

## RARE AND ENDANGERED PLANTS IN FLORA OF DELHI

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A list of plants which have been considered as rare, very rare and endangered is given on the basis of frequent floristic survey carried out in the area of Delhi during 2001-2006. Because of the habitat loss such as mining, rapid urbanization and increase in human interference with the natural habitats, these taxa are under a serious threat of extinction. Suggestions for their conservation have also been given.

**Keywords :** Endangered plants; Flora of Delhi; Rare plants.

### Introduction

Delhi is situated between 28° 12' N-28° 53' N and 76° 50' E-77° 23' E and spreads over an area of 1497 sq. km. The major land forms of Delhi are the rocky undulating hill terrain with hilltops and shallow valleys between them, the alluvial flood plains of the river Yamuna, flat tableland, and low-lying basin that collects rain water. The climate of Delhi is essentially a semiarid type with mean annual precipitation of 66.6 cm, extremely variable thermal conditions (maximum of 46°C to minimum of -0.6°C) and relative humidity (19% to 80%).

The native vegetation is a scrub forest with thorny xerophyte species as common floristic elements and 3-storeyed Aravalli vegetation type is restricted to sheltered valleys. Aravalli hill ranges, most distinctive and ancient mountain chain of peninsular India, mark the site of one of the oldest geological formations and one of the oldest mountain systems in the world. The last spur of the Aravalli reaches as far as the ridge of Delhi. A prolongation of the Aravalli hills enters Delhi from Gurgaon on the southern border and immediately expands into a rocky tableland, about 5 km in breadth. The Delhi Ridge is now divided into two parts, the northern portion being in old Delhi and the southern portion in New Delhi. In these forest areas of Delhi, a large mining activities, operation of stone crushers, pulverizes deforestation and unplanned construction activities are causing loss of habitats and changes of native vegetation/Flora.

John Forbes Royle (1799-1858), an English army man, was the pioneer plant explorer of the northern India and Himalayan mountains. Flora of Delhi (Maheshwari<sup>1</sup>) reports 957 total taxa belongs to 549 genera and 120 families. After Maheshwari's work, there is no any comprehensive study on Flora of Delhi. Keeping in view, we have undertaken the work 'Revision of Flora of Delhi'.

### Methodology

The present work is the result of planned explorations during 2001-2006. Frequent field surveys were undertaken

in different seasons to collect the plants. Field characters were noted in field diaries. Doubtful data were removed subsequently. The taxa were identified with the help of floras<sup>1-6</sup>.

Herbarium specimens are deposited in the Herbarium of Centre for Environmental Management of Degraded Ecosystems, as well as Herbarium of Aravalli Biodiversity Park, CEMDE, University of Delhi, Delhi.

In the following enumeration plants are arranged alphabetically by their Latin names, followed by status of plants mentioned in Maheshwari<sup>1</sup> work, abbreviated into categories as R-Rare; SR-status not reported; C-Common; NC- Not common; NR-Not Reported by Maheshwari<sup>1</sup>, P-Planted; O- Occasional; (R)- Reported on the authority of other workers; C-1 Collected only once as well as followed by the present status (present work) of the same taxa in last column.

### Results and Discussion

A total of eighty two taxa are recorded from the area of Delhi as rare, very rare and endangered. Comparative account of status of taxa reported in Maheshwari's<sup>1</sup> work and status of the same taxa as per the present observations have mentioned here.

Of these eighty two taxa listed here, five taxa are new additions to nine hundred fifty seven total taxa listed by Maheshwari<sup>1</sup> in his work and which falls into very rare and endangered categories (Table 1).

Therefore, this becomes the updated account on the status of rare and endangered plants of Delhi.

During frequent visits it had been observed that species those were rare in Maheshwari's<sup>1</sup> work, now these taxa becomes very rare or have become endangered. In Maheshwari's work some plants like *Argemone ochroleuca*, *Boswellia serrata*, *Helicteres isora*, *Melhaniania futeyporensis*, *Peganum harmala*, *Derris scandens* were reported as rare, some taxa on the authority of other workers, now they have largely disappeared from the area, because of loss of habitats, grazing,

Table 1. List of plants recorded from Delhi as rare, very rare and endangered.

Sr.No.	Botanical Names	Status in Maheshwari's work	Present Status
1.	<i>Abrus precatorius</i> Linn.	SR	Rare
2.	<i>Abutilon bidentatum</i> Hochst. ex Rich	(R)	Rare
3.	<i>Abutilon glaucum</i> (Cav.) Sweet.	(R)	Rare
4.	<i>Abutilon ramosum</i> (Cav.) Guill. & Perr.	R	Very Rare
5.	<i>Alysicarpus monilifer</i> DC. var. <i>monilifer</i>	SR	Rare
6.	<i>Alysicarpus monilifer</i> DC var. <i>venosa</i> Blatt. & Hallb.	NR	Rare and new report
7.	<i>Anisochillus carnosus</i> Wall.	(R)	Endangered
8.	<i>Anisomeles indica</i> Kuntze	C	Endangered
9.	<i>Anogeissus pendula</i> Edgew.	C	Very Rare
10.	<i>Argemone ochroleuca</i> Sweet.	(R)	Not Found
11.	<i>Arnebia hispidissima</i> DC.	SR	Endangered and collected only once
12.	<i>Blumea bifoliata</i> DC.	SR	Rare
13.	<i>Blumea lacera</i> DC.	SR	Rare
14.	<i>Boswellia serrata</i> Roxb. ex Colebr.	(R)	Not Found
15.	<i>Buddleja asiatica</i> Lour.	C	Very Rare
16.	<i>Ceropegia bulbosa</i> Roxb. var. <i>bulbosa</i>	R	Occasional
17.	<i>Ceropegia bulbosa</i> Roxb. var. <i>lushii</i> (Grah.) Hook. f.	NR	Very rare and new report
18.	<i>Cirsium wallichii</i> DC.	R	Endangered, collected only once
19.	<i>Coldenia procumbens</i> Linn.	C	Very Rare
20.	<i>Commelina hasskarlii</i> Clarke	(R)	Very Rare
21.	<i>Corchorus depressus</i> Stocks	SR	Rare
22.	<i>Crotalaria burhia</i> Buch.-Ham.	SR	Endangered
23.	<i>Crotalaria mysorensis</i> Roth.	(R)	Not found
24.	<i>Crotalaria sericea</i> Retz.	(R)	Very Rare
25.	<i>Cyanotis axillaris</i> Schult. f.	R	Not Found
26.	<i>Cynoglossum lanceolatum</i> Forssk.	SR	Very Rare
27.	<i>Derris scandens</i> Benth.	SR	Not Found
28.	<i>Dichrostachys cineria</i> Wt. & Arn.	C	Rare
29.	<i>Dipteracanthus prostratus</i> Nees	C	Rare
30.	<i>Dregia volubilis</i> Benth ex Hook. f.	R	Rare
31.	<i>Enicostemma verticillatum</i> Engel.	NC	Very Rare
32.	<i>Euphorbia dracunculoides</i> Lamk.	C	Rare
33.	<i>Glossocardia bosvallea</i> DC.	SR	Rare
34.	<i>Glossostigma spathulatum</i> Arn. Ex Benth.	C-1	Not found
35.	<i>Goniogyna hirta</i>	C-1	Very Rare
36.	<i>Grangea maderaspatensis</i> Poir.	SR	Rare
37.	<i>Helicteres isora</i> Linn.	R	Not found
38.	<i>Holarrhena antidysenterica</i> Wall.	SR	Endangered
39.	<i>Hybanthus enneaspermus</i> F. Muell.	R	Very rare

Sr.No.	Botanical Names	Status in Maheshwari's work <sup>1</sup>	Present Status
40.	<i>Hydrolea zeylanica</i> Vahl.	C-1	Very rare
41.	<i>Indigofera tinctoria</i> Linn.	SR	Rare
42.	<i>Indigofera trita</i> Linn. f.	SR	Rare
43.	<i>Ipomoea muricata</i> Jacq.	SR	Rare
44.	<i>Ipomoea obscura</i> Ker.-Gawl.	R	Common
45.	<i>Kickxia ramosissima</i> Janchen	C	Very Rare
46.	<i>Lepidagathis cristata</i> Willd.	R	Very Rare
47.	<i>Leptadenia pyrotechnica</i> Decne	R	Endangered
48.	<i>Leucas aspera</i> Spreng.	C	Rare
49.	<i>Leucas cephalotes</i> Spreng.	C	Rare
50.	<i>Leucas urticaefolia</i> R. Br.	C	Rare
51.	<i>Lindenbergia indica</i> Kuntze	C	Endangered
52.	<i>Ludwigia perennis</i> Linn.	R	Rare
53.	<i>Melhania futteyporensis</i> Munro ex Mast.	(R)	Not found
54.	<i>Melochia corchorifolia</i> Linn.	R	Very Rare
55.	<i>Mimosa hamata</i> Willd.	C	Endangered
56.	<i>Mollugo nudicaulis</i> Lamk.	C	Rare
57.	<i>Nepeta hindostana</i> Haines	R	Endangered
58.	<i>Oligomeris linifolia</i> Macbride	C-1	Not Found
59.	<i>Orthosiphon pallidus</i> Royle ex Benth.	R	Endangered
60.	<i>Oxystelma secamone</i> K. Schum.	C	Rare
61.	<i>Peganum harmala</i> Linn.	R	Not Found
62.	<i>Perotis indica</i> Kuntze	C	Rare
63.	<i>Plumbago zeylanica</i> Linn.	SR	Rare
64.	<i>Ranunculus aquatilis</i> Linn. var. <i>trichophyllus</i> Hook. f. & Thoms.	(R)	Rare
65.	<i>Rivea hypocrateriformis</i> Choisy	C	Very Rare
66.	<i>Salvadora oleioides</i> Decne	C	Rare
67.	<i>Schoenefeldia gracilis</i> Kunth	NR	Rare and new report
68.	<i>Sonchus asper</i> Hill	SR	Rare
69.	<i>Sterculia urens</i> Roxb.	(R)	Not Found
70.	<i>Streblus asper</i> Lour.	R	Very Rare
71.	<i>Synedrella nodiflora</i> (L.) Gaertn.	NR	New report and very rare
72.	<i>Tecomella undulata</i> Seem.	P	Endangered
73.	<i>Tetrapogon villosus</i> Desf.	R	Very Rare
74.	<i>Tylophora indica</i> Merr.	(R)	Endangered
75.	<i>Vaccaria pyramidata</i> Medik.	SR	Very Rare
76.	<i>Waltheria indica</i>	NR	Endangered and new report
77.	<i>Verbascum thapsus</i> Linn.	SR	Very Rare
78.	<i>Verbascum chinense</i> Santapau	C	Rare
79.	<i>Veronica anagallis-aquatica</i> Linn.	C	Rare
80.	<i>Wrightia tinctoria</i> R. Br.	SR	Very Rare
81.	<i>Zeuxine strateumatica</i> Schltr.	R	Very Rare
82.	<i>Zizyphus oenoplia</i> Mill.	R	Common

industrialization. In spite of frequent visits during the five years, the author could not relocate these taxa in habitats of their occurrence after the repeated search.

In Maheshwari's work plant like *Lindenbergia indica* reported as common but now it becomes endangered as it grows only on dry rocky habitats, due to loss of such habitats and huge stone crushing in forest areas.

In Maheshwari's work, it is mentioned that, Gurgaon hillocks are dominated by *Anogeissus pendula*, *Butea monosperma*, *Acacia leucophloea*, *Prosopis cineraria*, *Grewia tenax*, *Balanites roxburghii*, *Wrightia tinctoria* and *Dalbergia sissoo*, but today this is not the fact, because *Anogeissus pendula*, *Butea monosperma*, are almost rare or slowly going to disappear from the area, only few individuals of *Wrightia tinctoria* appears in the area.

Another some species such as *Dichrostachys cineria*, *Mimosa hamata*, *Anogeissus pendula*, *Kickxia ramossissima*, *Mollugo nudicaulis*, *Salvadora oleioides*, *Oxystelma secamone*, *Buddleja asiatica*, *Coldenia procumbens*, *Rivea hypocrateriformis* were abundant or common before forty two years, now they have become rare to very rare or endangered to the area, probably due to loss of habitats, huge mining in forest areas.

Interestingly, *Ipomoea obscura* and *Zyziphus oenoplia* were reported as rare, but in the present observations these taxa are found occasional to common in the area.

The observations suggested the following causes of destruction of habitats and alteration of 'Flora of Delhi'.

1) Mining 2) Grazing 3) Illicit cutting of woods for fuel by local inhabitants (near mining areas) 4) Encroachment into

the forest areas for construction activities and over dominance and invasion of exotic species like *Prosopis juliflora* over large areas and that replaces the native flora.

6) the social change and increasing needs 7) Development projects like Mal apartments into the forest areas, broadening of roads, industries. 8) Pollution, accretion.

If immediate action for the conservation and protection of these taxa is not taken, it will result into the disappearance of some of these very rare and endangered species of this region in near future.

It is suggested that

1. an *ex-situ* conservation of rare and threatened plants be attempted;
2. alternative fuel to local tribal to avoid illicit cutting of forest woods;
3. Tribal be educated about the importance of these plants through frequent meetings;
4. Prohibiting grazing in biodiversity rich areas after identifying such areas e. g. Asola and Bhatti wildlife sanctuary and Aravalli biodiversity park in south Delhi.

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