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ORIGINAL ARTICLE

Morpho-Physiological Changes in Major Carps in River Asan, Murena

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ABSTRACT

Industrialization, urbanization, population explosion and green revolution have deteriorated the various sources of water. The industrial effluents, sewage and polluted water from other sources when discharged into any stream or river not only cause pollution but drastically disturb the fauna & flora. The same is true to Asanriver flowing in Madhya Pradesh. It therefore becomes must to assess water quality of Asan at down stream site 'D' and Up stream site 'A' throughout its entire length in Murena district. It was since the beginning of 1970's that the environmental pollution became a serious problem in India. Because of rapid increase of population and concentration of factories around the costal region of Asan. Significant alteration in morpho-physiological parameters were observed in fishes.

Key words: *Morpho-physiochemical Changes, Major Carps, Rivep Asam*

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INTRODUCTION

Water for suitable life is prime important life, without water biotic activities are not possible on this planet. In nature water occurs on the land, below its surface in atmosphere and in the biomass. Almost all sources of fresh water including rivers and ponds are polluted due to urbanization and industrialization in the present time.Green revolution by using pesticides; domestic sewage and industrial effluent have contributed a lot of water and soil pollution. The industrial effluents, sewage and other pollutants when discharge in to any stream or river, not only cause pollution but disturb the whole biological system of lentic and lotic habitat and also cause pathogenic infection due to contamination of aquatic habitat. Villagers of the coastal region of rivers and streams generally bathe their cattle due to which the oxygen supply in the water is reduced and algae increases because faecal matter (dung) and excreta mix with water which diminishes the fish stock of water.

Due to traditions of some tribols the waste of worship and dead bodies generally throw in rivers which causes harm to pollute our life. Asanriver is boon for M.P. because its water is used for agriculture and for drinking purpose.In the present investigation the morpho-physiological changes in fishes of Asanriver has been observed to be of substandard quality because various untreated industrial effluents from Urban coastal region merge inside the river and affect fishes. Further municipal sewage mingles in the river without any treatment and deteriorates Asan water. Therefore, it has become necessary to assess the water quality of Asanriver and its impact of aquatic fauna.In the present investigation the morphological and physiological changes of *Labeorohita* and *Catlacatla* have been studied. The water quality of Asan water at up-stream site (site where there is negligible

population) and down stream site (site where community of different population survive have been selected).

MATERIALS AND METHODS

Water sampling sites are from river Asan at Murena. After each 3 months sample were collected at the each sampling stations at different times for the analysis of different parameters. Samples were collected in the middle of streams and at mid-depth in the direction of flow.

The study will be deal under the following head-

1. Murena will be marked out of the inlets of the pollutants.

2. Monitoring and analysis of the river water at following sampling stations:

a) ChandaGaon

b) JaroniGaon

c) KaruaGaon

d) GirgoniGaon

STUDY OF MORPHO-PHYIOLOGICAL PARAMETERS

1. Collection of fishes from river Asan at Murena and their acclimatization in laboratory condition.
2. Study of the Morphological changes of control and high temperature, pH and low. D.O. treated fishes.
3. Effect of temperature, pH and D.O. on survival time of fishes.
4. Study of the physiological changes of control and temperature pH and D. O. treated fishes, as well as tolerant limit.
5. Determination of haematocrit.

RESULTS AND DISCUSSION

Effect of Temperature, pH and Dissolved Oxygen on Growth and Development:

In central group, after 20 days the length and weight increased by 0.03% and 0.04% respectively. In high temperature treated fishes length and the weight were decreased by 1.9% and 3.02% in 35^{0}C after 20 days.In control group, after 20 days the length and weight were increased by 0.9% and 0.29% respectively. In high pH treated fishes the length and weight were decreased by 3.0% and 4.0% in 10.opH.Development and growth were observed by means of length and weight. In control group after 20 days the length and weight were increased by 0.10% and 0.12% respectively. In low dissolved oxygen treated fishes length and weight were decreased by 7.0% and 9.5% in 3.0 to 4.0 ppm.

Changes in Operculum-Movement with Temperature, pH and Dissolved Oxygen:

When the temperature is increased then the rate of operculum movement becomes decreased. The fishes were found to survive for more than 25 days in this solution. The breathing rate was normal in control group. The rate of operculum movement reduced to 62 per minute when temperature 35^{0}C after 10 days as against 83 per minute in control experiments.It is seen that the rate of operculum movement decreased as the pH increased. The fishes were found to survive for more than 25 days in these solutions. The breathing rate was normal in control group fishes.The rate of operculum movement was reduced to 60 per minute when pH was 10.0 after 10 days as against 76 per minute in control experiments.It is seen that the rate of operculum movement decreases as the dissolved oxygen decreases fishes were found to survive for more than 35 days in these solution. The breathing rate was normal in control group. The rate of operculum movement was reduced in 55 per minute when concentration of dissolved oxygen was 3.0 to 4.0 ppm as against 70 per minute in control experiments after 10 days.

TOLERANT LIMIT

Effect of temperature on survival period for *Labeorohita:*
All the fishes were alive up to 38^{0}C*Labeorohita* after 38^{0}C they started dying at different time intervals. In 45^{0}C all fishes died in 3-6 hours.

Effect of temperature on survival period for *Catlacatla:*
In case of *Catlacatla* all the fishes were alive up to 35^{0}C. After 35^{0}C they started dying at different time intervals. In 45^{0}C all fishes died in 3-6 hours.

Effect of pH on survival period for *Labeorohita*
All the fishes were alive up to 11.0 pH they started dying after different time intervals. In 13.0 pH all fishes died in 8-12 hours.

Effect of pH survival period for *Catlacatla*
All the fishes were alive up to 10.5 pH after 25 days in case of *Catlacatla*. After 10.5 pH they started dying after different time intervals. In 13.0 pH all fishes died in 8-12 hours.

Effect of dissolved oxygen on survival period for *Labeorohita*
All the fishes were alive up to 3.5 to 4.0 ppm after 25 days in case of *Labeorohita*. Below 3.0 ppm they started dying after different time intervals. In 1.5 ppm all fishes died in 4-8 hours.

Effect of dissolved oxygen on survival period for *Catlacatla*
All the fishes were alive up to 3.5 to 4.0 ppm in case of *Catlacatla*. Below 3.0 ppm they started dying after different time intervals. In 2.0 ppm all fishes died in 4-8 hours.

RESPIRATORY RATE

The respiratory rate is measured in form of opercular movement/min. of fishes at different four stations. It varies with sampling station and the month of sampling.

Table1: Average Respiratory Rate

Month	Average respiratory rate (movements of operculum/min) in *Labeorohita*			
	Site A	Site B	Site C	Site D
Oct-10	99	110	112	95
Jan-11	102	125	138	114
April-11	115	147	148	122
July-11	109	115	132	116
Month	**Average respiratory rate (movements of operculum/min) in *Catlacatla***			
	Site A	Site B	Site C	Site D
Oct-10	95	109	105	90
Jan-11	100	121	130	98
April-11	111	142	141	119
July-11	103	110	127	112

HAEMATOCRIT VALUE (PCV)

The haematocrit value is measured in form of percentage of fishes at different four stations. It varies with sampling station and the month of sampling. In high temperature treated fishes length and the weight were decreased by 1.9% and 3.02% in 35^{0}C.In high pH treated fishes the length and weight were decreased by 3.0% and 4.0% in 10.0 pH develpoment and growth were observed by means of length and weight. In low dissolved oxygen treated fishes length and weight were decreased by 7.0% and 9.5% in 3.0 to 4.0ppm. All the fishes were aliveupto38^{0}C. After 38^{0}C they started dying at different intervals. In 45^{0}C all fishes died in 3-6 hours. In case of major carps all the fishes were aliveupto 35^{0}C. After 35^{0}C they started dying at different time intervals. All the fishes were aliveupto11.0 pH. They started dying aftyre different time intervals. In 13.0 pH all fishes died in 8-12 hours.Major carps were aliveupto10.5pH. After 10.5pH they started

dying after different time intervals.All the fishes were aliveupto 3.5 to 4.0ppm after 25days. Below 3.0ppm they started dying after different time intervals. In 1.5ppm all fishes died in 4-8 hours.

Table 2: Average Haematocrti Value (Pcv)

Month	Average haematocrit value (%) in *Labeorohita*			
	Site A	Site B	Site C	Site D
Oct-10	20.5	19.4	21.0	17.2
Jan-11	19.2	18.5	24.2	18.7
April-11	21.3	22.3	24.9	19.6
July-11	22.4	20.0	18.4	20.8
Month	**Average haematocrit value (%) in *Catlacatla***			
	Site A	**Site B**	**Site C**	**Site D**
Oct-10	19.5	16.8	20.8	16.0
Jan-11	18.2	18.0	23.9	18.4
April-11	20.7	21.4	23.8	18.9
July-11	21.4	20.1	17.9	20.1

Site A= ChandaGaon, Site B= JaroniGaon, Site C= KaruaGaon, Site D= GirgoniGaon

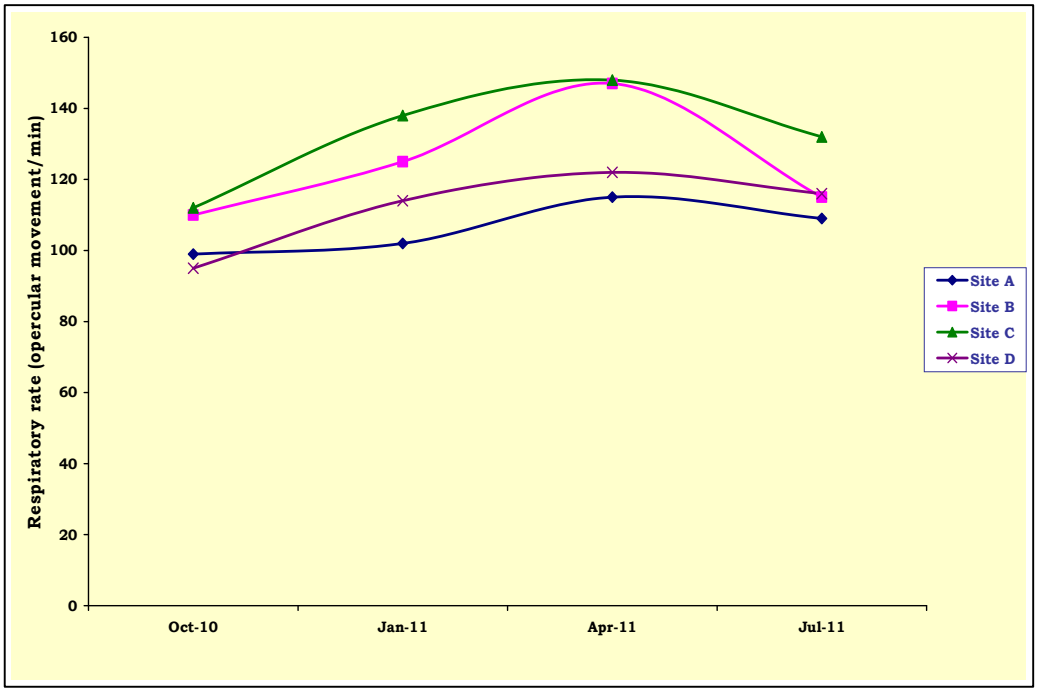

Fig. 1: Average respiratory rate of *Labeorohita* at the four different stations at three months interval

When the temperature is increased then the rate of operculum movement become decreased. The fishes were found to survive for more than 25days in these solution. The breathing rate was normal in control group. The rate of operculum reduced to 62 per minute when temperature increased.It is seen that the rate of operculum movement decreased as the pH increased. The fishes were found to survive for more than 25days in these solutions. The breathing rate was normal in control group fishes.The rate of operculum movement was reduced to 60 per minute when pH was 10.0.It is seen that the rate of operculum movement decreased as the dissolved oxygen decreases, fishes were found to survive for more than 35days in these solution. The breathing rate was normal in control group. The rate of operculum movement was reduced in 55 per minute when

concentration of dissolved oxygen was 3.0 to 4.0ppm as against 70 per minute in control experiments.

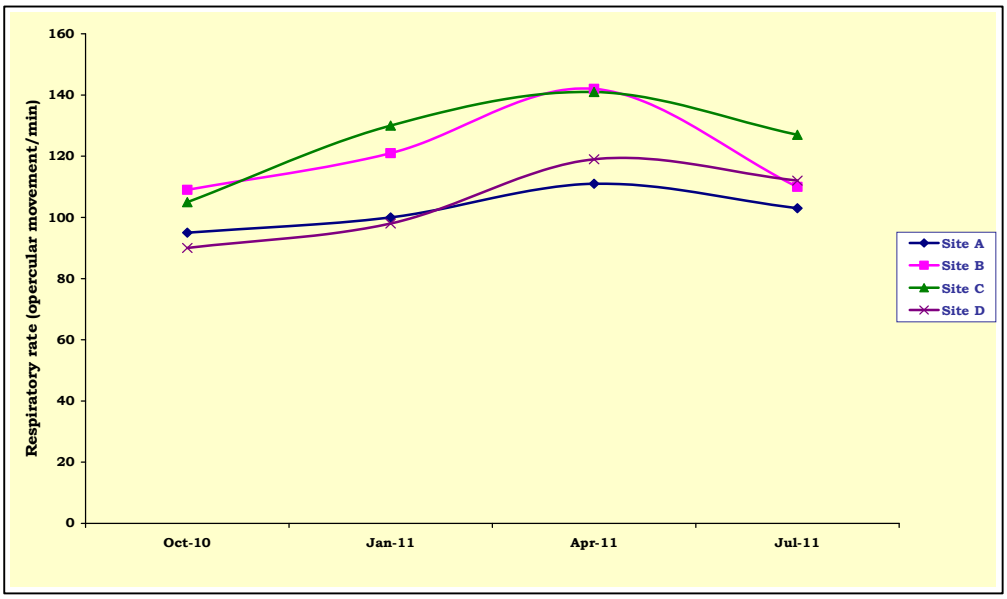

Fig. 2: Average respiratory rate of *Catlacatla* at the four different stations at three months interval

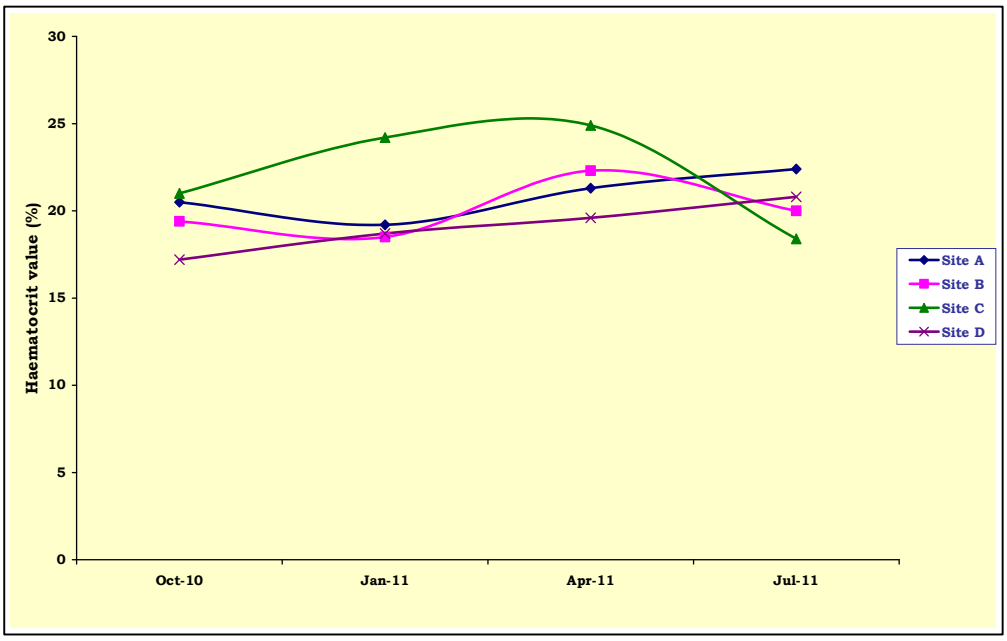

Fig. 3: Average haematocrit value of *Labeorohita* at the four different stations at three months interval

The haematocrit remains maximum in the month of July (2011) due to rainy season which indicate the low organic matter load in Asan River. But in Oct. (2010) to April (2011) the haematocrit decreased from up stream to down stream. It is due to increasing BOD and

COD but decreasing of DO from up stream to downstream site. The coliform as well as faecal coliform are also increasing from upstream to downstream site which also responsible for polluted water and cause of haematocrit loss in fishe

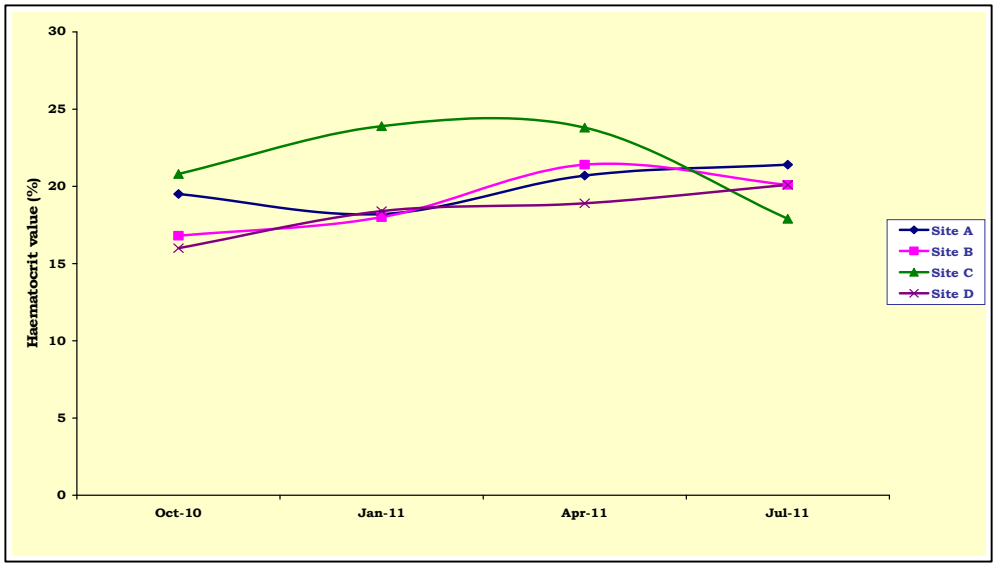

Fig. 4: Average haematocrit value of *Catlacatla* at the four different stations at three months interval

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