

Illumination of Phytoclimate Nature of 'Reserve Forest of Vadgam Taluka of Banaskantha District, (North Gujarat)' In Respect of Lifeform Classes of Angiosperms



Science

KEYWORDS : Lifeforms, Angiosperms,
Vadgam, Banaskantha, NBS

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ABSTRACT

Area under present study 'reserve forest of Vadgam taluka of Banaskantha district, North Gujarat' has been untouched in respect of its floral and ecological studies except present study even though being one of the flora rich regions. In consequence along with systematic identification and documentation of the flora, research to identify the status of lifeform classes of angiosperms found in the study area was of concern for the reason to obtain their eminence in comparison of Normal Biological Spectrum (NBS) and to reveal about its phytoclimate nature. Keeping this objective in the front during the research, results obtained in the end showed that characters of therophytes along with cryptophytes were dominant over other lifeform types of angiosperms in the study area. Based on this fact, the forest community of Vadgam taluka may be configured as crypto-therophytes in respect of its phytoclimate type.

INTRODUCTION

As a part of a thorough analysis of phytosociological characters present study deals with lifeform classification of angiosperms of reserve forest of Vadgam taluka and its comparison with NBS to reveal its phytoclimate type. There is a strong correlation between the climate of an area and the lifeforms of plants present in there. A phytoclimate is characterized by the lifeform which most greatly exceeds the percentages for its class in the normal spectrum. Lifeform is defined as a type of thing that is living or alive. Raunkiar (1934), defined plant lifeform as "the sum of the adaptations of the plant to climate". Plant lifeforms are classified on basis of the position of perennating buds on plants and the degree of their protection during adverse conditions. 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 along with their lifeforms of the study area was of concern. Comparison of the percentages of lifeform classes recorded in the study area to that of NBS, provided accurate knowledge of current standings of lifeforms and phytoclimate type of the forest.

STUDY AREA

Gujarat, the Western most state of India is rich in its floristic composition. The state constitutes four major forest types out of sixteen in the country- tropical moist deciduous forest, tropical thorn forest, littoral or mangrove forest and tropical dry deciduous forest (Champion and Seth, 1968). Present study area, 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. 110 villages of Vadgam taluka constitute Vadgam reserve forest range. The range is bordered with Palanpur range forest and Balaram sanctuaries in North-West, Ambaji in North, Danta in East and plains of Siddhapur in South.

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. Forest of the district is included in the tropical dry deciduous and tropical thorn forest type. 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. It is 35 km. far from district headquarters in Palanpur city. 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 13.22 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. Climate of the study area is sub-tropical. 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, collection of minor products, fodder and fire wood collection, over exploitation, poaching, check-dams and roads building, mining, encroachment, ecotourism, socio-economic and political issues and water scarcity.

METHODOLOGY

Present research 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. 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).

Plant species of angiosperms recorded in the study area were distributed as per Raunkiar's classification system for lifeforms (1934). Raunkiar classified plants into five broad life-form classes. 1) Phanerophytes - which is further classified into Mega-phanerophytes, Meso-phanerophytes, Micro-phanerophytes and Neno-phanerophytes, 2) Chamaephytes, 3) Hemicyptophytes, 4) Cryptophytes - which is further classified into Geophytes, Helophytes, Hydrophytes, Parasites, Epiphytes and Succulents, and 5) Therophytes. To identify the nature of phytoclimate type of the study area, percentages of lifeform classes recorded in the study area were compared to those of NBS.

RESULTS AND DISCUSSIONS

In the forest of Vadgam taluka a total of 536 species of angiosperms belonging to 367 genera of 109 families have been recorded during present study. Out of which 148 species comprising 27.61% of the total were found to be phanerophytes, ensuring the class as a second largest lifeform group. Within phanerophytes 7 (1.30% of the total) species were mega-phanerophytes, 30 (5.60% of the total) species were meso-phanerophytes, 68 (12.69% of the total) species were micro-phanerophytes and 43 (8.02% of the total) species were nano-phanerophytes. 71 species comprising 13.25% of the total were fit in the class of chamaephytes. 19 species comprising 3.54% of the total were belonging to hemi-chamaephytes. A total of 50 species comprising 9.33% of the total were fit in the class of cryptophytes. Out of which 17 (3.17% of the total) species were geophytes, 8 (1.49% of the total) species were helophytes, 14 (3.11% of the total) species were hydrophytes 2 (0.37% of the total) species were parasites, 6 (1.12% of the total) species were epiphytes and 3 (0.56% of the total) species were succulents. While a total of 248 species comprising 46.27% of the total was found to fit in the class of therophytes, the largest lifeform class of the study area (table 1).

Table 1: Distribution of angiosperms of the study area based on their lifeforms

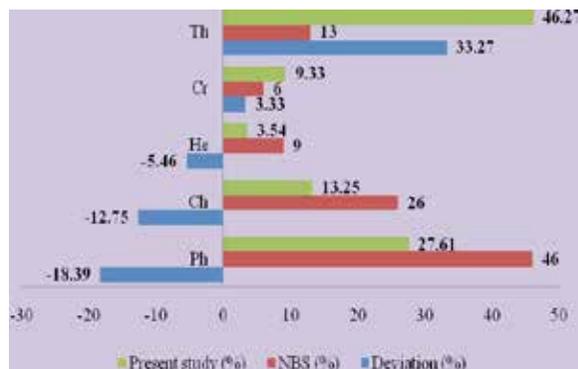
Sr. No	Life form	Code	No. of Species	Percentage
1	Phanerophytes	Ph	148	27.61%
	Mega phanerophytes	MMM	07	1.30%
	Meso phanerophytes	MM	30	5.60%
	Micro phanerophytes	M	68	12.69%
	Nano phanerophytes	N	43	8.02%
2	Chamaephytes	Ch	71	13.25%
3	Hemi-Chamaephytes	He	19	3.54%
4	Cryptophytes	Cr	50	9.33%
	Geophytes	G	17	3.17%
	Helophytes	HHH	8	1.49%
	Hydrophytes	HH	14	3.12%
	Parasites	P	2	0.37%
	Epiphytes	E	6	1.12%
	Succulents	S	3	0.56%
5	Therophytes	Th	248	46.27%
Total			536	100%

SUMMARY AND CONCLUSION

Percentages of lifeforms found in the study area were compared to the NBS. The largest class of lifeform of the present study, therophytes compressed 46.27% species of the total. A positive deviation of 33.27% came out when it was compared to that of NBS which is 13.00%. In case of cryptophytes, the class compressed 9.33% species of the total during present study. When it was compared to that of the NBS which is 6.00%, a positive deviation of 3.33% was found. Class of phanerophytes compressed 27.61% species of the total during present study. In its comparison of that of NBS which is 46.00%, a negative deviation of 18.39% was found. Class of chamaephytes of the study area compressed 13.25% species of the total during present study. When comparing it with that of the NBS which is 26.00%, a negative deviation of 12.75% was found. 3.54% species of the total was occupied by the class of hemi-chamaephytes during present study. When compared it with that of the NBS which is 9.00%, a negative deviation of 5.46% was found (table 2 & figure 1).

Table 2: Comparison of lifeform spectrum of present study with NBS

Sr. No.	Spectrum (%)	Ph	Ch	He	Cr	Th	Total
1	Present study	27.61	13.25	3.54	9.33	46.27	100
2	NBS	46.0	26.0	9.0	6.0	13.0	100
3	Deviation	-18.39	-12.75	-5.46	3.33	33.27	00

**Figure 1: Deviation in lifeform spectrum of present study in comparison with NBS**

Consequently, species of therophyte class were having their existence more than two and a half times than that of NBS in the study area. Cryptophytes also had positive deviation of almost half a time more than that of the NBS. All other lifeforms were having negative deviation in their lifeform spectrum, meaning that they were found in less numbers in the study area as compared to the NBS pattern. In this corollary, characters of therophytes along with cryptophytes showed dominance over other lifeforms of angiosperms. Based on this fact, the forest community of Vadgam taluka may be configured as crypto-therophytes in respect of its phytoclimate type.

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