



Water Quality of Kongba River

KEYWORDS

Physico-Chemical Parameters, Kongba river, fish aquatic insects

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ABSTRACT

Some physico-chemical parameters of Kongba river water have been studied in Rainy, winter and summer season of 2014. It was found that, there is a marked variation in the physico-chemical parameters of sample in different seasons. A total of eleven species of fish and seven groups of aquatic insects and one class of annelids were recorded from the river

Introduction:

Kongba river of Manipur is one of the major feeder of Imphal river located in between Latitude 23.80°N to 25.68°N and longitude 93.03°E to 94.78°E (Fig. 1) having a catchment area of about 250km². It arises from Kongba Maru at the end of Koubru range and Joined to Imphal River at Kyamgei. Even though, the river is small in size and length which is considered as one of the most important river in Imphal East for the traditional community of Meities, the major inhabitant of Manipur. The river is subjected to various anthropogenic activities for domestic purpose in bathing including animals, washing clothes and utensils, dumping of household garbage, fishing that may deteriorate water quality. Data on physico-chemical parameter of the river is very scanty. Thus, the present study was established.

Materials and Methods:

The present study on the Kongba river stretching of 20.0km. was selected and five sampling stations (1) Khundrakpam (2) Kongpal (3) Kongba Bazar (4) Uche-kon (5) Kiyamgei etc. were established monthly sampling at interval of every month were done from June to November 2014 in PVC and BOD bottles and the samples were brought to the laboratory in chilled condition. The Physico-chemical characteristics of water were estimated by standard procedures APHA, (1985) Fishes were analysed after Shrestha (1981), Berg (1974), Vishwanath (2000) while aquatic insects were analysed after Ward and Wipple (1984).

Results and Discussion:

Temperature of water varied from 10-29°C (Table-1) and transparency varied from 8-29cm. Water was always found in hazy colour except Khundrakpam (Sampling site 1) during investigation periods. P^H was always acidic near to neutral. Dissolved oxygen ranged from 5.2-10.3mg/l and BOD was found 1.4 to 3.5gm/l during investigation period. Total alkalinity ranged from 25 to 90gm/l. Increase in alkalinity was recorded during winter. Analogous variation in alkalinity was reported by Goel *et al* (1985). The total acidity ranged from 5-22.5mg/l. CO₂ content in water varied from 4.4-19.8 mg/l. Increasing free CO₂ may result in the increasing of alkalinity, Singhal *et al* (1986). Similarly,

chloride content ranged from 2.9-14.2 mg/l. According to WHO maximum permissible limit for chloride is 500mg/l. The value observed in present study is well below this permissible limit. The hardness concentration fluctuated between 14-83mg/l. Calcium hardness value observed in present study was higher during summer than winter. This phenomenon was supported by Rajmani, (2009) (Ph.D. Thesis). According to (Ohle we, 1956) the water above calcium values 25mg/l are classified as calcium rich. Thus, as per recommendation of Ohle we, most of the water sample of the present study are well below this classified. Most of the water sample in rainy season was moderately soft while water in winter and summer were found to be moderately hard. Generally 20mg/l hardness concentration of Ca⁺⁺ is considered efficient for fish culture according to Lind (1974). Nitrate and nitrite content in water varied from 0.01-0.10 mg/l and 0.01-0.39mg/l respectively. The result is supported by Zafar (1964)

Aquatic life depends on physico-chemical parameters of water. The fish and other aquatic fauna in the Kongba river were found to be distributed but influenced by combination of several physical, chemical and biological factors. The river bed with muddy soil and sandy substrate and growing vegetation showed a good diversity of aquatic fauna comprising eleven species of fish and seven groups of aquatic insects and one class of annelids were collected. Muddy soil substrate in the river showed a dominance of *puntius* spp. which are indicators of organic pollution. *Garra* spp. are dominating benthos were the members of Tubificidae. *Ephemeropterans*, *Coleopterans* and *Chironomus* spp. are the indicators of organic pollution. Death fishes were also observed during rainy season, may be the lack of oxygen since high inflow of domestic sewage rich in organic waste in water bodies fish kill by poison is common in Kongpal area. Conservation strategies must be adopted by checking the entry of waste into these economically, traditionally important water bodies.

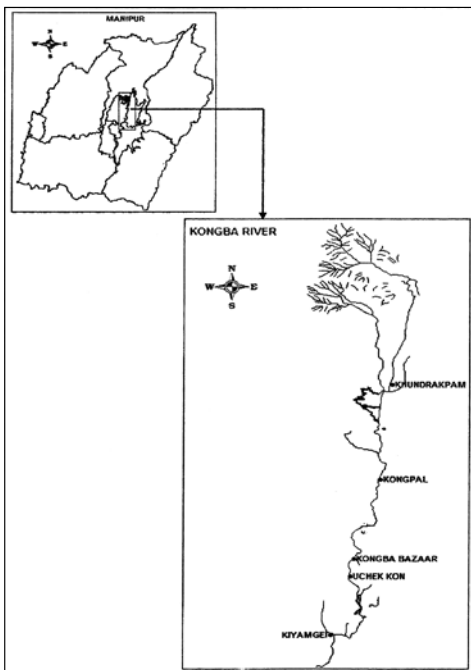


Fig. 1: Map of Kongba River

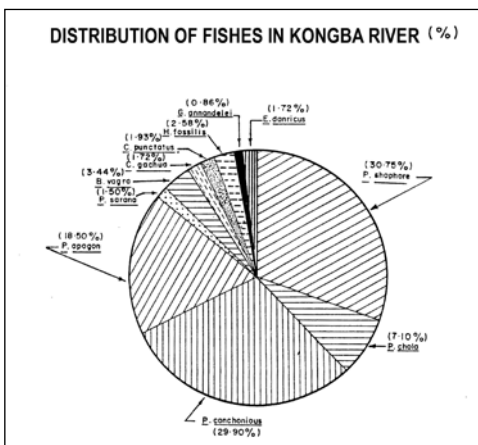


Fig. 2: Distribution of Fish (%).

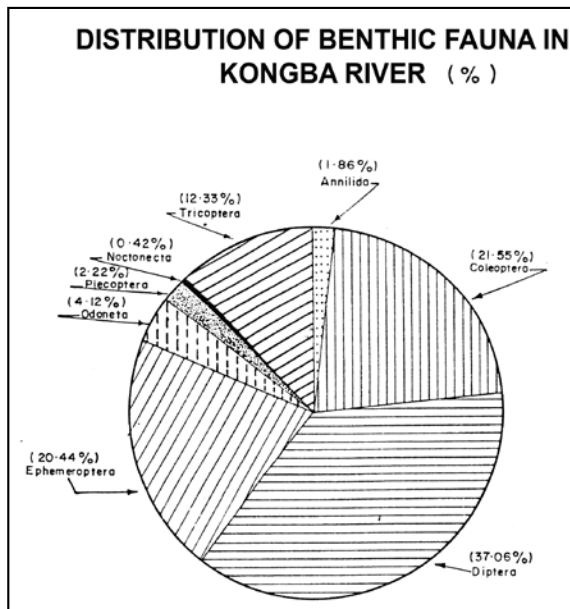


Fig. 3: Distribution of Benthic Fauna (%)

On the basis of macro invertebrate and their biotic index the study sites can be categorized into two types viz, unpolluted and polluted. The biological analysis showed a community with a high number of groups. This situation is demonstrated by the high scores of *Chironomus*. The pollution study is based on the presence of a big proportion of *Ephemeropterans* and *Coleopterans* at upstream region (Khundrakpam and Pangei area) while presence of *Dipterans* at downstream region. (Kongpal and Ucheckon, area) Snake headed fish was also found.

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Table – I Average Physico-Chemical Parameters of water in (gm/l) at the Kongba River from June to November, 2014

Parameters	June	July	August	September	October	November
Temperature (°C)	26.1±2.1	21.8±1.1	25±1.2	26.8±2.1	16.2±1.1	12.6±1.4
Transparency (cm)	19.3±1.5	21.1±5.7	25.5±6.1	15.8±3.9	-	-
pH	6.8±0.2	6.1±0.6	7.4±0.1	7.2±0	5.9±0.04	7.7±0.2
DO	6.8±1.2	6.1±0.8	6.8±0.7	6.0±0.3	8.2±0.8	9.1±0.7
BOD	2.1±1.1	2.1±1.0	2.0±0.8	1.4±0.5	3.5±1.6	3.4±2.5
T/A	42.6±21.6	40.6±16.2	67.4±12.3	58±22.4	45±17.0	58±14.3
Acidity	13±1	8.5±1.2	8±2.5	9.4±1	16±3.9	16±4.6
CO ₂	11.4±0.8	7.4±1.0	7.0±2.5	8.3±0.8	14.0±3.2	14.0±4.0
Chloride	4.3±1.1	4.6±1.5	11.5±0.9	11.3±0.8	9.0±1.4	12.7±1.2
T/H	25.8±2.3	26.6±2.1	28.0±18.3	32.0±18.2	33±28.1	28±15.5
Ca ⁺⁺	6.5±0.8	9.6±1.4	8.8±5.1	7.3±4.3	11.4±7.4	7.8±32
Nitrite	0.07±0.02	0.06±0.02	0.05±0.02	0.01±0.16	0.01±0.13	0.01±0.15
Nitrate	0.10±0.01	0.08±0.02	0.04±0.03	0.08±0.04	0.07±0.08	0.12±0.15

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