

EFFECT OF WATER QUALITY OF RIVER GOMTI (DISTT. SULTANPUR) ON MORPHOLOGICAL CHANGES IN *Macrobrachium malcolmsonii*

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ABSTRACT

The physico-chemical characteristic of the natural Gomti river draining the Sultanpur (U.P) are studied vis-s-vis to the urban effluents. An ionic dominance pattern of $Ca^{++} < Mg^{++} < Na^{+} < K^{++} : HCO_3 < SO_3^-$ in river water and $Ca^{++} < Na^{++} < Mg^{++} < K^{+} : HCO_3 < Cl < SO_4^-$ effluent water was recorded. The level of alkalinity, hardness, BOD, COD, DOM and water Quality index also depicted a response similar to the ionic spectra. Seasonal variation in various factors are illustrated in relation to percental water quality index. The present study is based on the physico-chemical parameters of the river Gomti at Sultanpur district because the fluctuation of water fluctuates the morphology as well as their development. Thus, these parameters affected the water bodies, specially, the fresh water Prawn *Macrobrachium malcolmsonii* other changes caused by water fluctuation.

KEYWORDS : Water quality, Gomti, Prawn, Sultanpur

The fresh water prawn is an important living aquatic resource and has become a good of protein diet as well as way of earning money through export. Besides fulfilling the domestic demand and fetching high price as compared to the fishes, the export potential of prawn is six time more than the price of other fish. Therefore, the prawn culture has grown as well developed industry and has become a good source of income. The production of the organisms directly depend on the productivity of ecosystem the Productivity of the aquatic ecosystem is largely regulated by the quality of water nutrient status and environmental factors (APHA, 2005) and Kanaujia and Mohanty (2001). The studies on the production efficiencies of aquatic ecosystem have been found to be of almost importance and helpful in the ecosystem for growth, production and taxonomic changes.

The physico-chemical characteristic of the natural Gomti river draining the Sultanpur (U.P) are studied vis-s-vis to the urban effluents. An ionic dominance pattern of $Ca^{++} < Mg^{++} < Na^{+} < K^{++} : HCO_3 < SO_3^-$ in river water and $Ca^{++} < Na^{++} < Mg^{++} < K^{+} : HCO_3 < Cl < SO_4^-$ in effluent water was recorded by many other investigators (Bilgrami, 1991).

The present study is based on the physico-chemical parameters of the river Gomti at Sultanpur district because the fluctuation of water fluctuates the morphology as well as their development etc. These are some parameters such as temperature, transparency, pH, BOD, COD and CI.

MATERIALS AND METHODS

Fresh water prawn sample were collected to study the important water quality parameters from the river Gomti at Sultanpur. The sample were collected and preserved immediately by adding 0.5 ml chloroform and transported carefully to the laboratory for chemical analysis. The samples were analysed for major physico-chemical parameters by the methods (APHA, 1985). The temperature of water was recorded by thermometer graduated from 0° to 50°C. Transparency of river water was measured by means of Secchi disc and result were computed as follows.

$$\text{Transparency} = A+B/2$$

The pH of water sample was recorded by pH meter, Dissolved oxygen was fixed soon after collection by adding 2 ml each of $MnSO_4$ and KOH solution, then dissolved by adding conc. H_2SO_4 and then transported to the Laboratory for analysis. Thereafter, the sample was titrated against N/40 thiosulphate in the presence of starch as an indicator. Calculation was done using the following formula :

$$DO = \text{ml titrate} \times N \times 200/V$$

Where, N= Normality, V= Volume.

BOD is the amount of oxygen required by the micro-organisms to stabilize decomposable organic matters in water under aerobic condition. BOD is a measure of the presence of organic materials.

COD is defined as total amount of Oxidizable material present in water sample that can oxidized by strong chemical oxidant is known as the chemical oxygen demand.

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The CI conc. was analyzed by titrating the sample with silver nitrate using potassium chromate as an indicator and the values were computed as per following formula :

$$\text{CI mg (l)} = \frac{(\text{ml} \times \text{N}) \text{ of AgNO}_3 \times 100 \times 355}{\text{Volume of Sample}}$$

RESULTS AND DISCUSSION

Various hydrological features of flowing water ecosystem are directly or indirectly influenced by the biotic and abiotic factors present within the system which are closely inter-related with each other, Growth, Multiplication and survival of resident aquatic organism are greatly influenced by the change in ecological parameters. In present study, monthly fluctuations in various water parameters during the year 2012-13 at river Gomti Sultanpur have been discussed.

The detailed monthly water temp variations recorded during 2012-13 in table 1 and 2. The maximum temperature recorded at 20°C in the month January while the maximum temperature of water was in a range of 31.5°C was recorded in the month of May.

The yearly mean temperature was 28°C. A marked fluctuation was observed in Surface water temperature during 2012-13.

The sites of River Gomti Sultanpur to be studied received adequate sunlight and transparency dropped from 28.2 to 32.03 cm except in June to July] however in rest of the months, it was in a normal range.

The pH of water ranged between 7.4-8.6 while in May it was 8.55 in July 7.4.

The BOD values recorded the site in the month of January (23±0.045mg) while maximum BOD values are recorded at site in the month of July (122±0.035/l)

Same results were observed by Craw (2002) and Shukla (1993). The values are effected by conc. of wastes.

COD values were recorded at site in month of June (26.4 + 85.4 mg/l). The minimum values observed in the month of January. It is also fluctuated by presence of sewage discharge at site. Similar observations have been done by Shukla and Tripathi (1989).

The details of chloride value ranged between 26.4 - 85.4 CI plays an important aspect for the water bodies. The maximum to minimum values of CI are in December

Table 1 : Physico-Chemical Parameters of Water Sample (2012-2013)

Parameters	Jan.	Feb.	Mar.	Apr.	May	June
Temperature	*20±0.09	22±0.08	23±0.01	26±0.02	31.5±0.01	30±0.02
Transparency	65.2±0.02	64.3±0.06	60±0.02	58.9±0.01	55.6±0.04	28.2±0.06
pH	7.67±0.027	7.6±0.027	7.5±0.01	7.7±0.02	8.55±0.01	7.9±0.01
BOD	*20±0.045	50±0.02	6.5±0.02	67±0.02	70±0.03	122±0.04
COD	*140±0.035	142±0.021	190±0.020	198±0.031	215±0.050	246±0.020
Cr	71.3±0.02	68.2±0.061	68.2±0.061	44±0.01	50.3±0.02	26.4±0.06

Table 2 : Physico-Chemical Parameters of Water Sample (2012-2013)

Parameters	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature	28±0.01	25±0.01	24±0.02	26±0.03	23±0.02	21±0.02
Transparency	32.3±0.05	34.2±0.02	35.3±0.07	37.4±0.06	39.6±0.04	50±0.07
pH	*7.4±0.02	7.5±0.02	7.6±0.02	7.7±0.015	7.7±0.015	7.8±0.01
BOD	112±0.04	150±0.06	95±0.03	85±0.02	80±0.01	75±0.02
COD	240±0.010	230±0.310	198±0.322	197±0.211	192±0.11	172±0.212
Cr	*26.4±0.06	31.4±0.021	33.4±0.031	41.2±0.01	79.5±0.06	85.4±0.07

and July respectively. The maximum values may be due to large amount of sewage disposal at the site. Many investigators investigated the CI i.e Shukla and Tripathi (1989) and Bilgrami (1991).

Thus, above Parameters affected the water bodies, specially, the fresh water Prawn *Macrobrachium malcolmsonii* (Qurashi 1990) Its morphology, larval development, breeding, and other changes caused by water fluctuation.

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