Fluctuation in the Population Density of Macro-invertebrates of River Ganga at Pashulok Barrage, Rishikesh. (Uttranchal, India)

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Abstract

The present paper describes fluctuation in the population density of Macro-Invertebrates of river Ganga at Pashulok Barrage, Rishikesh. This investigation was carried out between September 1998 and Feb 1999. Total Eight groups of Macro-invertebrates were observed. Out of which, Diptera (33.52%). Ephimeroptera (30.62%), Gastropoda (13.65%) and Trichoptera (10.59%) dominated over the other groups. The population of Macro-Invertebrates found maximum in the month of February, whereas the minimum values were recorded in September.

Key Words: Macro-Invertebrates, River Ganga

Introduction

The population density of any ecosystem, not remains static, while changes with time. The Macro-invertebrates are one of the important parts of the aquatic ecosystem. These Macro-invertebrates provides food to the aquatic ecosystem. These Macro-invertebrates provide food to the aquatic fauna and also acts as an indicator of natural water quality. The Macro-invertebrates change their population density with the change in physico-chemical characteristics of water. Therefore, macro-invertebrates are the important constituents of aquatic food web. The study on the macro-invertebrates of the Ganga River at Rishikesh has not received proper attention. However, some workers studied the macro-invertebrates of Ganga River and its tributaries at different places (Khanna 1993 and Joshi et al. 1996). The present paper describes fluctuation in the population density of macro-invertebrates in the river Ganga at Pashulok barrage, Rishikesh.

Materials and Methods

The study was conducted between September 1998 and February 1999 on the river Ganga at Rishikesh (U. A.). The sampling station was selected at the right bank of the Ganga River which is 500 meter down stream Pashulok Barrage.

The macro-invertebrates were collected each month between 7 am to 11 am. All the macro-invertebrates were collected using $1m^2$ quadrate having a fine net. Analysis was done following the standard methods of APHA 1976 and Needham and Needham 1972.

Results

The data is showing monthly fluctuation of different macro-invertebrate groups in their population density is tabulated in Table 1.Total eight groups of macro-invertebrates were counted. The macro-invertebrates population mainly constituted of the Diptera, Ephimeroptera, Gastropoda and Trichoptera, whereas Plecoptera, Odonata, Hemiptera and Coleoptera were found less in density. The population of macro-invertebrates was dominated by the Diptera (total average 67.50 uits/m^2 $\pm$ 56.49) and Ephimeroptera (67.67 units/m^2 $\pm$ 3 7.36) followed by Gastropoda, (27.5 units/m^2 $\pm$ 21.44), Trichoptera (21.33 units/m^2 $\pm$ 18.57), Plecoptera (7.11 units/m^2 $\pm$ 5.35). Coleoptera (5.33 units/m^2 $\pm$ 4.50). Hemiptera (3.60 units/m^2 $\pm$ 1.67) and Odonata (3.40 units/m^2 $\pm$ 2.51). The macro-invertebrates showed their highest average value in the month of February (45.38 units/ m^2 $\pm$ 51.76), and lowest average value in September (3.17 units/m^2 $\pm$ 4.92). The total percentage of different macro-invertebrate groups was recorded as Ephimeroptera 30.62 %, Trichoptera 10.59 %, Diptera 33.52 %, Gasropoda 13.65 %, Hemiptera 1.769 %, Odonata 1.68 %, Plecoptera 5.46 % and Coleoptera 2.65 %) Table 1.

Table 1. Macro-invertebrate population in the river Ganga between September 1998 and February 1999 at Pashulok barrage, Rishikesh

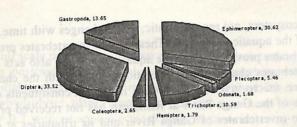| Months	Parameters								
	Ephimeroptera	Plecoptera	Odonata	Trichoptera	Hemiptera	Coleoptera	Diptera	Gastropoda	Average
September, 1998	12	-	1	1	-	1	1	3	3.17 ± 4.92
October, 1998	26	-	2	4	2	1	14	11	8.57 ± 9.97
November, 1998	55	5	2	12	4	2	55	19	19.25 ± 24.63
December, 1998	90	8	3	30	4	9	70	40	35.86 ± 36.44
January, 1999	80	16	7	48	2	11	138	30	41.50 ± 50.25
February, 1999	107	15	5	33	6	8	127	62	45.38 ± 51.76
Average	61.67 ± 33.58	11.0 ± 5.69	3.4 ± 2.71	21.33 ± 19.75	3.60 ± 1.15	5.33 ± 4.82	67.5 ± 54.1	27.5 ± 14.74	27.90 ± 19.96

Fig. 1 : Percentage of macro-invertebrates in River Ganga at Pashulok Barrage, Rishikesh

Discussion

The minimum population density of macro-invertebrates was found in the month of September and the maximum population density was observed in the month of February. The macro-invertebrates showed fluctuation in their population density because as it is directly influenced by the biotic and abiotic factors. Pratt. et al. 1981, Singh 1997 and Vig 1998 also showed the same Phenomena. In Rishikesh the rainy season was between late June and September. During these months there was a large amount of water with high velocity, which wash away the eggs and larval of macro-invertebrates. Richardson 1921 andKhanna 1993 has reported this activity in their work and shown that scarcity of food as another factor causing retardation in their population density during rainy season.

Due to high velocity of water, the plankton and other food material washed away. The temperature and total solids were found high in rainy season which retards the growth of biotic community of water. In this study macro-invertebrate population showed a continuous increase from September onwards, which was due to availability of food to them. There was a good planktonic population due to active photosynthesis during winter months. Thus, the macro-invertebrates are positively related to plankton population. Therefore, it may be concluded from the above study that the population density of macro-invertebrates fluctuates due to the influence of several biotic and abiotic components.

Acknowledgement

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