

## Critically Endangered Flowering Plants in the Forest of Nashik District (M.S) India.

D. G. Jadhav

Department of Botany, MGV's, Mahilaranta Pushpatai Hiray Arts, Science and Commerce Mahila Mahavidyalaya, Malegaon Camp, Nasik - 423203

### Abstract

The present research paper deals with the study of threatened status of flowering plants assessed in forest of Nashik district (M.S) India, according to IUCN guidelines. During the course of investigation the forest of Nashik district extensive and intensive field survey was conducted during 2018-2019. Some plants not only showed restricted distribution but also appeared endangered, Vulnerable, and near threatened. The causes of threatened species are studied and conservation strategies are suggested. The area explored during study is restricted to Nashik district especially to Baglan region. The forest is dry deciduous type. Total 84 species of flowering plants are evaluated and placed in the threat categories. Out of the 84 plant species, 6 are critically endangered are enlisted. The species are *Aerides maculosum* Lindl, *Ceropegia hirsuta* Wight, *Curcuma pseudomantana* Grah, *Dendrobium barbatum* Lindl, *Impatiens dalzielii* Hook. f. and *Pimpinella adscendens* Dalz.

**Keywords:** Critically Endangered, Flowering Plants, Nashik District.

### Introduction

The increasing pressure of human settlement in India, which has almost doubled since 1947, has altered the natural vegetation of the Indian subcontinent. Now nearly one sixth of the land (6,75,538 Km<sup>2</sup>, i.e. about 20.55% as per 2001 assessment) is covered by forests, most of which are found in isolated pockets of the hilly tracts in South India, northern and north-eastern parts. Strict forest laws enforced in recent years have helped in retaining the status of at least some of the tropical and semi-evergreen forests in India.

India is one of the top three countries in number of threatened endemics for at least one taxonomic group. Threat to biodiversity due to invasive alien species is considered only to that of habitat destruction. Most of the exotic species has been naturalized in many states of India. These toxic species because of its fertile seed production, fast spreading ability, allopathic effects on other plants, humans and other animals created health hazards. *Lantana camera*, one of ten worst weeds of world and native of America, is now found all over the Indian subcontinent.

Some of the species whose number has been reduced to a critical level have been adversely affected. Therefore they may become extinct if not given special attention to protect them. The restricted species have neither colonizing and nor regenerative ability for regeneration. About 60,000 plant species that are listed as threatened or extinction in the world. From these species 33 % (approximately 20,000) are from India only.

The botanical survey of India has prepared a provisional list of threatened plants species. India provides with a unique wealth of biota which includes a large number of medicinal and aromatic plants. Many of these plants are rare and endemic and found only in the form of wild sources. Most of these wild medicinal

and aromatic plant species are mostly found in forests which has and occupied highly specialized ecological niche with restricted distribution (Kirtikar and Basu, 1918).

### Study Area

Maharashtra is one of the largest state of Indian Union lying between 22° 1' - 16° 4' N latitude and 72° 6' - 80° 9' E longitude , covering an area of 3,07,690 sq km, about 800 km east – west and 700 km north – south. On the south of Maharashtra lies Goa and Karnataka, on the south east is Andhra Pradesh, on the north Madhya Pradesh and on the north-west the Gujarat state. The floristic pattern of the state differs greatly due to rainfall, temperature, humidity, soil type and topography

The Nashik district in Maharashtra state is located between latitude 19° 35' and 20° 50' and longitudes 73° 35' and extend over the area of 15,587 sq. km. It is bounded on the north-west by the Dangs and Surat district of Gujarat state on the north by Dhule district, on the east by Jalgaon and Aurangabad district, on the south by Ahmednagar and south-west by Thane district of Maharashtra state, The Baglan is situated at 20° 56' North longitude and 74° 04' East longitude. The Forest in this tract is located on extreme part of Western Ghats. Present work is restricted to the forests of Baglan especially Chirai, Mulher, Salher, Narkol, Jakhod, Dangsaundane, Taharabad etc.

### Materials and methods

The main methods used to collect data were, Direct field observation, Plant specimen collection and identification, Plant authentication (Cooke, 1958; P. Lakshaminarasimhan and B.D. Sharma, 1991). Species specific information of plants in use was collected for preparation of Taxon Data Sheet according to the guidelines of IUCN (1993, 2000). 84 plant species are critically assessed into different categories according to IUCN guidelines. Six plants are identified photographs are taken, their morphology, distribution, phenology, world distribution (Kirtikar and Basu (1918) and threat recorded with the help of floras, manuals and other relevant literature (Deshpande, 1993; Nayar, 1993). Herbarium are made and preserved in the Department of Botany, Z.B. Patil College, Deopur Dhule.

### Observations

Extensive survey was carried out during 2018-2019 in Baglan forests of Nashik district. 84 flowering plants collected, relevant information gathered related to threat status. The basic information of species is collected and photographs of threatened species are taken for taxon data sheet preparation. All the collected plant species are identified with the help of floras, manuals and other literature. Taxon Data Sheets are prepared according Conservation Assessment and Management Planning (Mace *et.al.* 1992; Mace and Stuart, 1994). The threatened status of collected species is assessed on the basis of collected data.

**Table 1: Showing assessed 84 plant species with families**

Sr. No.	Rare Species	Family	Threatened Status
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1	<i>Aerides maculosum</i> Lindl.	Orchidaceae	
2	<i>Aeschynomene aspera</i> L.	Fabaceae	
3	<i>Aglaia lawii</i> (Wight.) Sald.	Meliaceae	
4	<i>Anisochilus carnosus</i> (L.) Wall.	Lamiaceae	
5	<i>Argyreia strigosa</i> (Roth.) Roberty.	Convolvulaceae	
6	<i>Arisaema tortuosum</i> (Wall.) Schott.	Araceae	
7	<i>Aristida setacea</i> Retz.	Poaceae	
8	<i>Arundinella metzii</i> Hochst. ex Miq.	Poaceae	
9	<i>Butea superba</i> Roxb. ex Willd.	Fabaceae	
10	<i>Canthium angustifolium</i> Roxb.	Rubiaceae	
11	<i>Capparis brevispina</i> DC.	Capparaceae	
12	<i>Carvia callosa</i> (Wall.) Bremek.	Caryophyllaceae	
13	<i>Ceratophyllum demersum</i> L.	Acanthaceae	
14	<i>Ceropegia hirsuta</i> Wight. & Arn.	Asclepiadaceae	
15	<i>Ceropegia sahyadrica</i> Ansari & Kulk.	Asclepiadaceae	
16	<i>Cissus pallida</i> (Wight. & Arn.) Planch.	Vitaceae	
17	<i>Cissus vitiginea</i> L.	Vitaceae	
18	<i>Coix gigantea</i> Koen. ex Roxb.	Poaceae	
19	<i>Commelina hasskarlii</i> Commel. & Cyrt.,	Commelinaceae	
20	<i>Commelina paleata</i> Hassk.	Commelinaceae	
21	<i>Conyza bonariensis</i> (L.) Cronq.	Asteraceae	
22	<i>Corchorus tridens</i> L.	Tiliaceae	
23	<i>Costos speciosus</i> (Koenig.) J.E. Sm.	Zingiberaceae	
24	<i>Crotolaria mysorensis</i> Roth.	Fabaceae	
25	<i>Curcuma pseudomantana</i> Grah.	Zingiberaceae	
26	<i>Cyclea fassicalyx</i> Dunn.	Fabaceae	
27	<i>Cadaba fruticosa</i> (L.) Druce.	Menispermaceae	
28	<i>Cymbopogon martinii</i> (Roxb.) Wats.	Poaceae	
29	<i>Cyperus esculentus</i> L.	Cyperaceae	
30	<i>Cyperus nutans</i> Vahl.	Cyperaceae	
31	<i>Dendrobium aqueum</i> Lindl.	Orchidaceae	
32	<i>Dendrobium barbatum</i> Lindl.	Orchidaceae	
33	<i>Desmodium procumbens</i> (Mill.) Hutch.	Fabaceae	
34	<i>Dichanthium annulatum</i> (Forssk.) Stapf.,	Poaceae	
35	<i>Digitaria ablutens</i> (R.&S.) Veldk.	Poaceae	
36	<i>Dioscorea belophylla</i> (Prain.) Haines.	Dioscoraceae	
37	<i>Dioscorea hispida</i> Dennst.	Dioscoraceae	
38	<i>Drimia indica</i> (Roxb.) Jessop.	Liliaceae	
39	<i>Ensete superbum</i> (Roxb.) Cheesm.	Musaceae	
40	<i>Eriolaena candollei</i> Wall.,	Sterculiaceae	
41	<i>Eriolaena quinquilocularis</i> (W. & A.) Wight.	Sterculiaceae	
42	<i>Euphorbia erythroclada</i> Boiss.	Euphorbiaceae	
43	<i>Euphorbia rosea</i> Retz.	Euphorbiaceae	
44	<i>Fimbristylis complanata</i> (Retz.) Link.	Cyperaceae	
45	<i>Grangea maderaspatana</i> (L.) Poir.	Asteraceae	

46	<i>Grewia serrulata</i> DC.	Tiliaceae	
47	<i>Habenaria marginata</i> Coleb.	Orchidaceae	
48	<i>Hibiscus talbotii</i> (Rakshit) Paul & Nayar.	Malvaceae	
49	<i>Hibiscus caesius</i> Garcke.	Malvaceae	
50	<i>Hibiscus trionum</i> L.	Malvaceae	
51	<i>Hymenodictyon orixens</i> (Roth.) Mabb.	Rubiaceae	
52	<i>Impatiens acaulis</i> Arn.	Balsaminaceae	
53	<i>Impatiens dalzelii</i> Hook. f.	Balsaminaceae	
54	<i>Indigofera trita</i> L.f.	Fabaceae	
55	<i>Iphigenia indica</i> (L.) A. Gray.	Liliaceae	
56	<i>Iphigenia pallida</i> Baker.	Liliaceae	
57	<i>Iseilema antheophoroides</i> Hack.	Poaceae	
58	<i>Kyllinga aquamulata</i> Thonn.	Cyperaceae	
59	<i>Launaea intybacea</i> (Jacq.) Beauv.	Asteraceae	
60	<i>Macrotyloma uniflora</i> (Lam.) Verdc.	Fabaceae	
61	<i>Manikara hexandra</i> (Roxb.) Dub.	Sapotaceae	
62	<i>Melochia pyramidata</i> L.	Sterculiaceae	
63	<i>Neanotis latifolia</i> (Dalz.) Deb. & Dutta.	Rubiaceae	
64	<i>Nepeta hindostana</i> (Heyne ex Roth.) Haines.	Lamiaceae	
65	<i>Phyllanthus scabrifolius</i> Hook.f.	Euphorbiaceae	
66	<i>Phyllocephalum scabridum</i> (DC.) Kirkman.	Asteraceae	
67	<i>Pimpenella adscendens</i> Dalz.	Apiaceae	
68	<i>Polycarpon prostratum</i> (Forssk.) A. & S.	Caryophyllaceae	
69	<i>Portulaca tuberosa</i> Roxb.	Portulacaceae	
70	<i>Remusatia vivipara</i> (Roxb.) Schott. & Endl.	Araceae	
71	<i>Rhynchospora wightiana</i> (Nees.) Steud.	Cyperaceae	
72	<i>Rotala rotundifolia</i> (Buch-Ham. ex D.Don.) Kochne.	Lythraceae	
73	<i>Rubia cordifolia</i> L.	Rubiaceae	
74	<i>Salacia chinensis</i> L.	Celastraceae	
75	<i>Scilla hyacinthina</i> (Roth.) Mc Bride.	Liliaceae	
76	<i>Smithia purpurea</i> Hook.	Fabaceae	
77	<i>Solanum anguivi</i> Lam.	Solanaceae	
78	<i>Sorghum halepense</i> (L.) Pers.	Poaceae	
79	<i>Sorghum nitidum</i> (Vahl.) Pers.	Poaceae	
80	<i>Spermadictyon suaveolens</i> Roxb.	Rubiaceae	
81	<i>Sporobolus coromandelianum</i> (Retz.) Kunth.	Poaceae	
82	<i>Tamilnadia uliginosa</i> (Retz.) Tirv. & Sastre.	Rubiaceae	
83	<i>Triplopogon ramosissimus</i> (Hack.) Bor.	Poaceae	

84	<i>Tripogon jacquemontii</i> Starf.	Poaceae	
85	<i>Vaccaria pyramidata</i> Medik.	Caryophyllaceae	

### Enumeration critically endangered plant species

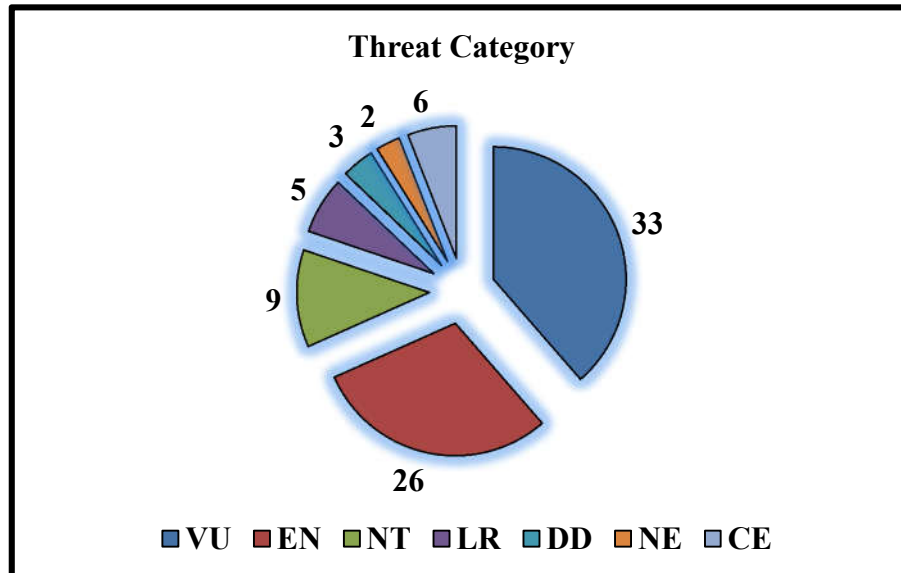
1. *Aerides maculosum* Lindl. Orchidaceae.  
Stems sheathed. Leaves channeled, coriaceous, linear-oblong, broadest at middle. Flowers pink, pedicillate, bracteate. Inflorescence simple, or branched. Capsules obovoid, shortly stalked.  
**Distribution** : Frequent on trees. DGJ (637) Tatani.  
**World Distribution** : Indian.
2. *Ceropegia hirsuta* Wight. & Arn. *Kandil-phul*  
Asclepiadaceae.  
Twinning herbs; stem terete. Leaves petiolate, variable, lower ovate, middle ovate-lanceolate, upper lanceolate, acute, margins ciliate. Flowers few, in lateral, umbellate cymes, funnel shaped above, subglobose below, hairy inside and along margins.  
**Distribution**: Very rare in dense forest of Baglan Region, DGJ-1112  
**World distribution**: W. Peninsula.
3. *Curcuma pseudomantana* Grah. *Ran-haldi* Zingiberaceae.  
Herbs, scapigerous. Leaves elliptic-oblong, glabrous, obtuse and mucronate at apex, tapering at base. Inflorescence of spikes, lateral and central. Capsules subglobose, 3-lobed with arillate seeds.  
**Distribution** : Frequent in shady areas. DGJ (1154) Tatani.  
**World Distribution** : Indian.
4. *Dendrobium barbatum* Lindl. Orchidaceae.  
Pseudobulbous, nodes 3-5; internodes striate. Leaves absent at the time of flowering. Flowers in the terminal or lateral racemes, white to pale pink. Capsules ellipsoid or obconical, greenish-purple with 3 broad and 3 narrow bands, beaked.  
**Distribution** : Occasional on trees. DGJ (1081) Babbulne.  
**World Distribution** : Indian.
5. *Impatiens dalzelii* Hook. f. & Thoms. Balsaminaceae.  
Succulent, annual, reddish, herbs. Leaves opposite, sessile or subsessile, ovate, lanceolate, hairy on nerves above, glabrous and pale beneath, cordate or subcordate or acute at base. Flowers in fascicles; spurs minute, tinged with red. Capsules 5-ribbed, ribs wavy. Seeds black polished, oblong.  
**Distribution** : Common on hill slopes and hill tops. DGJ (781) Mulher Fort, Dangsaundane.  
**World Distribution** : Indian.
6. *Pimpinella adscendens* Dalz. Apiaceae.  
Herbs, annual, prostrate or ascending. Leaves mostly radical, leaflets imparipinnate, terminal longer than lateral. Flowers white, in terminal compound umbels. Fruits long, ovoid.  
**Distribution** : Rare in open areas. DGJ (824) Tatani.  
**World Distribution** : Indian.

### Results

Data obtained from the field survey is represented with consistent and well planned intensive and extensive field work. The information on the flowering plants have been recorded to analyze the threat status. In all information on 101

species found to be appropriate to include in the study. These are represented in Pie Diagram (Figure 1).

Specific information on the species, families, habit, habitat, IUCN Categories and Figure shows the various categories of plants under Vulnerable-33, Endangered-26, Not Threatened-09, Lower Risk-05, Data Deficient-03, Not Evaluated-02 and Critically Endangered-06.



**Figure 1: Showing the Pie Diagram of IUCN Categories of Assessed Plants from the Forest of Nashik District**

*VU- Vulnerable, EN- Endangered, NT-Near Threatened, LR- Lower Risk, DD-Data Deficient, NE-Not Evaluated, CE-Critically Endangered.*

### Conclusion

Present study has revealed that in the area there are 84 threatened flowering plant species under the threat categories. They have been critically analyzed following the IUCN (1993, 2000) guidelines. Out of the 84 plant species, 6 are critically endangered. The species are *Aerides maculosum* Lindl, *Ceropegia hirsuta* Wight, *Curcuma pseudomantana* Grah, *Dendrobium barbatum* Lindl, *Impatiens dalzielii* Hook. f. and *Pimpinella adscendens* Dalz. The causes of getting endangered are trade, overexploitation, habitat loss, habitat fragmentation, over grazing, soil erosion, climate changes, loss of reproduction, low seed germination capacity and shifting cultivation practices of the tribal people along with heavy encroachment. These species can be protected in reserve forests 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 medicinal plants must be adopted. It is very essential to study the complete biological and ecological background of these species.

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