

## Discerning status of threatened and locally rare angiosperm species of reserve forest of Vadgam taluka of Banaskantha district (North Gujarat)



### Science

**KEYWORDS :** threatened, locally rare, angiosperms, Vadgam, Banaskantha

<b>Patel A. H.</b>	Municipal Arts and Urban Bank Science College, Mehsana (N. Guj.) R. R. Mehta College of Science & C. L. Parikh College of Commerce, Palanpur (N. Guj.)
<b>Vyas D. N.</b>	Municipal Arts and Urban Bank Science College, Mehsana (N. Guj.) R. R. Mehta College of Science & C. L. Parikh College of Commerce, Palanpur (N. Guj.)
<b>Dabgar Y. B.</b>	Municipal Arts and Urban Bank Science College, Mehsana (N. Guj.) R. R. Mehta College of Science & C. L. Parikh College of Commerce, Palanpur (N. Guj.)

### ABSTRACT

Along with systematic identification and documentation of the flora of 'reserve forest of Vadgam taluka of Banaskantha district, North Gujarat', research to discern the status of threatened and locally rare angiosperm species was of concern for the reason to obtain their standings in current state of affairs. Area under present study has been untouched in respect of its floral and ecological studies except present study even though being one of the flora rich regions. The area was found to be affluent in plant diversity along with 5 threatened and 22 locally rare angiosperm species. The study area is not exempted from the fact that the world is facing danger for extinction of many species. Mounting pressure of anthropogenic activities has resulted destruction to the habitats and loss of many species eventually. This paper discusses about the status, distribution and threats faced by the threatened and locally rare plants of the study area.

### INTRODUCTION

Plants are one of the very essential components on this earth and are very crucial as they form the main life supporting system for many living things including human race. It is important to know their status in general. The mounting pressure on land has pushed certain species to the extent of becoming extinct. About a tenth of the total species of angiosperms are facing one or other form of extinction threats globally and there are nearly 1500 species of plant species in India listed as threatened, of which most are angiosperms (Daniels and Jayanthi, 1996). These plants have their own ecological role in the ecosystem and their loss would mean another species lost forever. Threatened species are species which are vulnerable, endangered or critically endangered and no longer assigned category of conservation dependent. IUCN also defines threatened species as a group of these three categories, depending on the degree to which they are threatened. The 2008 IUCN red list showed that the number of threatened plant species is increasing gradually. The resurgence of public interest in plant-based medicine coupled with rapid expansion of pharmaceutical industries necessitated an increased demand of medicinal plants, leading to over-exploitation that threatened the survival of many medicinal plants (Soni, 2009).

In present study status of plant species has been worked out on the criteria, based on threatened and locally rare species of angiosperms as a part of a thorough analysis of phytosociological characters of the study area. At first observation area under present study 'Vadgam taluka reserve forest of Banaskantha district, North Gujarat' seemed to be rich in its flora. Thus, the objective to identify plants which are threatened or locally rare was of concern. The study provided actual overview of the study area in respect of its threatened and rare flora that may be helpful in developing strategies or action plan for its conservation and development.

### STUDY AREA

Rich in its floristic composition the state of Gujarat is also diverse in its wildlife and geographical distribution of species, especially angiosperms. Vadgam taluka is located in the East Banaskantha district of North Gujarat region. The province occupies a total of 565.87 sq. km. geographical area, which is about 5.26 % of the total area of the district.

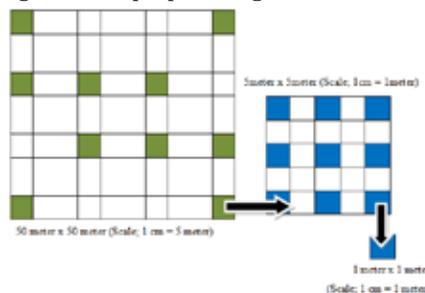
The forest of Banaskantha district covers 1106.55 sq. km. area in 9 different ranges of forests under 12 talukas. Vadgam taluka range forest is one of them. The reserve forest of Vadgam taluka is situated between 72° 49' E longitude and 23° 59' N latitude and approximately

750 feet above the mean sea level. The climatic condition of the area is semi-arid. The reserve forest area of Vadgam taluka is spread into two forest ranges - Danta range forest and Palanpur range forest. The reserve forest of Vadgam taluka covers total area of 13.218 sq. km. Based on the phytosociological characteristic and vegetation type of the study area, it may be categorized as dry deciduous forests. Patches of thorny scrubs, small grasslands, river line vegetation, parasites, epiphytes and cultivated vegetation are observed here. Temperature ranges here from as high as 44° C in summer to as low as 7° C in winter with average rainfall of 800 mm. mostly in monsoon. The area is also facing anthropogenic pressure viz. grazing, fodder collection, over exploitation, check-dams building, mining and encroachment.

### MATERIALS AND METHODS

The investigation was based on the survey of more than three years of extensive and intensive, regular excursions of the study area which is enriched with floral components and having ecological significance. To collect the data for determination of phytosociological characters of angiosperms, belt transect method (Muller-Dombois and Ellenberg, 1974; Kershaw, 1973) was used. Total 165 sample plots, each of 50 x 50 m. were laid down in the study area. Each such sample plot was divided into strips of 5 m. and 10 m. simultaneously from North to South and its perpendicular. Thus, a total of 16 segments of 5 X 5 m. and 9 segments of 10 X 10 m. were formed. All the segments of 10 X 10 m. were considered to study tree species, while out of 16 segments of 5 X 5 m. each randomly 9 were studied for shrub and climber species. Within each such segment a quadrat of 1 X 1 m. was laid down to assess herb layer (figure 1). All the plant species which were found inside and outside as well of the sample plots were identified and documented using 'Flora of Gujarat State' (Shah, 1978) and 'Flora of the Presidency of Bombay' (Cooke, 1901-1908).

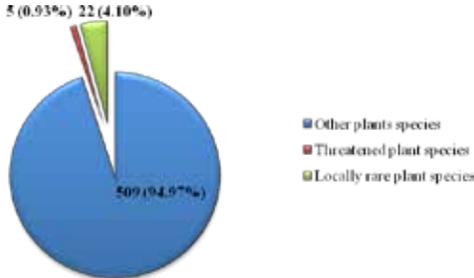
**Figure 1: Sample plot design**



Identification and distribution of threatened and locally rare plants were based on the inventory and frequency analysis of the flora. Threatened plant species were categorized on the basis of information available from World Conservation Monitoring Centre (WCMC, 1994). A special inspection was carried out to search for further availability of the threatened plants near the spots where they were documented. After determining the frequency, plant species with least frequency in the studied sample plots were recognized as locally rare plants.

**RESULTS AND DISCUSSIONS**

Out of a total of 536 species of angiosperms belonging to 367 genera of 109 families recorded in the study area a total numbers of 27 species comprising 5.03% of the total were listed out as threatened and locally rare together, out of which Five plant species comprising 0.93% were categorized as threatened (WCMC, 1994) and 22 species comprising 4.10% were locally rare (figure 2).



**Figure 2: Distribution of threatened and locally rare plant species of the study area**

Amongst the threatened plant species 3 were tree species and 2 were shrub species, all belonging to 5 different families. *Boswellia serrata* Roxb. a tree species from Burseraceae family was found with the frequency of 7.9, which was least amongst all. This tree species was followed by *Tecomella undulata* (Sw.) Seem. a tree species of Bignoniaceae family with 8.5 frequency, *Gloriosa superba* L. a shrub species of Liliaceae family with 11.52 frequency, *Bombax ceiba* L. a tree species of Bombacaceae family with 12 frequency, and *Mucuna prurita* Hk. f. a tree species of Fabaceae family with 13.94 frequency (table 1).

All the 22 locally rare species were belonging to 19 different families, of which 3 species were from Rubiaceae and 2 were from Asclepiadaceae family. Out of these locally rare plant species 7 were tree species and there were 5 species in each habit of shrub, herb and climber.

**Table 1: Threatened and locally rare plant species of the study area.**

Sr. No.	Plant species	Family	Habit	Frequency
<b>Threatened plant species</b>				
1	<i>Boswellia serrata</i> Roxb.	Burseraceae	T	7.9
2	<i>Tecomella undulata</i> (Sw.) Seem.	Bignoniaceae	T	8.5
3	<i>Gloriosa superba</i> L.	Liliaceae	S	11.52
4	<i>Bombax ceiba</i> L.	Bombacaceae	T	12
5	<i>Mucuna prurita</i> Hk. f.	Fabaceae	T	13.94
<b>Locally rare plant species</b>				
1	<i>Guazuma ulmifolia</i> Lam.	Rubiaceae	T	0.61
2	<i>Anthocephalus kadamba</i> L.	Rubiaceae	S	1.21
3	<i>Amorpha phalloides</i> (L.) Link. & DC.	Fabaceae	C	1.21
4	<i>Leptadenia reticulata</i> (Retz.) W. & A.	Asclepiadaceae	T	1.21
5	<i>Phyllanthus niruri</i> L.	Phyllanthaceae	T	1.21
6	<i>Stemmadia tomentosa</i> Heyne ex Roth	Moraceae	T	1.21
7	<i>Leptadenia reticulata</i> (Retz.) W. & A.	Asclepiadaceae	C	1.82
8	<i>Breynia retusa</i> (Dennst.) Alst.	Euphorbiaceae	S	1.82
9	<i>Dregea volubilis</i> (L. f.) Bth.	Asclepiadaceae	C	1.21
10	<i>Ipomoea pes-caprae</i> (L.) W. & A.	Asclepiadaceae	C	1.82
11	<i>Stemmadia tomentosa</i> Heyne ex Roth	Moraceae	C	1.82
12	<i>Dregea volubilis</i> (L. f.) Bth.	Asclepiadaceae	S	1.21
13	<i>Arygyreia nervosa</i> Boj.	Convolvulaceae	C	1.82
14	<i>Sesamum orientale</i> L.	Pedaliaceae	H	1.82
15	<i>Lepidagathis cristata</i> Willd.	Acanthaceae	H	2.42
16	<i>Chlorophytum borivilianum</i> Sant. & Fernand.	Liliaceae	S	2.42
17	<i>Acacia jacquemontii</i> Bth	Leguminosae	T	3.03
18	<i>Cassia toria</i> L.	Fabaceae	H	1.82
19	<i>Ficus drupacea</i> Thunb var. <i>pubescens</i> Roth.	Moraceae	T	1.21
20	<i>Chlorophytum borivilianum</i> Sant. & Fernand.	Liliaceae	H	2.42
21	<i>Phyllanthus niruri</i> L.	Phyllanthaceae	T	1.21
22	<i>Amorpha phalloides</i> (L.) Link. & DC.	Fabaceae	H	1.82

Fig. C = climber, H = herb, S = Shrub, T = tree

Amongst the locally rare plant species *Hymenodictyon excelsum* (Roxb.) Wall. a tree species of Rubiaceae family, *Guazuma ulmifolia* Lam. a tree species of Sterculiaceae family and *Phoenix sylvestris* (L.) Roxb. a tree species of Palmaceae family were found with 0.61 frequency of each, which was least amongst all. It was followed by *Anthocephalus kadamba* L. a tree species of Rubiaceae family, *Holoptelea integrifolia* (Roxb.) Planch a tree species of Ulmaceae family, *Morinda tomentosa* Heyne ex Roth a tree species of Rubiaceae family, *Ficus drupacea* Thunb var. *pubescens* Roth. a tree species of Moraceae family, *Dregea volubilis* (L. f.) Bth. a climber species of Asclepiadaceae family, *Grewia subinequalis* DC. a shrub species of Tiliaceae family, *Ampelocissus latifolia* (Roxb.) planch. a climber species of Vitaceae family and *Strychnos potatorum* L. a shrub species of Loganiaceae family each with 1.21 frequency, *Leptadenia reticulata* (Retz.) W. & A. a climber species of Asclepiadaceae family, *Arygyreia nervosa* Boj. a climber species of Convolvulaceae family, *Breynia retusa* (Dennst.) Alst. a shrub species of Euphorbiaceae family, *Hemidesmus indicus* (L.) Schult. a herb species of Piproplocaceae family, *Cannabis sativa* L. a herb species of Canabinaceae family, *Amorphophallus commutatus* (Roxb.) Bl. a herb species of Araceae family, *Sesamum orientale* L. a herb species of Pedaliaceae family and *Manilkara zapota* L. a shrub of Sapotaceae family each with 1.82 frequency, *Lepidagathis cristata* Willd. a herb of Acanthaceae family and *Chlorophytum borivilianum* Sant. & Fernand. a herb of Liliaceae family each with 2.42 frequency and *Acacia jacquemontii* Bth with 3.03 frequency (table 1).

**CONCLUSION**

In respect of its floristic and ecological characteristics, the region under present study has been found to be rich and valuable. Identification of 536 higher plant species in the forest area of 1321.8 hectare showed high plant diversity in the region. Within that documentation of 5 threatened plant species added up the importance of its flora. Apart from that recognizing of 22 locally rare plant species out of the total has been a big concern for the flora of the study area. Mounting anthropogenic pressure has resulted in extinction of many plant species in several areas globally. Forest region of Vadgam taluka of Banaskantha district, North Gujarat is also not exempted from this fact. As mentioned earlier the study area is facing human interference all through the year as grazing, fodder collection, over exploitation, check-dams building, mining and encroachment. A thorough and long term management plan may be developed by the concerned agencies to analyze each such anthropogenic activity at grass root level and find solutions to reduce them. Generating interest about biodiversity and its conservation in vernacular people along with implementation of strict laws will be a great advantage in improving the habitat for the survival and increase in number of threatened and locally rare plant species. A germplasm may also be introduced in the area to store seeds of such valuable plant species and cultivate them further.

**REFERENCE**

1) Champion, H. G. and Seth, S. K. (1968). A revised survey of forest types of India, FRI, Dehradun. | 2) Daniels, R. J. R. and Jayanthi, M. (1996). Biology and conservation of endangered plants: The need to study breeding systems. *Tropical Ecology*. 37(1):39-42. | 3) Cooke, T. (1901-1908). *Flora of the Presidency of Bombay*. Vol.-I, II & III. London. (Botanical Survey of India, reprinted 1958, Calcutta). | 4) Kershaw, K. A. (1973). *Quantitative and dynamic plant ecology*, New York: American Elsevier Publishing Co., inc. | 5) Mueller-Dombois and Ellenberg H. (1974). *Aims and methods of vegetation ecology*. Jhon Wiley and Sons, New York. | 6) Shah, G. L. (1978). *Flora of Gujarat State*. Vol. I & II. S. P. University Press, Vallabh Vidyanagar, Gujarat. | 7) Soni, V. (2009). Threatened wild medicinal plants: who cares? *Cur. Sci.*, 96 (7): 875. | 8) WCMC (1994). Status report as of 24 November 1994, Gujarat, Printout from plant database BG-BASE. World Conservation Monitoring Centre. |