific patches in the Western Ghats that are of special significance as they constitute habitats of endangered species several of

which are on IUCNs endangered species list. (Gunawardene et al. 2007; Bharucha et.al.;2010).

The plant species which were abundant previously in this region are being exploited consistently. Several species of plants are already extinct or on verge of extinction. The alarming rate of loss of biodiversity in Western Ghats is a major concern today. Many plant species are under constant anthropogenic pressure on account of their economic value. With population explosion, shifting cultivation, grazing, encroachment

for agriculture, extraction of timber and fuel wood, spread of invasive alien weeds, and selective removal of certain species such as the medicinal plants have all resulted in clearing of the natural vegetation. (Rao; 2019)

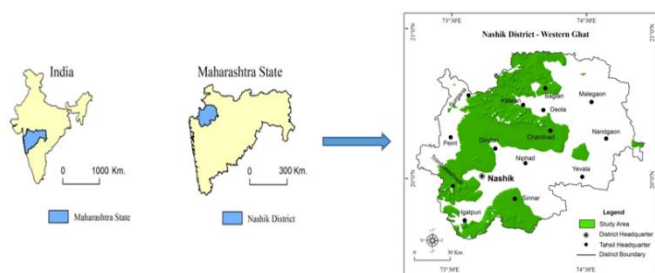
An endangered species is one, which is in danger of extinction throughout all or of a significant portion of its range.(Bryde, 1979; Smith 1980; Nayar and Sastry; 1990). Many medicinal plant species have gone into threatened category due to their increased demand and these need to be assessed as endangered or even critically endangered or have to be put under legal protection. (Mehta et.al.; 2020). Some species are critically endangered in the wild and therefore it is essential to take urgent steps to conserve the wealth of medicinal plants. The present investigation was undertaken in order to survey and document endangered plant species of Western Ghats of Nasik district which is found to be under huge human pressure due to which numbers of species are being included under rare endangered and threatened (RET) category. In recent years; increasing loss of biodiversity has created serious threat to the survival of mankind. 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. Most part of Western Ghats especially northern Western Ghats harbors dry habitats including coastal plains (Devgad, Malvan, Konkan), lateritic plateaus (Ratnagiri), high-elevation plateaus (Kaas, Gothane), steep rocky areas (Gaganbawda, Kumbharli Ghat), dry deciduous forests (Satara, Wai), and rocky mountain tops (Nashik). This underlines the need for exhaustive floristic explorations to understand their actual distribution (Surveswaran et.al.;2020). Though the several efforts are underway worldwide to conserve critically endangered species, the efforts in India are far too few that might be due to expensive and time-consuming species recovery programmes and lack of focus. However; long-term monitoring involving

periodical assessment of the population changes of the species need to be developed so as to potentially delist them from the red-list. (Ravikanth and Aravind et.al.;2018).

## II. METHODS AND MATERIAL

The Nasik district is located between latitudes 19°35'and 20°50' and the longitudes 73°30' and 74°55' and extends over an area of 15,582 sq.km. The forests of the district cover an area of 3,446.28 sq.km. The vegetation of the Nashik region is semi-moist to dry deciduous forest type but mixed with the members of thorny stunted plants in moderate rainfall zone (600-1000 mm). The tree vegetation is sparse with low density and stunted growth mainly restricted to valleys and slopes. (www.nashiknic.in). The study area i.e. Western Ghats of Nasik district includes mainly forest pockets and outskirts of Peith, Kalwan, Surgana, Baglan, Sinnar, Chnadwad and Trymbakeshwar tehsils. (Fig.1).

The collection, identification and documentation of endangered plant species observed during an extensive survey from the months of July 2015 to December 2020. The field data such as distribution, number of individuals, habit and habitat was recorded and documented as photographs also. The collected specimens were identified by referring to various floras like flora of presidency of Bombay (Cooke;1958), flora of Nasik (Lakshminarasimhan and Sharma), flora of Dhule and Nandurbar districts (Patil;2003). The nomenclature, IUCN category of collected plant species has been adapted and list of observed plant species has been updated according to the available online resources and databases of ICBN, IUCN red list. (www.iucnredlist.org.). (Ahmedullah and Nayar; 1987; Nayar and Sastry; 1987-1990; Mishra and Singh; 2001).



**Fig.1.** location map showing study area

### III. RESULTS AND DISCUSSION

The results of the study have revealed that 30 plant species belonging to 14 families 19 genera, 28 species and 2 varieties. Of these; 22 plant species were herbs, 04 were twiners 2 were shrubs and one climber one was an epiphyte. (Fig.2-B). Among these; majority of the herbs and twiners were dicot plants and few were monocots. (Fig.2-C). In the present study; the maximum number of endangered plant species were found to be belonging to the family Apocynaceae which covered total of 8 species, followed by Liliaceae, and Orchidaceae with total of 6 and 4 species respectively (Table 1, Fig. 2-A). Present study has revealed that in the area there were 30 endangered flowering plant species found to be under endangered category according IUCN; 1993, and 2000 guidelines. Of these; the dominance of plant families like Apocynaceae has also been reported in wide-ranging tropical forests of Western Ghats and is also evident in this study. Sukumaran and Raj;2007, Sarvalingam and Rajendran;2016). The possible causes of these plant species getting endangered are illegal trade, overexploitation, habitat loss, habitat fragmentation, over grazing, soil erosion, climate changes, loss of reproduction, low seed germination etc. A major concern is the conservation of outlying hill ranges, low plateaus or isolated hills and elevated areas which can have immense bioresources with endemic and endangered ground flora. (Bharucha et.al.;2010). Even though the species *Gloriosa superba* L. was reported as an endangered species according to IUCN reports and earlier studies; it was observed as quite abundant

during the present studies. (Sarvalingam and Rajendran;2016). Plant species like *Ceropegia mahabalei*, *Ceropegia sahyadrica*, *Chlorophytum bharuchii*, *Sonerila scapigera*, *Begonia phrixophylla*, *Begonia trichocarpa* etc. were found to be growing mostly on dry cliffs and hill passes of Western Ghats which are known to support ecologically specialized microhabitat to some vascular plant species. (Datar and Watve; 2018). Also, during the present study; it was observed that some plant families have been represented by few endangered or critically endangered and newly added pant species to Nasik flora; especially in case of family Apocynaceae represented by total 8 species of genus *Ceropegia* only; Liliaceae by genus *Chlorophytum* (03 species), similarly Orchidaceae and Bigoniaceae have been represented by genera like *Habenaria* and *Begonia* (02 species each) respectively. (Garud and Shinde 2018). However; it was found that most of these species especially *Ceropegia hirsuta*, *Ceropegia lawii*, *Gloriosa superba*, *Canscora diffusa* etc. can be cultivated and conserved through reintroduction in the college garden and in particular reserved areas. There is however, now an urgent need to evolve a sound strategy for the management and conservation of these plants on a long-term basis. To evolve suitable strategies for conservation the domestic cultivation of endangered plants must be adopted.

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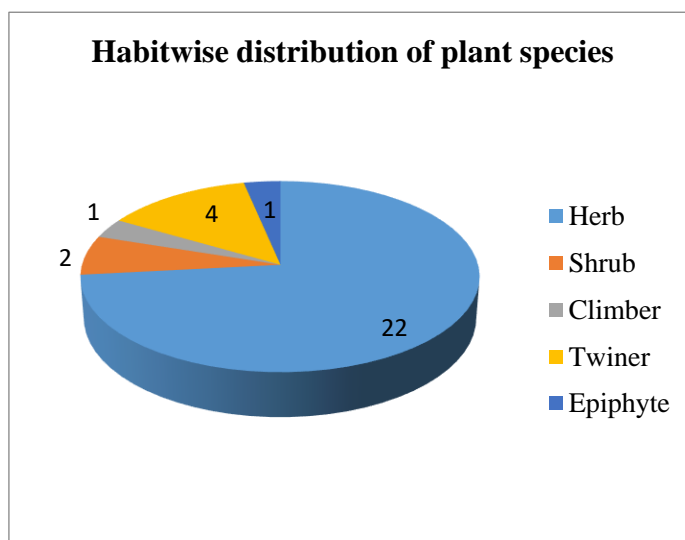
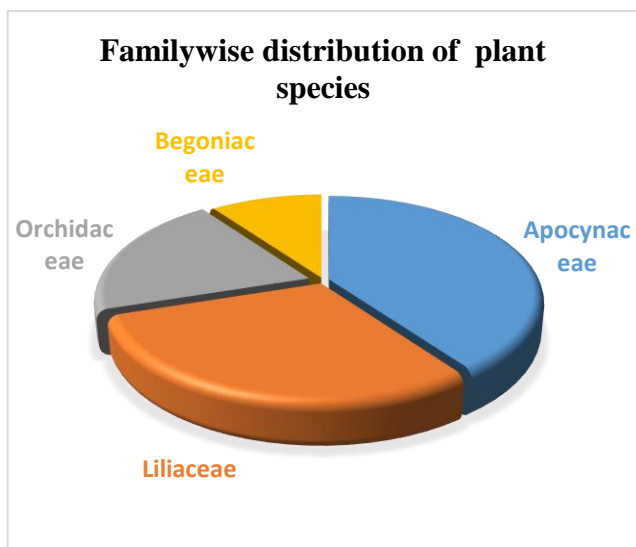
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**Table 1** : List of endangered plant species recorded within the study area

Sr. No.	Plant species	Family	Local Name	Habit
1.	<i>Ceropegia anjanerica</i> Malpure, Kamble & Yadav	Apocynaceae	Lahan kharpudi	Herb
2.	<i>Ceropegia bulbosa</i> var. <i>balbosa</i> Roxb.		Hamil	Twinner
3.	<i>Ceropegia bulbosa</i> var. <i>lushii</i> (Grah.) Hook f.		Gavtya hamil	Twinner
4.	<i>Ceropegia hirsuta</i> Wight & Arn.		Hamil	Twinner
5.	<i>Ceropegia lawii</i> Hook.		Moti Kharpudi	Herb
6.	<i>Ceropegia media</i> (Huber) Ansari		Medi Kharchudi	Twinner
7.	<i>Ceropegia mahabalei</i> Hemandri		Kharchudi	Herb
8.	<i>Ceropegia sahyadrica</i> Ansari & Kulkarni		Kharpudi	Herb

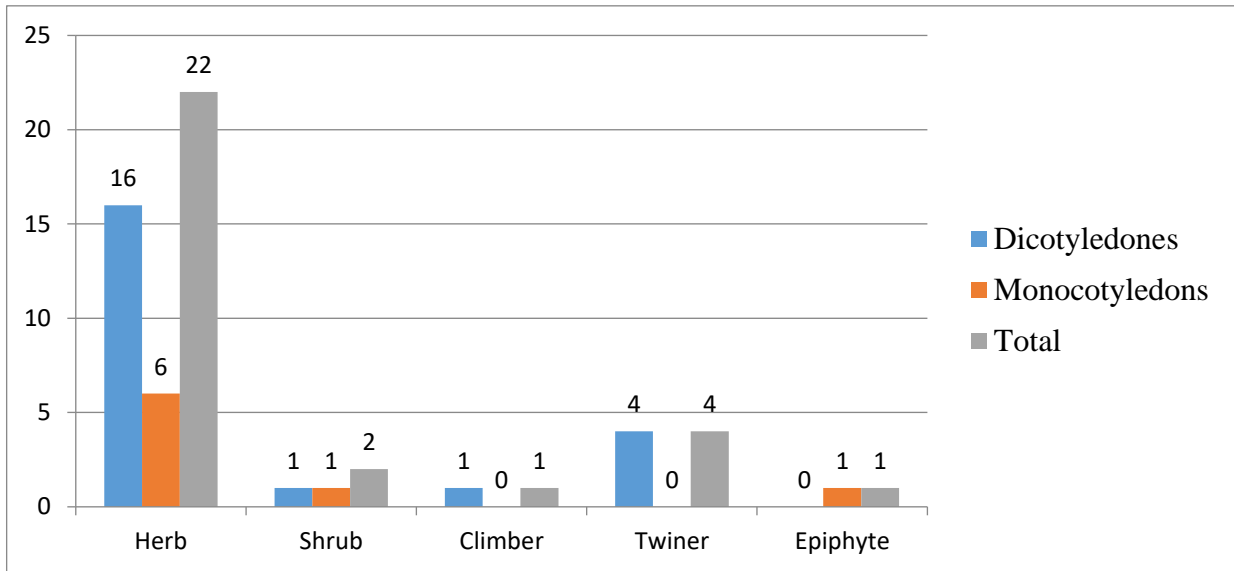
9.	<i>Asparagus racemosus</i> Willd.	Liliaceae	Shatavari	Shrub
10.	<i>Chlorophytum borivilianum</i> Sant. & Fernand.		Kolu	Herb
11.	<i>Chlorophytum bharuchii</i> Ansari		Musali	Herb
12.	<i>Chlorophytum tuberosum</i> (Roxb.) Baker		Safed musali	Herb
13.	<i>Dipcadi concanensis</i> (Dalz.) Baker		Konkan dipkadi	Herb
14.	<i>Gloriosa superba</i> L.		Kal-lavi	Herb
15.	<i>Dendrobium barbatulum</i> Lindl	Orchidaceae	Vasant abri	Epiphyte
16.	<i>Eulophia ochreatea</i> Lindl		Amarkand	Herb
17.	<i>Habenaria suaveolens</i> Dalz.		Habe abri	Herb
18.	<i>Habenaria panchganiensis</i> Sant. & Kap.		Panchgani habeabri	Herb
19.	<i>Begonia phrixophylla</i> Blatt. & McC.	Begoniaceae	Shimpli	Herb
20.	<i>Begonia trichocarpa</i> Dalz		Pandari shompali	Herb
21.	<i>Thalictrum dalzellii</i> Hook.	Ranunculaceae	Swetamber	Herb
22.	<i>Maytenus rothiana</i> (Lawson) Lobreau	Celastraceae	Lokhandi	Shrub
23.	<i>Cayratia trifolia</i> (L.) Domin	Vitaceae	Ambatvel	Climber

24.	<i>Vigna khandalensis</i> (Sant.) Raghavan	Fabaceae	Budmug	Herb
25.	<i>Sonerila scapigera</i> Dalzell	Melastomataceae	Sonerila	Herb
26.	<i>Neanotis sahyadrica</i> Billore & Mudaliar	Rubiaceae	Kapar chandani	Herb
27.	<i>Canscora diffusa</i> (Vahl) var. <i>tetraptera</i> R. Br	Gentianaceae	Kilwar	Herb
28.	<i>Leucas deodikarii</i> Billore & Hemadri	Lamiaceae		Herb
29.	<i>Zingiber diwakarianum</i> R. Kr. Singh.	Zingibearaceae	Shindvan	Herb
30.	<i>Arisaema sahyadricum</i> Yadav et al.	Araceae	Saapkand	Herb



**Fig. 2 - A** Familywise distribution of plant species

**Fig.2 B.** Habit wise distribution of plant species



**Fig.2-C** Habit wise distribution among Dicot and Monocot plant species







A- *Thalictrum dalzellii*, B- *Dendrobium barbatulum*, C- *Zingiber devakarianum* , D- *Arisaema sahyadricum* E- *Gloriosa superba*, F- *Ceropegia anjanerica*, G- *Ceropegia sahyadrica*, H- *Ceropegia lawii* , I- *Ceropegia hirsuta*, J- *Ceropegia mahabalei*, K- *Ceropegia media*, L- *Ceropegia bulbosa* var. *balboas* M- *Ceropegia bulbosa* var. *lush,i* N- *Vigna khandalensis*, O- *Sonerila scapigera*, P- *Canscora diffusa*, Q- *Habenaria panchganiensis*

**Fig. 3.** Photo plate showing floral diversity of recorded endangered plant species.