Status of Lifeforms of Angiosperms Found at 'Thol Lake Wildlife Sanctuary', (North Gujarat) in Comparison of Normal Biological Spectrum (NBS)

Vyas D. N.	Researcher, R. R. Mehta College of Science & C. L. Parikh College of Commerce, Palanpur (N. Guj.)
Dabgar Y. B.	Principal, R. R. Mehta College of Science & C. L. Parikh College of Commerce, Palanpur (N. Guj.)

ABSTRACT   *Being one of the three sanctuaries of the North Gujarat region 'Thol Lake Wildlife Sanctuary' is eminent for its resident and migratory waterfowl. Even though being a protected wetland the sanctuary has been untouched in respect of systematic identification and documentation of its flora except present study. Research to identify the status of lifeforms of angiosperms found at the sanctuary was of concern for the reason to acquire their standings in comparison of Normal Biological Spectrum (NBS). Keeping this objective in the front results gained after the research showed that species of therophyte class were having their existence more than double than that of the NBS in the study area, while all other lifeforms were having their deviation in minus, meaning that they are found in less numbers in the sanctuary as compared to the NBS configuration.*

Introduction

Quality of flora exhibits natural wealth of particular region. Lifeform is defined as a type of thing that is living or alive. Raunkiar's (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 general observation area under present study 'Thol Lake Wildlife Sanctuary' 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 lifeforms recorded in the study area to that of Normal Biological Spectrum (NBS) provided accurate knowledge of current status of lifeforms in respect of their existent in the sanctuary. Based on the fact a proper and sustainable management plan could be developed to minimize deviations between percentages of present lifeforms of the study area and that of the NBS.

Study area

Gujarat is unique in considering its wealth of natural and man-made water bodies/wetlands. Four such inland wetlands in the state have been established and designated as sanctuaries primarily for waterfowl. These are Nal sarovar, Khijadia, Porbandar and Thol (Singh, 1998). Though, the selected study area Thol is encompassing irrigation tank, is legally named 'Thol lake Wildlife Sanctuary' as per the notification. It is in fact one of the sanctuaries of the state considering that waterfowl constitute dominant form of the wildlife to be protected. The sanctuary is popularly known as 'Thol Bird Sanctuary' (TBS).

The area falls under Mehsana district of North Gujarat region, which is a semi-arid zone and mostly composes dry deciduous vegetation. In physiognomic manner forests of the district are of scrub type where vegetation is open i.e. trees and shrubs are widely spaced. The vegetation on the whole consists of co-dominant by thorny shrubs and trees capable of resisting drought. Such vegetation falls under Bio-geographic zone – IV. The area under present study also falls under the same conditions and categories naturally. In addition to that it is a protected area which is considered as wetland. The vegetation found here mainly was of scrub type with mixed flora of aquatic and marshy plants. TBS comprise a total area of 699 ha. with 5.62 km. long periphery. The area experiences three distinct seasons, winter, summer and monsoon. Temperature ranges here from as low as 8°C in winter to as high as 43°C in summer. Average annual rainfall is 600 mm, ranging from 100 mm to 800 mm. The study area is also facing anthropogenic pressures viz. agriculture, grazing, industrialization, oil drilling and tourism.

Materials and methods

Present 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. Because the study area holds a water body with variation in water covered area during different seasons of the year, the survey was started from the peripheral region. Meanwhile when and where (mostly in summer) the water lodged areas dried up, were also surveyed. Thus, entire sanctuary was covered to quantify ecological characters. For this purpose standard quantitative assessment technique like belt transects method (Muller-Dombois and Ellenberg, 1974; Kershaw, 1973) was used. Depending on the width of peripheral region a 100 mt. wide belt was recognized and studied using different sized sample plots for various vegetation habits viz tree, shrub, twiner, climber and herb. Circular plots of 10 mt. radius each were plotted at every 50 mt. intervals randomly within the belt area for the study of tree species. Within each such plot, a circular plot with 8 mt. radius was considered for the study of shrub, twiner and climber species and within that plot two quadrates of 1 sq. mt. each were laid randomly to study herb layer. Same sized plots were plotted within rest of the sanctuary area also. Quadrates of 1 sq. mt. were examined by using point intercept method, in which species of herbs were recorded on two diagonal axis at the distance of every 10 cm.

All the higher plant species recorded in the study area were distributed as per Christen 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) Hemicryptophytes, 4) Cryptophytes** – which is further classified into hydrophytes, helophytes and geophytes, and **5) Therophytes.**

Results and discussions

In TBS out of a total of 278 higher plant species, 110 species comprising 39.56% were found to be phanerophytes ensuring the class as a largest lifeform group. Within phanerophytes 20 (7.19% of the total) species were meso-phanerophytes, 33 (11.87% of the total) species were micro-phanerophytes and 57 (20.50% of the total) were nano-phanerophytes. 64 species comprising 23.02% of the total were fit in the class of chamaephytes. 10 species comprising 3.60% of the total were belonging to hemi-chamaephytes. A total of 15 species comprising 5.40% of the total were fit the class of cryptophytes. Out of which 8 (2.88% of the total) species were from hydrophytes and 7 (2.52% of the total) species were from helophytes. While a total of 79 species comprising 28.42% of the total was found to be fit in the class of therophytes, the second largest lifeform class at TBS *(table 1)*.

Table 1: Plants distribution based on lifeforms at TBS

| Sr. No.	Lifeform	Code	No. of species	Percentage
1	Phanerophytes	Ph	110	39.56
	Mega phanerophytes	MMM	00	00
	Meso phanerophytes	MM	20	7.19
	Micro phanerophytes	M	33	11.87
	Nano phanerophytes	N	57	20.50
2	Chamaephytes	Ch	64	23.02
3	Hemi-Chamaephytes	He	10	3.60
4	Cryptophytes	Cr	15	5.40
	Hydrophyte	H	8	2.88
	Helophytes	HH	7	2.52
	Geophytes	Ge	00	00
5	Therophyte	Th	79	28.42
Total			278	100

Summary and conclusion

Percentages of lifeforms found in the study area were compared to the NBS. The largest class of lifeform phanerophytes of the present study compressed 39.56% species of the total in the present study. A deviation of -6.44% was came out when it was compared to that of NBS which is 46.00%. In case of chamaephytes, the class compressed 23.02% species of the total in the present study. When compared to that of the NBS which is 26.00%, a deviation of -2.98% was found. Class of hemi-chemaephytes compressed 3.60% species of the total in present study. In comparison of that of NBS which is 9.00%, deviation of -5.40% was found. Class of cryptophytes of the study area compressed 5.40% species of the total in the present study. When comparing that of the NBS which is 6.00%, a deviation of -0.40 was found. That was the least deviation found in any class of lifeform. 28.42% species of the total was occupied by the class

of therophytes in the present study. When compared that of the NBS which is 13.00%, a deviation of 15.42% was found, which was the largest amongst all the classes of lifeforms *(table 2 & figure 1)*.

Table 2: Comparison of lifeforms of present study with NBS

Sr. No.	Spectrum (%)	Ph	Ch	He	Cr	Th	Total
1	Present study	39.56	23.02	3.60	5.40	28.42	100
2	NBS	46.00	26.00	9.00	6.00	13.00	100
3	Deviation	-6.44	-2.98	-5.40	-0.60	15.42	00

Figure 1: Deviation in lifeforms of present study in comparison with NBS
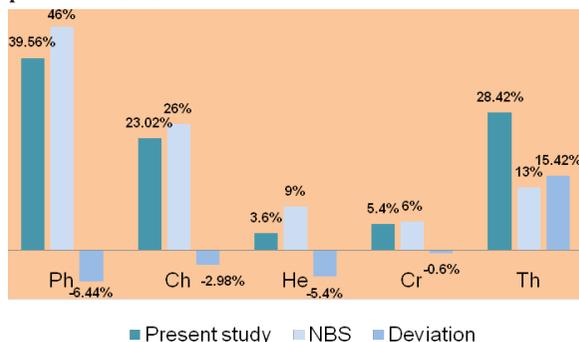
Thus, species of therophyte class were having their existence more than double than that of NBS in the study area. All other lifeforms were having their deviation in minus, meaning that they are found in less numbers in the sanctuary as compared to the NBS configuration. In this consequence, characters of therophytes showed dominance over other lifeforms of angiosperms. Based on this fact, the forest community of TBS may be configured as therophytes in respect of its phytoclimate type. Special conservation strategies may be developed to increase percentage of phanerophytes, chamaephytes, hemicryptophytes and cryptophytes. Intensive plantation and control on anthropogenic pressure especially on grazing and tourism would help in sustainable habitat improvement of TBS.

REFERENCE

1) Kershaw, K. A. (1973). Quantitative and dynamic plant ecology, New York: American Elsevier Publishing Co., inc. | 2) Mueller-Dombois and Ellenberg H. (1974). Aims and methods of vegetation ecology. Jhon wiley and Sons, New York. | 3) Raunkiaer, C. (1934). The lifeform of plant and statistical plant geography Clarendon Press, Oxford England, P:632. | 4) Singh, H. S. (1998). Wildlife of Gujarat (Wildlife protected habitats of Gujarat state), GEER Foundation, Gandhinagar, Gujarat. |