A STUDY OF THE NEURA OX-BOW LAKE AT SONPUR (SARAN)

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Abstract: - A Study of the Neura an oxbow lake, Sonpur (Saran) District (Bihar) was reported. 40 species, belonging to 13 families are recorded of which Cyprinidae was the most dominant (14). Certain physico-chemical parameters such as dissolved oxygen, free CO₂, and alkalinity were studied to know the aquatic health of the oxbow lake.

Keywords: Neura, Ox-Bow lake, Physico-chemical parameter, Sonpur, Saran, Bihar.

1. INTRODUCTION

Sonpur is naturally endowed with large number of rivers, lakes and beels (wetlands). These water bodies act as a major habitat for large variety of aquatic flora and fauna. Weed infested beels are especially rich in ichthyofauna (Biswas and Choudhury, 2008). However, like other natural water bodies in Sonpur, fish diversity has been steadily declining from the beels mainly due to habitat destruction and anthropogenic activities. The growth, distribution and abundance of aquatic animals mainly depend on the quality of water. Therefore, regular monitoring of water is important for better production of the fishery resources. Water quality of any water body mainly fluctuates due to its physical, chemical and biological parameter. Few studies have been made on the diversity of fish and physico-chemical parameter of different water bodies of Sonpur. The present report deals with the Neura and certain physico-chemical parameter of Moridikhow, a weed infested oxbow lake in Sonpur (Saran) District of Bihar.

2. Materials and Method

Neura is an oxbow lake which was originally a part of the river Gandak. It is a perennial water body, mostly choked with aquatic macrophyte especially during dry months. Entire bank of the lake is occupied by local villagers and they use water and other aquatic resources for their livelihood.

3. Collection of sample and chemical analysis

Five different stations were selected in the lake for sampling of water. Water samples were collected at monthly basis during morning hours from these sampling stations. Analyses of different Physio chemical parameters were done as per standard method (APHA, 1998; Trivedy et.al, 1987). A mercury thermometer was used to record both air and water temperature. pH was recorded with a digital portable pH meter.

Fish samples were collected every month during the study period from different local fishermen. Fishermen used different indigenous methods to catch fishes. They generally used gill nets, cast nets, drag nets of different mesh sizes for collecting different types of fishes. Collected specimens are preserved in 10% formalin and identified following Talwar and Jhingran (1991).

4. 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 CO₂ 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 CO₂ 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 CO₂ value increases. High aquatic vegetation may be the reason for such a high CO₂ value as most part of the water surface is covered with water hyacinth. The value of free CO₂ 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

<table>
<thead>
<tr>
<th>Month</th>
<th>Air Temp °C</th>
<th>Water Temp °C</th>
<th>pH</th>
<th>DO (mg/l)</th>
<th>Free CO$_2$ (mg/l)</th>
<th>Alkalinity (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>21.35±1.63</td>
<td>17.7±0.42</td>
<td>7.3±0.23</td>
<td>4.42±1.06</td>
<td>4.78±1.32</td>
<td>100±12.91</td>
</tr>
<tr>
<td>February</td>
<td>23.9±1.56</td>
<td>20.75±2.47</td>
<td>7.32±0.12</td>
<td>5.98±1.82</td>
<td>5.81±1.53</td>
<td>89.5±7.98</td>
</tr>
<tr>
<td>March</td>
<td>29.75±1.06</td>
<td>23.75±1.06</td>
<td>7.14±0.35</td>
<td>2.91±1.14</td>
<td>1.75±0.39</td>
<td>69.5±7.62</td>
</tr>
<tr>
<td>April</td>
<td>30.65±0.49</td>
<td>25.9±1.55</td>
<td>7.16±0.42</td>
<td>3.64±1.62</td>
<td>2.31±1.27</td>
<td>71.5±17.3</td>
</tr>
<tr>
<td>May</td>
<td>32.5±2.12</td>
<td>30±1.41</td>
<td>7.1±0.23</td>
<td>5.22±3.76</td>
<td>2.02±1.31</td>
<td>77±12.95</td>
</tr>
<tr>
<td>June</td>
<td>33.1±1.56</td>
<td>30.5±0.71</td>
<td>6.9±0.34</td>
<td>4.48±1.74</td>
<td>2.95±1.39</td>
<td>62±2.82</td>
</tr>
<tr>
<td>July</td>
<td>31±1.41</td>
<td>30.25±1.77</td>
<td>7.13±0.67</td>
<td>5.33±3.72</td>
<td>3.02±1.53</td>
<td>46±6.99</td>
</tr>
<tr>
<td>August</td>
<td>32.5±0.71</td>
<td>31.15±0.21</td>
<td>7.2±0.78</td>
<td>5.47±2.83</td>
<td>3.85±1.44</td>
<td>58±8.56</td>
</tr>
<tr>
<td>September</td>
<td>29.5±0.71</td>
<td>28.75±0.35</td>
<td>6.9±0.41</td>
<td>4.52±2.21</td>
<td>5.17±2.28</td>
<td>52±9.78</td>
</tr>
<tr>
<td>October</td>
<td>26.25±0.35</td>
<td>24.5±0.71</td>
<td>7.15±0.56</td>
<td>3.42±1.73</td>
<td>5.27±2.26</td>
<td>64±5.16</td>
</tr>
<tr>
<td>November</td>
<td>25.35±0.92</td>
<td>24.4±0.57</td>
<td>7.23±0.83</td>
<td>2.93±1.49</td>
<td>4.80±1.04</td>
<td>85±6.67</td>
</tr>
<tr>
<td>December</td>
<td>23.5±0.70</td>
<td>22.75±2.47</td>
<td>7.26±0.26</td>
<td>2.63±1.58</td>
<td>5.63±0.95</td>
<td>106.5±14.35</td>
</tr>
</tbody>
</table>

#### Neura diversity

During the study, a total of 40 fish species belonging to 13 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 *Amblypcharryngodon 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.

Fifty 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

<table>
<thead>
<tr>
<th>Family</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>IUCN status</th>
<th>CAMP Status</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family: Cyprinidae</td>
<td>1. <em>Amblypcharryngodon mola</em> (Ham. -Buch.)</td>
<td>Brass fish</td>
<td>LC</td>
<td>LRlc</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>2. <em>Aspidoparia jaya</em> (Ham. -Buch.)</td>
<td>Aspidoparia</td>
<td>LC</td>
<td>VU</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>3. <em>A. morar</em> (Ham. -Buch.)</td>
<td>Aspidoparia</td>
<td>LC</td>
<td>LRnt</td>
<td>C</td>
</tr>
</tbody>
</table>
4. *Calla catla* (Ham. -Buch.) | Common carp | NE | VU | O
5. *Cirrhinus mrigala* (Ham. -Buch.) | Mirgal | 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.) | Holy barb | LC | LRnt | 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 | LHnt | 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. *P. gachua* (Schneider) | Dwarf snakehead | LC | VU | O
19. *C. marulius* (Ham. -Buch.) | Peacock snakehead | LC | LRnt | O
20. *C. punctatus* (Bloch) | Spotted snakehead | LC | LHnt | C
21. *C. striata* (Bloch) | Striped snakehead | LC | LRlc | O

**Family: Siluridae**
22. *C. spinor* (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
25. *Mystus bleeker* (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: Bagridae**
28. *C. trachurus* (Linn.) | Magur | LC | VU | O

**Family: Belontidae**
29. *Trichogaster fasciatus* (Schneider) | Banded gourami | LC | LRnt | C
30. *T. laka* (Ham. -Buch.) | Dwarf gourami | LC | NE | C
31. *T. sota* (Ham. -Buch.) | Honey gourami | LC | NE | O

**Family: Anabantidae**
32. *Anabas testudineus* (Bloch) | Climbing perch | DD | VU | O

**Family: Channidae**
33. *Chanda nama* (Ham. -Buch.) | Elongate glass perchlet | LC | NE | C
34. *Pseudoambassis baculis* (Ham. -Buch.) | Himalayan glassy perchlet | LC | NE | C
35. *P. ranga* (Ham. -Buch.) | Indian glassy fish | LC | NE | O

**Family: Mastacembelidae**
36. *Mastacembelus armatus* (Ham. -Buch.) | Zig-zag spiny eel | NE | NE | R
37. *M. panculus* (Ham. -Buch.) | Striped spiny green eel | NE | LRnt | R

**Family: Mastacembelidae**
38. *Heteronotus fossilis* (Bloch) | Stinging catfish | LC | VU | O

**Family: Mastacembelidae**
39. *Nandus nandus* (Ham. -Buch.) | Leaf fish | LC | LRnt | R

**Family: Mastacembelidae**
40. *Pseudotropus atherinoides* (Bloch) | Indian potashi | NE | EN | O

**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.
References


7. IUCN. IUCN Red List of Threatened Species. Version


