

Regular Article

The Analysis of Length-weight Relationship of *Channa punctatus* with Relative Physico-chemical Parameters

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Abstract

The present observations stated that the growth of *Channa* affected due to the pollution of water. In the clear water the growth was good i.e. 1.89% in comparison to polluted water i.e. 1.05%. The DO was also decline in polluted water i.e from 8.14 to 2.34 mg/l.

Key words: *Channa*, length, weight, water quality

Introduction

Growth has been one of the most intensively studied aspects of fish biology as it indicates the health of the individual and the population. Temperature is one of the most important environmental factor and along with other factors, influences growth rate. Fishes are cold blooded animals i.e. their body temperature depends upon the temperature of the water in which they live. Each fish species has a temperature range with in which it grows quickly called optimum temperature. Dissolved oxygen level depends on temperature, and by itself is also an important factor affecting growth rate of fishes. The fish is deprived of extra aerobic energy required for growth and reproduction, if DO falls below a certain level. The upper limit of temperature tolerance of air breathing fishes like *Anabas*, *Channa*, *Heteropneustus*, *Clarias* etc. lies between 39°C-41°C.

Study area

River Ramganga flow in Bareilly is located on latitude between 28° 2' N to 28° 5' N and longitude between 79° 0' E to 79° 48' E above the sea level.

Materials and Methods

Water samples were collected at regular seasonal intervals for a period of one year. The following physical and chemical parameters were measured. Colour, pH, turbidity, temperature, DO were determined by using standard procedures (APHA, 1995). Fresh samples of fishes were obtained from fish market. These fishes were acclimated in the laboratory conditions for one month. The Growth Index (K-Factor) of fishes was calculated according to (Carlander, 1969).

Results and Discussion

Physico-chemical parameters

The colour of clear water was colorless but a blackish colour was found of polluted water. The temperature of clear water was 27.3°C±0.135 and in polluted water it increases up to 31.5°C±0.173. The observations of turbidity 17.87±0.023 to 38.24±0.023 NTU in clear and polluted river water respectively. The pH values of clear water was 7.28±0.013 and it was found 8.77±0.017 in polluted water, The values of Dissolved Oxygen 8.14±0.046 mg/l in clear water and it was found 2.34±0.013 in polluted water.

Growth parameters

The mean value of growth factor (K-factor) in group A1 (clear water) was 1.89% and 1.05% in group A2 (clear water). The K-factor was recorded 1.43% in group B1 (polluted water) and 0.76% in group B2 (polluted water). The average K factor of group A (clear water) was 1.47% and 1.09% in group B (polluted water). The maximum growth factor (1.89%) was recorded in group A1 of clear water and minimum (0.76%) was recorded in group B2 of polluted water.

Hydrobiological parameters like pH, temperature, Total Dissolved Solids, Dissolved Oxygen, turbidity and excess of salinity act as limiting factors for aquatic organisms like fishes. Studies on the hydro-biological parameters of river water play an important role in determining the biological activities of the aquatic fauna present therein. Colour is one of the easily observed and prime indicators of water pollution but unfortunately, quantitative standards are still not available. Effluent water colour of the textile and dye houses, paper mills, tanneries, slaughter houses and other industries are also pollution indicators. Temperature is basically an important factor for its effects on chemical and biological reactions in water. A rise in water temperature accelerates chemical reactions, reduces solubility of gases, amplifies taste and odour and elevates metabolic activity of organisms. The present analysis indicates that the water temperature is affected by effluents. Kapoor (1993) observed that the water temperature varied from 16°C to 32°C in different rivers, Deorania, Nakatia and Ramganga.

Turbidity is actually the expression of optical property (Tyndall effect) in which the light is scattered by the suspended particles present in water. Turbidity values recorded a pre monsoon > monsoon > post monsoon trend at all the experimental sites. Which is in agreement to the findings of Agarwal *et al.* (1976). Hydrogen ion concentration (pH or Potentia hydrogenii) is a scale of intensity of acidity or alkalinity and measures the concentration of hydrogen ions in water. During the entire study period, the water of river Ramganga was found alkaline, significant changes in pH occur due to the disposal of industrial wastes and sewage. It correlates with the findings of Weltzl (1972). DO in natural water is an indicator of ecosystem's health and, thus, plays a very important role in those waters. The impacts of low DO concentration include fish mortality and aesthetic nuisance. The present data show changes in the chemical characteristics of the water making it unfit for the normal growth of the fishes. In the present study, the higher DO recorded during post monsoon may be due to the impact of rain water resulting in aeration. This is in agreement with the results of Koshy and Nayer (1999) and Chandra *et al.* (2009).

Temperature is directly correlated to toxicity and thus a rise in temperature effects the fish growth directly as well as indirectly by affecting the planktonic organisms. Pandey and Shukla (1982) observed declining growth rate of certain tropical freshwater fish's viz. *Collisa fasciatus* and *Channa punctatus* fingerlings under pollutional stress of arsenic, zinc and malathion. The cause was attributed to the impaired nucleic acids and protein metabolism in the fingerlings of the above mentioned fishes by the pollutants.

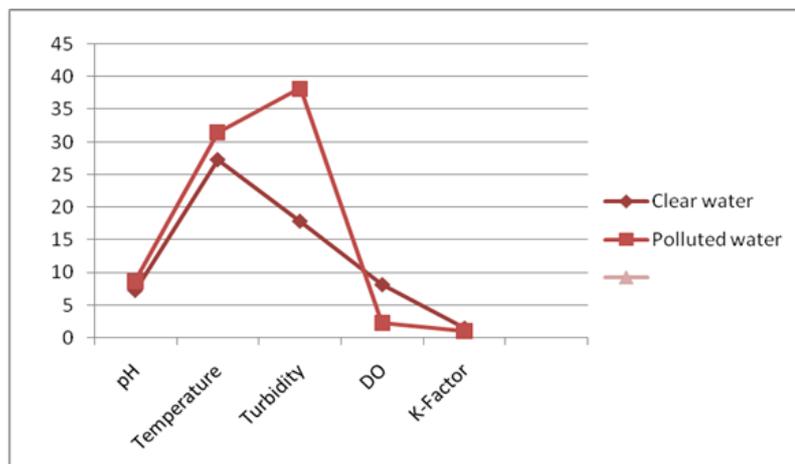
The changed values in hydrobiological parameters can adversely affect the growth of the fish, as, concurrent with these changes; the normal growth pattern was also simultaneously affected. The present study further highlights the necessity of monitoring hydrobiological parameters in order to safeguard the interest of the water-dwelling biota.

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Table 1: length-weight relationship of *Channa punctatus* with relative physico-chemical parameters

Parametrrs	Colour	Odour	pH	Temperature	Turbidity	DO	K-factor
Sites							
Clear water	Colorless	Odorless	7.28±0.013	27.3°C±0.135	17.87±0.023	8.14±0.046	1.47%
Polluted water	Blackish	Foul smell	8.77±0.017	31.5°C±0.173	38.24±0.023	2.34±0.013	1.09%

Fig:1-Correlation between physico-chemical parameters and growth factor of *Channa punctatus*



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