



A study on planktonic components of River Yamuna

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Abstract

The present study deals with the plankton component in Yamuna river basin. During the study period (2006-07) total number of plankton comprises of zooplankton, Bacillariophyceae, Chlorophyceae, Desmidiaceae and Myxophyceae and range from 90 unit/liter (August) to 531 unit/liter (February) for Kuthnor, 96 unit/liter (August) to 557 unit/liter (February) for Naugaon and 105 unit/liter (August) to 569 unit/liter (February) for Haripur. Bacillariophyceae was found as dominating group followed by Chlorophyceae, Desmidiaceae and Myxophyceae.

Keywords: Plankton, River, Chlorophyceae, Desmidiaceae, Myxophyceae

Introduction

In India, few detailed studies are available on the ecobiological characteristics of main stream of Rivers Bhagirathi and Ganga for its total length, mainly on account of Ganga Action Plan. On the other hand no such comprehensive systematic study is available on River Yamuna mainly in its Himalayan regime. Besides the tributaries of these two major rivers viz., the Bhagirathi – Ganga and the Yamuna within their Garhwal Himalayan catchment areas. Except for a project based study by Joshi and Singh (1997) for river Ganga and its two minor tributaries in between Dev prayag and Rishikesh. The present study is mainly centered to assess the plankton components of River Yamuna. Plankton are the heterogeneous assemblage of minute organisms which occur in the natural water and float by the wave action and movement of water. The quantitative and qualitative changes in the planktonic constituents of the river system under this study was observed with special attention of their contribution to evaluate in the form of primary and secondary productivity of the system.

Study site

The Yamuna river originates from the Yamunotri glacier near Bander Punch district of Uttarkashi in Uttarakhand state. Three sites were selected along the Yamuna stretch to monitor the plankton components within Uttarakhand Himalaya Site-I

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(Yamuna River near Barkot at Kuthnor). Site - II (Yamuna River at Naugaon) and Site-III (Haripur near Kalsi)

Materials and Method

Planktonic samples were collected in 2006 and 2007 with the help of plankton net. The samples were collected by filtering a known volume of water through the plankton net. For preservation of plankton 4% formalin was used (prepared from 40% formaldehyde solution). The sample was concentrated by sedimentation method, removing the supernatant by decanting and the desired final volume was obtained. For counting, 1ml of concentrated sample was taken and placed Sedgwick rafter counting cell following the Standard methods of APHA (1995).

Results and Discussion

The result of present study is shown in Table-1 & 2 and in Fig. 1 & 2. The plankton component comprises of zooplankton, Bacillariophyceae, Chlorophyceae, Desmidiaceae and Myxophyceae. During the present study total number of plankton ranged from 90 unit/liter (August) to 531 unit/liter (February) for Kuthnor, 96 unit/liter (August) to 557 unit/liter (February) for Naugaon and 105 unit/liter (August) to 569 unit/liter (February) for Haripur. Whereas in second year of study the total number of plankton varied from 90 unit/liter (August) to 527 unit/liter (February) for Kuthnor, 84 unit/l (Sep.) to 547 unit/l (Feb.) for Naugaon and 92 unit/liter (Sep) to 565 unit/l (Feb.) for Haripur.

Table-1: Monthly mean values of plankton component (unit /lit) of River Yamuna at three sites for year 2006

Month	Kuthnor (Site I)						Naugaon (Site II)						Haripur (Site III)					
	Zoo	Bac	Chl	Des	Myx	Total	Zoo	Bac	Chl	Des	Myx	Total	Zoo	Bac	Chl	Des	Myx	Total
Jan	5	399	83	33	0	520	8	404	90	35	0	537	9	410	90	41	0	550
Feb	11	415	89	13	3	531	15	422	95	20	5	557	17	429	93	23	7	569
Mar	22	357	67	29	7	482	25	342	72	35	9	483	29	341	75	31	11	487
Apr	25	147	44	21	9	246	25	148	45	25	10	253	28	149	49	29	10	265
May	31	118	39	15	9	212	30	120	40	16	14	220	31	125	45	17	14	232
June	27	32	33	17	15	124	25	36	38	18	17	134	27	44	40	17	17	145
July	34	14	21	11	13	93	35	15	25	12	18	105	33	17	39	15	19	123
Aug	31	15	24	9	11	90	32	16	26	11	11	96	33	17	30	13	12	105
Sep	18	29	39	12	9	107	20	30	40	12	12	114	21	31	41	19	15	127
Oct	17	51	41	34	0	143	16	55	46	35	3	155	17	57	40	41	2	157
Nov	15	114	69	37	0	235	14	115	75	38	0	242	15	115	83	43	0	256
Dec	3	239	101	33	0	376	5	250	105	40	0	400	6	251	111	45	0	413
Mean	19.2	160.8	54.17	22.0	6.3	263.3	20.8	162.8	58.1	24.8	8.25	274.7	22.2	165.5	61.3	27.8	8.9	285.8

Zoo = Zooplankton, Bac = Bacillariophyceae, Chl = Chlorophyceae, Des = Desmidiaceae, Myx = Myxophyceae

Almost similar results were recorded for various other aquatic systems by Pahwa and Mehrotra (1966) in the Ganga River. Das and Upadhyaya (1979) observed maximum phytoplanktonic concentration during March and April in lakes of Kashmir and Nainital. Badola and Singh (1981) reported high values of plankton during January to March. Joshi *et al.* (1996) opined that plankton production was mainly influenced by temperature, while Bhatt *et al.* (1984) stated that temperature is lesser effective for the abundance of biotic population as observed in the Kosi river. In present study Bacillareophyceae was the dominating group followed by Chlorophyceae, Desmidiaceae and Myxophyceae. Joshi and Singh (1997) reported higher planktonic population during winter months in Ganga at Hardwar and also observed

Bacillareophyceae as the dominating group among phytoplankton.

Conclusion

The present study concludes that the Yamuna river ecosystem support a rich and colourful planktonic diversity as compared to some other riverine ecosystems of Garhwal Himalayas. Though quite few factors seems to play significant role in the build up of planktonic population. The hilly basin of the stream has shallow water in comparison to their counterparts of plain segment. From the present observation it can be concluded that Bacillareophyceae was the dominating group followed by Chlorophyceae, Desmidiaceae and Myxophyceae.

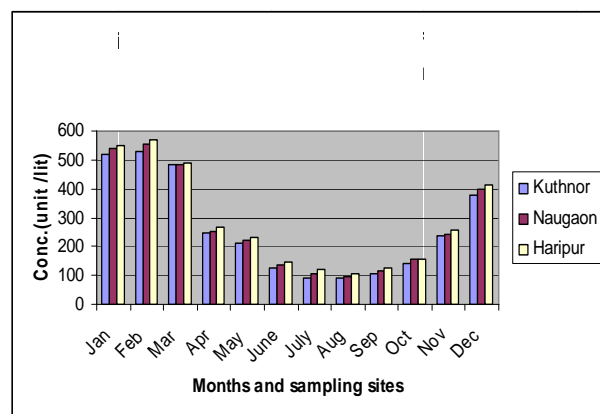


Fig. 1 Monthly mean values of plankton component (unit/l) for the second year

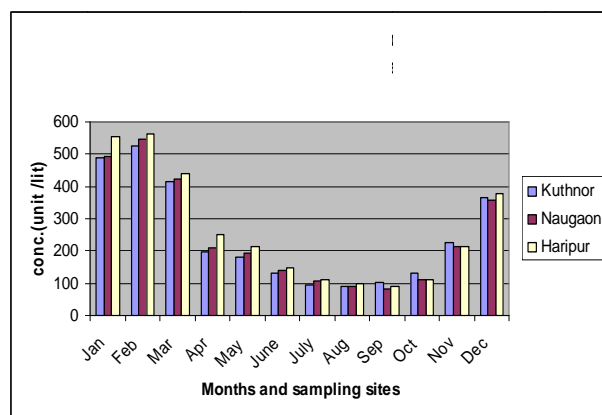


Fig. 2 Monthly mean values of plankton component (unit/l) for the second year

Table -2: Monthly mean values of plankton component (unit /lit) of river Yamuna at three sites

Month	Kuthnor (Site I)						Naugaon (Site II)						Haripur (Site III)					
	Zoo	Bac	Chl	Des	Myx	Total	Zoo	Bac	Chl	Des	Myx	Total	Zoo	Bac	Chl	Des	Myx	Total
Jan	8	365	90	24	0	487	7	368	92	26	0	493	9	414	101	29	0	553
Feb	13	401	98	15	0	527	13	417	98	17	2	547	12	419	111	21	2	565
Mar	21	295	62	27	9	414	22	297	67	29	7	422	22	303	69	35	12	441
Apr	18	118	35	12	14	197	19	121	37	14	19	210	26	135	47	21	21	250
May	47	85	29	9	11	181	49	90	28	11	17	195	33	105	41	17	19	215
June	28	42	31	18	12	131	30	45	35	17	11	138	34	44	36	18	15	147
July	34	18	22	10	11	95	36	19	29	15	8	107	37	17	30	13	12	109
Aug	30	17	24	9	10	90	32	17	25	10	8	92	33	15	28	12	10	98
Sep	22	28	35	11	8	104	23	27	26	8	0	84	25	26	31	8	2	92
Oct	18	45	38	30	0	131	17	47	35	12	0	111	19	45	34	11	0	109
Nov	17	110	68	32	0	227	16	101	65	31	0	213	18	97	65	33	0	213
Dec	3	222	105	37	0	367	6	214	103	34	0	357	7	219	114	39	0	379
Mean	22.0	146.0	53.0	20.0	6.0	245.9	23.0	147.0	53.0	19.0	6.0	247.0	23.0	153.0	59.0	21.0	8.0	264.0

Zoo = Zooplankton, Bac = Bacillariophyceae, Chl = Chlorophyceae, Des = Desmidiaceae, Myx = Myxophyceae

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