



Life Forms and Biological Spectrum of the Flora of Gorumara National Park, West Bengal, India

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Abstract

In the present study, 350 taxa of higher plants have been classified into different life forms and biological spectrum of the flora of Gorumara National Park, West Bengal, India has been prepared and compared with Raunkiaer's normal spectrum that depicts Thero-Phanerophytic phyto-climate of the area.

Keywords: Biological spectrum, Gorumara National Park, Life forms, Thero-Phanerophytic phyto-climate.

Introduction

The system for classifying plants into different life-forms has been proposed by many ecologists (Warming, 1909; Raunkiaer, 1934; Dansereau, 1951; Ellenberg and Muller-Dombois, 1974; Box, 1981). However, the system of Raunkiaer (1934) is more accepted and comprehensive in which position of the buds or plant propagules from which shoot or foliage develop after unfavorable or adverse seasons have been considered as most important criteria for classifying plants into different life-forms. The percentage distribution of life-forms in the flora of a region is expressed in the form of biological spectrum. Since the life form is related to environment around the plants, the biological spectrum is also regarded as indicator of prevailing environment and are also useful in comparing geographically widely separated plant communities. Biological spectrum may be substantially changed due to introduction of weeds or due to biotic influences like livestock grazing, agriculture practices and other biotic disturbance.

Many ecologists have determined the biological spectrum of different regions of India (Meher-Homji, 1964, 1981; Kumar and Krishnamurthy, 1993; Pandey and Parmar, 1993; Singh and Arora, 1994; Ranjan and Verma, 1995; Rana et al., 2002; Ranjan, 2012). Meher-Homji (1981) described a critical assessment of 38 spectra from different parts of India and classified these in ten main types of phyto-climates. However, the rich and varied flora of Gorumara National Park has not been studied so far from this viewpoint. Therefore, the present study was carried out during 2008 to 2012 and 350 taxa of higher plants were collected.

The study area

The Gorumara National Park (GNP) is situated in Jalpaiguri district of West Bengal and lies between latitude 26°47'25.6" - 26°43'25.6" N and longitude 88°52'4.2" - 88°47'7.3" E and having 120–130 m elevation. It is bounded in the north by Batabari-Nagrakata Road, in the south by Bichabhanga Road, in the east by Jaldhaka river and in the west by NH-31. The park covers an area of ca. 79 sq km and for administrative set up it is divided into 2 Ranges *viz.*, Gorumara South Range and Gorumara North Range; 6 Beats *viz.*, Gorumara, Dhupjhora, Bichabhanga, Ramsai in south range and Murti, Khunia in north range; 07 camps (checkpost) *viz.*, Bamni, Gorati, Zero Bundh, Medla, Chukchuki in south range and Tondou in north range. There are 13 revenue villages, 04 forest villages and 05 tea gardens around the park. The park can be approached by road from Jalpaiguri (80 km) or Siliguri (45 km).

In the park area the average day temperature normally ranges from 10°C to 20°C during winter and 27°C to 35°C during summer. There is noticeable variation between day and night temperatures throughout the years and sometimes the winter nights are severe.

Main source of rainfall is south-west monsoon. The maximum rainfall occurs from middle of June to end of September and July and August receive the highest rainfall. Average annual rainfall is about 382 cm. Pre-monsoon showers often accompanied by hail in the month of April and May.

The area remains adequately humid throughout the year due to its location. Maximum humidity recorded 80–90% often below 75%. Humidity is less during December to February.

In general, the forest is composed of dry mixed forest, wet mixed forest, sal forest and large terrai-grassland interspersed with riverine forest. The sanctuary has tree cover throughout, but more in the north-west area of *Jatraprasad* and *Khunia* towers area. The ground vegetation is covered with the herbaceous plants mainly seasonal annuals. In the north-west corner of *Khunia* range, the basin of *Murti* river is covered with large grasses which are suitable niche for wild animals.

Materials and Methods

The present study is based on extensive field surveys from 2008 to 2012 of Gorumara National Park. Attempts were made to collect the specimens from all habitats and in different seasons. Data on habit, habitat, associations, flowering and fruiting period and abundance were recorded. All plants specimens were collected by authors, numbered and preserved as voucher specimens for future reference. The plants were identified using relevant literature and comparison with the authentic specimens housed in the Central National Herbarium (CAL). All the herbarium sheets have been deposited in the CAL. In the present study, the system of Raunkiaer as modified by Ellenberg and Muller-Dombois (1974) has been followed. All the plant species are grouped into various life forms and a biological spectrum is prepared for the Gorumara National Park and compared with the Raunkiaer's normal spectrum to ascertain the phyto-climate of the area.

Results and Discussion

It is evident from the table 1, that Therophytes (33.14%) is a dominant life form in the Gorumara National Park, which is almost three times higher than the normal spectrum and its predominance indicates warm climate (Dansereau, 1951). The Phanerophytes (23.71%) is less than normal spectrum. The good percentage of lianas (5.14%) indicates that forest of Gorumara National Park is open and is suitable for the growth of lianas. Since the Therophytes (33.14%) dominates over other life forms and succeeded by Phanerophytes (23.71%), the phyto-climate of the Gorumara National Park is Thero-phanerophytic.

Table 1. Biological spectrum of Gorumara National Park, compared with Raunkiaer’s normal spectrum.

Life forms	Gorumara National Park		Raunkiaer’s normal spectrum %
	No. of taxa	% of taxa	
Therophytes	116	33.14	13
Phanerophytes	83	23.71	28
Nanophanerophytes	72	20.57	15
Chamaephytes	28	8	9
Hemicryptophytes	17	4.85	26
Hydrophytes & Helophytes	4	1.14	2
Lianas	18	5.14	...
Geophytes	3	0.85	4
Epiphytes	9	2.57	3
Total species	350	100	100

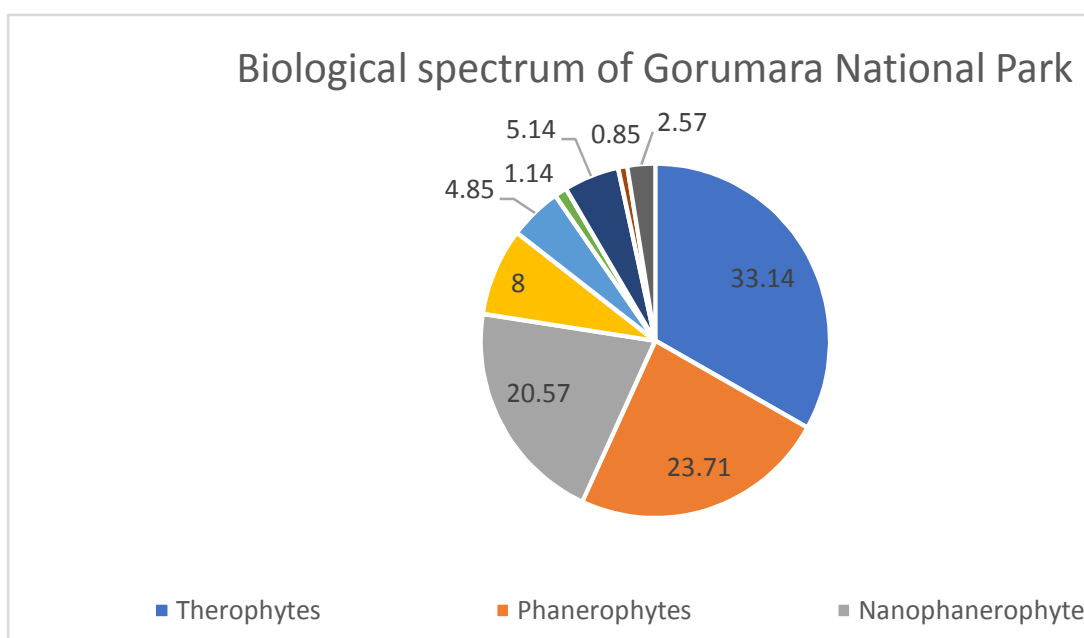


Fig.1. Biological spectrum of Gorumara National Park

Conclusion

The Gorumara National Park is geographically a part of Doars region which falls in eastern Himalayan (Hooker, 1904) and is characterized by *sal* dominant deciduous forest. The vegetation of the park is predominantly evergreen type mixed with deciduous species. The vegetation shows the general characteristic of the topography, climate, and ecological distribution of the species. The present study revealed that Therophytes (33.14%) followed by Phanerophytes (23.71%) exhibit the phyto-climate is Thero-phanerophytic. Further, an increase in

percentage of Therophytes and decrease in percentage of Phanerophytes, Nanophanerophytes and Hemicryptophytes indicates that the area is affected by deforestation, over exploitation, over grazing and constructional and developmental activities.

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References

- Box, E.O. 1981. Predicting physiognomic vegetation types with climate variables. *Vegetatio*. 45: 127–139.
- Dansereau, P. 1951. Description and recording of vegetation upon a structural basis. *Ecology* 32: 172–229.
- Ellenberg, H. and Muller-Dombois, D. 1974. A key to Raunkiaer's life forms with Revised subdivisions. Appendix A. In: Muller-Dombois, D and H. Ellenberg (eds). *Aims and Methods of Vegetation Ecology*. John Wiley and Sons, New York, pp. 547
- Hooker, J.D. 1904. A sketch of the Flora of British India. London, pp. 55
- Kumar, T.S. and Krishnamurthy, K.V. 1993. Raunkiaer's life forms, biological spectrum and phytogeography of the flora of Shervaroy Hills of Eastern Ghats (South India). *Geobios New Reports* 12: 152–157.
- Meher-Homji, V.M. 1964. Life forms and biological spectrum as epharmonic criteria of aridity and humidity in the tropics. *J. Indian Bot. Soc.* 43: 423–430.
- Meher-Homji, V.M. 1981. Environmental implications of life form spectra from India. *J. Econ. Taxon. Bot.* 2: 23–30.
- Pandey, R.P. and Parmar, P.J. 1993. An assessment of biological spectrum of flora of Rajasthan. *J. Econ. Taxon. Bot.* 17: 99–103.
- Rana, T.S., Datt, B. and Rao, R.R. 2002. Life Forms and Biological Spectrum of the Flora of Tons Valley, Garhwal Himalaya (Uttaranchal), India. *Taiwania* 47(2): 164–169.
- Ranjan, V. 2012. Life Forms and Biological Spectrum of the Flora of Parasnath Wildlife Sanctuary, Chota Nagpur Plateau, (Jharkhand), India. *Indian J. Forest.* 35(4): 513–515.
- Ranjan, V. and Verma, B.K. 1995. Biological spectrum of Lalitpur flora. *Geobios New Reports* 14: 81–82.
- Raunkiaer, C. 1934. *The Life Forms of Plants and Statistical Plant Geography*. Clarendon Press, Oxford, pp. 623.
- Singh, B.P. and Arora, A. 1994. Biological spectrum of the vegetation of Ganganagar district of Rajasthan. *Rheedea* 4: 74–78.
- Warming, E. 1909. *Ecology of Plant. An introduction to the study of communities*. Clarendon Press. Oxford, pp. 422.

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