A STUDY OF THE NEURA OX-BOW LAKE AT SARAN WITH SPECIAL REFERENCE TO ITS FISH PRODUCTIVITY

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***Abstract:* - A Study of the Neura an ox-bow lake, fish productivity in Saran District (Bihar) was reported. Certain physico-chemical parameters such as dissolved oxygen, free CO_2, and alkalinity were studied to know the aquatic health of the oxbow lake.**

Keywords: Neura, Ox-Bow lake, Fish Productivity, Saran, Bihar.

I.ITRODUCTION

Development of fresh water aquaculture is one of the most important production oriented programmes of the country, being implemented by the state/union territory. Most of the aquaculture practices are practiced in ponds ox-bow lake in Bihar. Several aspects of management practices are being investigated of enhancing the fish productivity of pond which enclose broad stock management nutritional management, health of environmental management. Out of the above stated management environmental management is most essential in which hydrobiological factors are taken into consideration. This type of work would definitely add a lot of knowledge in fish production partially the edible and valuable IMC and Exotic carps from our fresh water inland fisheries resources particularly of Saran Division spl. Neura ox-bow lake. Organisms change the medium in which they live by their metabolic activity. Obvious examples of such changes are removal of dissolved organic substances (biological self-purification) and the decrease in flow rate of volume of water resulting from a biomass increase. The metabolic activities of the organisms, which are essential for water quality management, are primarily reactions of ecosystems. A given environmental factor e.g., light causes a specific response e.g., production of oxygen. It is impossible at present to identify all the constituents and individual reactions within an ecosystem, due to their large number and complexity.

Materials and Method

The aqua biotic condition, physio-chemical properties of'NEURA RESERVOIR (OX-BOW LAKE)' were studied forgetting the systemic position of Ichthyofauna and bio fauna including the planktons and bottom fauna. In the session, the extensive study includes the collection of bio-physical and bio-chemical examination of fishes, aquatic plants, planktons, water samples and soil samples in the laboratory and the results were recorded for further analysis.

Collection of sample and chemical analysis

The fishes, thus collected were first kept in 8% formalin for 48 hours. After that the fishes were transferred in 5% formalin and preserved for detailed study and identification in the laboratory. The identification and classification of the fishes were made with the help of Day's "Fish Fauna of British India" and "The Classification of the fishes, Present and Extinct" of Leo S. Berg respectively. The collection of the aquatic plants was made physically. All aquatic plants which were present in the water body were collected by the sitting on a boat. All the collected plants and weeds were kept in a plastic bucket. The bucket was half filled with water. By keeping the plants and weed in water filled bucket, they remain in normal condition. Thus, aquatic plants were collected and being brought in the laboratory for identification. Till the identification was completed the water of the bucket was changed at regular intervals.

Result and discussion

Physio chemical parameter of the lake

The studied physio chemical parameters include air and water temperature, pH of water, dissolved oxygen (DO), free CO_2 and alkalinity of water. During the study period, air temperature was recorded maximum in June and minimum in January. Similarly, water temperature was noted high in summer and low in winter. As water temperature is dependent on-air temperature, therefore, air and water temperature show similar fluctuation during the year. The Hydrogen ion concentration or pH of water did not show much fluctuation throughout the year. pH of water show that water of the studied lake is near neutral (6.9-7.1) to slightly alkaline (7.3). pH range between 6.5-7.5 is an indicative of productive water.
Dissolved oxygen (DO) is an important parameter as most of the aquatic organisms can breathe only that oxygen that is dissolved in water. DO was recorded maximum in February (5.98± 2.82mg/l) and minimum in December (2.63±1.58mg/l)

in the studied area. The value of DO was highly variable. After a high value in February, a sudden drop in DO value was observed in March. This may be due to profuse vegetation growth in the surface of the water body.

The free CO_2 was ranged between 1.75- 5.81mg/l. The lowest value was recorded in March and the highest value was recorded in February. From March onwards, Free CO_2 value increases. High aquatic vegetation may be the reason for such a high CO_2 value as most part of the water surface is covered with water hyacinth. The value of free CO_2 is also dependant on time and site of water. As sampling was done during morning hours, photosynthetic activities were reduced at that time and hence high value of free CO_2 is recorded. Near periphery also, free CO_2 is found to be more than centre.

Alkalinity is the capacity of water to neutralise acids and an ability to absorb hydroxyl ion without significant pH change (Koliyar and Rokade, 2008). The range of alkalinity 40-90 mg/l is considered as highly productive. The calculated alkalinity is ranged between 46-106 mg/l of the studied lake. Alkalinity is maximum in December and minimum in August. Similar observation about alkalinity was made by Saud *et al.* (2012).

Table 1: Monthly variation in the physio chemical parameter of the oxbow lake

Month	Air Temp ^0C	Water Temp ^0C	pH	DO (mg/l)	Free CO_2 (mg/l)	Alkalinity (mg/l)
January	21.35±1.63	17.7±0.42	7.3±0.23	4.42±1.06	4.78±1.32	100±12.91
February	23.9±1.56	20.75±2.47	7.32±0.12	5.98±1.82	5.81±1.53	89.5±7.98
March	29.75±1.06	23.75±1.06	7.14±0.35	2.91±0.14	1.75±0.39	69.5±7.62
April	30.65±0.49	25.9±1.55	7.16±0.42	3.64±1.62	2.31±1.27	71.5±17.3
May	32.5±2.12	30±1.41	7.1±0.23	5.22±3.76	2.02±1.31	77±12.95
June	33.1±1.56	30.5±0.71	6.9±0.34	4.48±1.74	2.95±1.39	62±2.82
July	31±1.41	30.25±1.77	7.13±0.67	5.33±3.72	3.02±1.53	46±6.99
August	32.5±0.71	31.15±0.21	7.2±0.78	5.47±2.63	3.85±1.44	58±8.56
September	29.5±0.71	28.75±0.35	6.9±0.41	4.52±2.21	5.17±2.28	52±9.78
October	26.25±0.35	24.5±0.71	7.15±0.56	3.42±1.73	5.27±2.26	64±5.16
November	25.35±0.92	24.4±0.57	7.23±0.63	2.93±1.49	4.80±1.04	85±6.67
December	23.5±0.70	22.75±2.47	7.26±0.26	2.63±1.58	5.63±0.95	106.5±14.35

Neura diversity

During the study, a large number of fish species belonging to different families were identified. List of fishes with common names, conservation status based on the report of Conservation Assessment and Management Plan (CAMP) for freshwater fishes of India by Molur and Walker and IUCN Red List of Threatened Species are given in Table 1. Of these, Cyprinidae family with 14 fish species dominating the lake followed by Channidae family with 5 species. Bagridae, Belontiidae, Chandidae and Siluridae family are represented by 3 species each. Notopteridae and Mastacembelidae family are reported from the lake each with 2 species.

Among the reported fishes, *Labeo rohita* is a very common fish for the fishermen. They are usually caught by hook and line and it is a popular fishing gear for the villagers. Other commonly found fishes are *Amblypharyngodon mola* and *Notopterus notopterus.* They are abundant species. Fourteen species are commonly found and twenty-one are occasionally found from the lake. *Mastacembelus armatus, M. pancalus* and *Nandus nandus* are generally not common for the fishermen. Villagers also use cast net, gill net, bamboo made traps etc. for fishing. Fishing is continuous throughout the year. However, peak fishing season is winter (Dec-Feb). Local villagers employed *Phasi jal* in night and in early morning they collect their catch from the net. Different nets are used to catch different sized fishes.

During monsoon, fishes like *Wallago attu, Channa sp, Puntius sp* breed in the beel. But carps like *Catla catla, Labeo rohita, Labeo gonius* etc. breed in running water of main river Gandak. They migrate from the lake to river through the connecting channel.

Forty fishes recorded in the studied beel indicate rich diversity of fishes in the lake. According to IUCN status, major fishes of this lake are of least concern (LC) category. Four species are nearly threatened (NT) and categories of five species are not evaluated (NE). According to CAMP status, a major part of the fishes is lower risk near threatened (LRlc) type. Six species are vulnerable and three are endangered species.

Table 2: Checklist of fishes found in the oxbow lake with occurrence, IUCN and CAMP status

Family	*Scientific Name*	Common Name	IUCN status	CAMP Status	Occurrence
Family: Cyprinidae	*1. Amblypharyngodon mola (Ham. -Buch.)*	Brass fish	LC	LRlc	A
	2. Aspidoparia jaya (Ham. -Buch.)	Aspidoparia	LC	VU	C
	3. A. morar (Ham. -Buch.)	Aspidoparia	LC	LRnt	C
	4. Catla catla (Ham. -Buch.)	Common carp	NE	VU	O
	5. Cirrhinus mrigala (Ham. -Buch.)	Mrigal	LC	LRnt	O
	6. Esomus danricus (Ham. -Buch.)	Flying barb	LC	LRlc	C
	7. Labeo bata (Ham. -Buch.)	Minor carp	LC	LRnt	O
	8. L. gonius (Ham. -Buch.)	Kuria labeo	LC	LRnt	O
	9. L. rohita (Ham. -Buch.)	Rohu	LC	LRnt	C
	10. Puntius conchonius (Ham. -Buch.)	Rosy barb	LC	LRlc	C
	11. P. sophore (Ham. -Buch.)	Spot fin swamp barb	LC	LRnt	C
	12. P. ticto (Ham. -Buch.)	Two spot barb	LC	LRnt	C
	13. Rasbora daniconius (Ham. -Buch.)	Black line rasbora	NE	LRnt	C
	14. R. rasbora (Ham. -Buch.)	Yellow tail black tip	LC	LRnt	O
Family: Notopteridae	*15. Chitala chitala* (Ham. -Buch.)	Feather back	NT	EN	O
	16. Notopterus notopterus (Pallas)	Bronze feather back	LC	LRnt	A
Family: Channidae	*17. Channa barca* (Ham. -Buch.)	Violet snakehead	DD	NE	O
	18. C.gachua (Schneider)	Dwarf snakehead	LC	VU	O
	19. C. marulius (Ham. -Buch.)	Peacock snakehead	LC	LRnt	O
	20. C. punctatus (Bloch)	Spotted snakehead	LC	LRnt	C
	21. C. striata (Bloch)	Striped snakehead	LC	LRlc	O
Family: Siluridae	*22. Ompok pabda* (Ham. -Buch.)	Gulper catfish	NT	EN	O
	23. O. pabo (Ham. -Buch.)	Pabo catfish	NT	NE	O
	24. Wallago attu (Bloch & Schneider)	Helicopter catfish	NT	LRnt	C
Family: Bagridae	*25. Mystus bleekeri* (Day)	Day's mystus	LC	LRlc	O
	26. M. cavasius (Ham. -Buch.)	Gangetic mystus	LC	LRnt	O
	27. *M. tengara* (Ham. -Buch.)	Tengara mystus	LC	NE	C
Family: Claridae	*28. Clarias batrachus* (Linn.)	Magur	LC	VU	O
Family: Belontidae	*29. Trichogaster fasciatus* (Schneider)	Banded gourami	LC	LRnt	C
	30. T. lalia (Ham. -Buch.)	Dwarf gourami	LC	NE	C

Conclusion

The rich Neura of the lake indicates the high productivity of the lake. However, fish diversity is declining due to anthropogenic stress on water such as washing clothes, washing different containers etc. by the local people. Fishing nets with small mesh size is also responsible for degradation of fish diversity. To conserve diversity, people awareness is must and they will learn to use resources without causing any damage to those resources. Along with the capture fishery, culture fishery can also be adopted for higher production from the lake. Proper regulation of fishing gears and their mesh size and their fishing intensity should also be monitored. Weed management is another important matter for consideration. As a result, the socio-economic condition of the fishermen of the area will also be improved. It will also open the avenues of more employment opportunities since, large number of people skilled- unskilled; will be required to handle such a large quantity of fish. It will develop on one hand, the national economy and on the other hand will solve the problem of protein rich food to a large extent and it will help to solve the unemployment.

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