BIOLOGICAL SPECTRUM OF THE FLORA OF BUXAR DISTRICT, BIHAR

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ABSTRACT

Buxar forms a district of Patna division in the Ganga Valley and is under intense cultivation and irrigation by an efficient sone canal system. In the present paper life-forms of 540 angiospermic species have been studied and the same have been compared with Raunkiaer's normal biological spectrum and other spectra of the adjoining regions of Ganga Valley. This reveals the dominance of therophytes which indicate that the phytoclimate of the district is therophytic. The area is devoid of its original natural vegetation and the dominance of therophytes is due to the introduction of weeds of cultivation.

INTRODUCTION

The district of Buxar having an area of 1786. 74 sq. km. lies between $25^{\circ}20'-25^{\circ}75'$ N Lat. and $83^{\circ}75' 84^{\circ}40'$ E. Long. at an elevation of 57m. above sea level. It consitutes a part of the Gangetic plain stretching south of Ganga to the foot of Chotanagpur plateau of Bihar. The entire area is a flat alluvial tract highly fertile and densely populated. The average annual rainfall is 1306 mm. with maximum in July and August. The dry period varies from 7-8 months. January is the coldest month of the year with the mean temperature 17°C.

The present work is based on the extensive floristic study of Buxar district (Singh 1993). 540 angiospermic species collected from the area have been classified into their life-forms as recognised by Raunkiaer (1934) and modified by Braun-Blanquet (1932). The biological spectrum of the area has been compared to Raunkiaer's normal biological spectrum in order to find out whether our results support Raunkiaer's hypothesis that phytoclimate is an indicator of the vegetation of an area.

OBSERVATION

Of 540 angiospermic species collected from the area, the lifeform analysis indicate 45.8% of therophytes which is 3.5 times higher than that of

the Normal Biological Spectrum (NBS). The percentage of cryptophytes (geophytes and hydrophytes) (8.65%) also exceeds NBS by 1.44 times. The proportion of phanerophytes (25.7%) and nanophanerophytes (11.3%) though substantial is lower by 6% than that in NBS. The percentage of chamaephytes (3.27%) and hemicryptophytes (2.24%) is much lower than in the NBS. The parasites (0.56%) are poorly represented but lianas (2.5%) are better. Thus we find that the therophytes are growing dominantly in the area along with a high percentage of phanerophytes.

DISCUSSION

The fair representation of phanerophytes, indicative of wet tropical forest, is not the result of their natural growth but due to the plantation of trees in selected areas of the district, like public parks, gardens, orchards and roadsides through various government schemes and public efforts.

The high percentage of cryptophytes (geophytes and hydrophytes) seems to be the result of increased water facilities in the area due to a network of canals. The preponderance of geophytes may be due to warm and humid conditions and the presence of porous fertile upper horizon of alluvial soil which is functional for the development of perennating organs of geophytes. The presence of

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hemicryptophytes and chamaephytes are fairly low as these are mostly found in cold climatic zones.

A comparison of the biological spectrum of the area with that of NBS indicates that the phytoclimate of Buxar is therophytic (Table 1). But the ombrothermic diagram (Fig.1) of the area reveals mesophanerophytic climate (Raunkiaer 1937). This is contradictory to Raunkiaer's hypothesis and lends support to Beadle (1951) who holds that climate is not always an indicator of flora and vegetation. Others (Warming 1909, Meher-Homji, 1963) also argue that flora of an area is determined not only by its climate but by its history as well.

In the present case biotic disturbances seem to be the most operative factor of the environment in determining the flora rather than the climate. Singh and Arora (1994) have also argued that due to biotic disturbances the proportion of life-forms may change. The district is a highly fertile and densely populated cultivated area. The agricultural practices have increased the proportion of therophytes considerably by the introduction of annual weeds.

Habitats/Areas	Rainfall (mm)	No.of dry months	Mean Tempera- ture of the coldest month (°C)	Ph	N	Ch	н	G	нн	Th	L	Ρ	Plant climate
1	2	3	4	5		6	7	8		9	10	11	12
Normal Spectrum	-	-	-	28	15	9	26	4	2	13	-	-	
Buxar district (present work)	1306	7–8	17	25.7	11.3	3.27	2.24	5.12	3.53	45.8	2.5	0.56	Therop- hytic
Patna (Singh & Siddiqui, 1984	1332	7–8	17	31.8	8.76	-	0.27	2.83	2.56	49.59	3.5	0.7	
Varanasi (Singh 1967; Singh & Ambasht, 1975)	1050	7	16	-	_	3.1	20.3	7.8	_	68.7	-	-	**
Karamnasa, Varanasi dist. (Rao, 1968)	1040	8	16	40		6	1	-	10	43	-	-	11
Gorakhpur, For- est of Gorakhpur (Siddiqui, 1972)	1275	7	16	18.2	15.6	4.4	7.4	7	5.4	32.6	9	0.4	••
Madhaulia Forest of Gorakhpur (Ansari & Singh, 1979)	1275	7	16	15	11.1		-	2.6	3.7	57.9	4.6	0.3	"
Allahabad (Srivastava, 1944)	1060	7	16	20.6	11.6	9.2	3.4	7.	.8	41.6	3.1	2.7	59

Table-1: Comparison of biological spectra of various habitats or areas with normal spectrum

Ph-Phanerophytes ;N-Nanophanerophytes ;Ch-Chamaephytes ;H-Hemicryptophytes ;G-Geophytes ;HH-Hydrophytes and halophytes ;Th-Therophytes ;L-Lianas ;P-Parasites.



Moreover, Buxar has been the centre of three historic wars which must have destroyed the natural vegetation of the area.*

Meher-Homji (1981) has pointed out that therophytic climate is common in cultivated areas with a rainfall of 1000-1300 mm. and dry season of 7 to 8 months duration which have been deprived of their original natural vegetation. He has cited several examples : Allahabad (Srivastava, 1944), Varanasi (Singh, 1967; Rao, 1968; Singh & Ambasht, 1975) and Gorakhpur (Siddiqui, 1972; Ansari & Singh, 1979) (Table 1). Similar results have been reported from Patna (Singh & Siddiqui, 1984). Incidentally all these places have proximity among themselves as well as with Buxar (Fig. 2).

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^{*}The first war was fought at Chausa in 1539 between Humayun & Shershah and the second one in 1764 between British forces and combined forces of Shuja-ud-Daulah, Mir Qasim and the Mughal Emperor, Shah Alam II. The last war was fought in 1857 by Veer Kunwar Singh with the British forces.



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