

Eco-biology of *Mastacembelus pancalus* (Ham.) and their distribution in different water bodies

M. Afzal Hussain, F. Adib Flowra and M. Altaf Hossain*

Fisheries Laboratory, Department of Zoology, University of Rajshahi, Rajshahi 6250, Bangladesh

*Corresponding author

Abstract

The eco-biological of the spiny eel, *Mastacembelus pancalus* in the river Padma, adjacent flood plains and ponds were influenced by various physico-chemical factors such as water temperature, water transparency, pH, dissolved oxygen, free carbon dioxide and alkalinity. Flood plain areas are the best habitat for the *M. pancalus* with maximum abundance.

Key words: Eco-biological condition, Padma, Flood plains, *M. pancalus*

Mastacembelus pancalus is a common freshwater spiny eel of the family Mastacembelidae locally known as baim. The present study area comprised of the river Padma and flood plain areas is supposed to be ideal for freshwater habitat of lotic typed and lentic typed for the occurrence of *M. pancalus*. The systematic account and studies reported by Karim and Hossain (1972 a & b), Shafi and Quddus (1982), Rahman (1989), Jhingran and Talwar (1991) indicated that this fish remained virtually unstudied.

To establish the eco-biology of *M. pancalus*, fortnightly water samples were collected for a period of one year in the river Padma, adjacent flood plains area (beel) and ponds. The water temperature was recorded with a mercury thermometer, pH by pocket pH meter (WQC-OA, TOA). Dissolved oxygen (DO) and free carbon dioxide (CO₂) were measured following the methods described by APHA (1989) and Welch (1948), respectively. Water current, aquatic vegetation and abundance of the fish were also investigated. The monthly meteorological recorded data on the air temperature, rainfall were collected from the Meteorological Department of Rajshahi.

The physico-chemical parameters of the river Padma, flood plain areas and ponds are exhibit maximum and minimum variations according to change of month and season are shown in Table 1, and eco-biological variation in distribution of *M. pancalus* is given in Table 2.

Table 1. The maximum and minimum limit of physio-chemical parameters

Parameters	Limits	Water bodies		
		River	Flood plains	Pond
Air temp.	Maximum	April	April	May
	Minimum	January	January	January
Water temp.	Maximum	May	April	May
	Minimum	January	January	December
Rainfall	Maximum	September	December	September
	Minimum	December	April	December
Transparency	Maximum	April	December	August
	Minimum	August	December	May
pH	Maximum	January	July	April
	Minimum	July	November	August
Dissolved oxygen	Maximum	Oct.-May	August	April
	Minimum	July-Sep.	April	August
Carbon-di-oxide	Maximum	June-Nov.	Feb.-May	June-Dec.
	Minimum	Dec.-May	June-Jan.	Jan.-May

Table 2. Eco-biological distribution of *M. pancalus* in different water bodies

Ecological condition	River	Flood plains	Pond
Soil texture	Sandy and sandy loamy	Mostly sandy loamy	Mostly clay
Water current	Very common	Mostly stagnant, rare in monsoon	Stagnant
Water temp.	13.5-29.8°C	16.7-28.9°C	28-31.4°C
Transparency	0.05-1.24m	0.31-0.43m	0.35-0.46m
Dissolved oxygen	3.15-5.95mg/l	4.23-8.33mg/l	3.19-6.54mg/l
Carbon-di-oxide	2.62-8.41mg/l	2.69-8.66mg/l	2.77-9.83mg/l
pH	6.75-8.1	6.97-7.63	6.83-8.39
Aquatic vegetation	Rare	Rare	Common
Species abundance	Common during monsoon, rare in rest period	Very common	Rare

On the observation, among the 3 areas studied, *M. pancalus* were more abundant in flood plain areas then ponds or river Padma. Among the fishing season winter season and early part of the summer are found as peak period for *M. pancalus* along with other fishes because flood plains becomes calm and water starts to be vacated. It was observed that this species spawn in the monsoon.

Among the different parameters, rainfall is an important factor in the breeding of *M. pancalus* as cloudy day accompanied by the thunderstorm and rain, seen to exercise some influenced on spawning (Saha *et al.* 1957). In the river Padma, the minimum turbidity was found in the monsoon and post monsoon months like June to September due to strong current of water which washed away huge silt in water including many

other suspended matter. From October onwards up to May, water become slowly clear with the maximum values of transparency due to absence of such disturbing matters (Hickman 1979, Hossain 1989).

The calculated mean values of pH were recorded in the Padma indicated neutral or slightly alkaline. In the flood plains and ponds, the pH values were almost same to the river water (Table 1). Among the dissolved gases, in the flood plain areas the average dissolved oxygen (DO) contents is more than the other water bodies (Table 2). The fluctuation in the DO concentration is mainly influenced by the factors like dissolved organic matter, plankton and bottom vegetation, The values of free carbon dioxide show inverse relationship to the oxygen.

The present investigation aiming the physico-chemical condition of three types of water bodies and a comprehensive observation do, however, make it possible to describe which factors play a definite role are in need of more precise analysis.

References

- American Public Health Association (APHA), 1989. Standard methods for the examination of water and waste water. American Public Health Association Washington DC.
- Hickman, M., 1979. Seasonal succession, standing crop and determinants of tile phytoplankton of Ministik lake, Alberta, Canada, *Hydrobiologia*, 64: 105-121.
- Hossain, M.A., 1989. On the methods of determining the reproductive cycle in fisheries species. 76th Ind. Sc. Cong. Ass. Madurai, India.
- Jhingran, A.G. and P.K. Talwar, 1991. Inland Fishes of India and Adjacent Countries. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi, India. Vol (1&2): 1158 pp.
- Karim M.A. and M.A. Hossain, 1972a. Studies on the biology of *Mastacembelus pancalus* (Ham.) in artificial ponds. Part-1, Natural habitat, distribution, food and feeding habits and economic importance. *Bangladesh J. Biol. Sci.*, 1(2): 10-14.
- Karim, M.A. and M.A. Hossain, 1972b. Studies on the biology of *Mastacembelus pancalus* (Ham.) in artificial ponds. Part-II, Sexual maturity and fecundity. *Bangladesh J. Biol. Sci.* 1(2): 15-18.
- Saha, K.C., D.P. Sen, A.K.R. Chowdhury and Chakrabarty, 1957. Studies on the factors influencing spawning of Indian major carps in "bundh" fisheries. *Indian J. Fish.*, 4: 284 - 294.
- Shafi, M. and M.M.A. Quddus, 1982. Bangladesher Matsaw Sampad. Bangla Academy. Dhaka. 444 pp. (in bengali)
- Welch, P.S., 1948. Limnological Methods. McGraw-Hill. Publ., New York. 381 pp.

(Manuscript received 5 August 2001)