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STUDY OF ANOMALIES IN *CIRRHINUS MRIGALA* (HAM. BUCH) INHABITING FRESHWATER ENVIRONMENTS OF JAMMU REGION OF J & K

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ABSTRACT
Three deformed specimen of *Cirrhinus mrigala* (Ham. Buch.), showing anomalies were collected from fish ponds at Birpur region of Jammu province of J&K. The three specimens were found to have anomalies like truncated post dorsal body with ventral bulging in anal region; absence of caudal region, and attenuate post dorsal body with a hump in the dorsal fin region. In the present study, truncated post dorsal body with ventral bulging in anal region have been described

KEY WORDS: *Cirrhinus mrigala*, Anomalies, Truncated post dorsal body.

INTRODUCTION

Fish anomalies under natural conditions are not uncommon and have been well documented by various workers from India and abroad. Some earlier reports on fish teratology from Jammu and Kashmir are those of Dutta and Malhotra (1984, 86), Dutta *et al.* (1994, 1995a, b, 1997, 99, 2005), Ara (2000), and Gupta *et al.* (1998, 2000, 2002, 2004). Except for this scanty information on fish teratology, there is no record of any anomaly in fish from lotic and lentic waters of Jammu region of J&K. So the present communication is an addition to the existing knowledge of fish abnormalities from this part of the country and forms an important aspect of study of fish biology.

MATERIALS & METHODS

Three abnormal specimens of *Cirrhinus mrigala*, were seen in the collections made from Birpur ponds, Jammu. The abnormal fish specimens were measured for their length and weight and examined for various morphological deformities. The fishes were then preserved in 10% formaldehyde solution and were brought to the laboratory for further detailed studies. For the study of vertebral deformities, the fishes were exposed to X-ray radiations.

RESULTS AND DISCUSSION

Deformities as observed in fishes like *Cirrhinus mrigala*, noticed in the collections made from Birpur ponds, Jammu, include:

1. Truncated post-dorsal body with ventral a bulging in the anal region:

A single aberrant specimen of *Cirrhinus mrigala*, measuring 23.6cm and weighing 175gms, was recognized from its truncated post-dorsal body and a ventral bulging in the anal region.

Body of the normal fish is streamlined; dorsal fin origin is more towards the snout than the caudal region. Longest pectoral ray falls short of pelvic fin, longest pelvic ray falls short of anal fin and longest anal fin ray falls short of bilobed caudal fin. In the aberrant specimen, post-dorsal body is truncated. Like the normal fish, dorsal fin origin in the abnormal fish is more towards the snout than the caudal region. The longest pectoral ray falls short of pelvic fin, longest pelvic ray falls short of anal fin, and the longest anal ray reaches upto caudal peduncle due to shortening of post dorsal body. In the aberrant specimen, vertebral column forms a sort of spiral structure.

Comparison of morphological features of normal specimen and abnormal specimen of *Cirrhinus mrigala* has shown certain variations. The number of fin rays in dorsal, pectoral, pelvic, anal and caudal fin in the normal fish is 6,15,9,8,15 whereas in the abnormal fish, the numbers of fin rays are 6, 14, 8, 8 and 15 respectively.

An X-ray analysis has revealed the presence of 38 vertebrae in the vertebral column of normal specimen and 33 vertebrae in the aberrant specimen. Various aberrations in the vertebral column of this deformed fish are:

- 1^{st} to 7^{th} vertebrae are loose with normal intervertebral spaces.
- 8^{th} to 10^{th} vertebrae are tightly fused together.
- 11^{th} to 14^{th} vertebrae are tightly fused forming a sort of depression in the pelvic region.
- 15^{th} to 17^{th} vertebrae are again compact and fused together, have deformed or no haemal spines and forms a sort of diffused spiral from 8^{th} to 17^{th} vertebrae with diffused shapes and structures.
- The vertebral column from 18^{th} vertebrae shows slight downward bend upto 25th vertebrae.
- 26^{th} to 38^{th} vertebrae form a sort of spiral shaped structure ending into the urostyle. This results in the reduction in the post anal length of the body.

The haemal and neural spines are normal throughout the vertebral column.

The various body ratios like : head length in total body length, head length in standard body length, eye diameter in head length, head height in head length, pre-ocular length in head length, body height in total body length, body height in standard body length, pre-dorsal length in total body length, pre-dorsal length in standard body length, post-dorsal length in total body length, post-dorsal length in standard body length, pre- anal length in total

body length, pre-anal length in standard body length, post-anal length in total body length, post-anal length in standard body length, in normal and abnormal fish are (Table I).

Anomalies in fishes have been attributed to various factors like salinity fluctuations, parasitic infections, low concentration of dissolved O_2, radiations, U.V. radiations, dietary vitamin deficiency, parasitic infection, hereditary factor, defective embryonic development, pollution *etc*.

The fish abnormalities as given above cannot be attributed to any of these factors, as the present collection sites are free from any pollution and various physico-chemical characteristics of water fall within the safe limits of fish survival. Fish anomalies due to injury or predation, have also been reported by Devadoss (1983), Singh, Kohli and Goswami (1986-87), Dutta and Kumar (1991) and Khan (2001). Whereas in other specimens, anomalies are caused due to some developmental errors during the course of development of fish.

TABLE I. Comparison of morphological features of normal and abnormal specimen of *Cirrhinus mrigala* (Ham. Buch.)

S. No.	Body Ratios	Normal Fish	Deformed Fish
1	Head length in total body length	5.53	5
2	Head length in standard body length	4.47	4
3	Eye diameter in head length	5.7	5.2
4	Head height in head length	1.27	1.1
5	Pre-ocular length in head length	3.8	3.6
6	Body height in total body length	4.63	3.8
7	Body height in standard body length	3.75	3.0
8	Pre-dorsal length in total body length	2.62	2.5
9	Pre-dorsal length in standard body length	2.12	2.0
10	Post-dorsal length in total body length	1.61	3.8
11	Post-dorsal length in standard body length	1.31	3.0
12	Pre-anal length in total body length	1.58	1.6
13	Pre-anal length in standard body length	1.28	1.3
14	Post-anal length in total body length	2.71	4.3
15	Post-anal length in standard body length	2.19	3.4
16	Length of dorsal fin in total body length	4.2	5.6
17	Length of dorsal fin in standard body length	3.4	4.4
18	Length of pectoral fin in total body length	7.87	10.2
19	Length of pectoral fin in standard body length	6.37	8.17
20	Length of pelvic fin in total body length	7.87	7.3
21	Length of pelvic fin in standard body length	6.37	5.8
22	Length of anal fin in total body length	7.87	6.3
23	Length of anal fin in standard body length	6.37	5.0
24	Length of caudal fin in total body length	5.25	4.7
25	Length of caudal fin in standard body length	4.25	3.76
26	Height of caudal peduncle in standard length	5.10	7.8
27	Distance between pectoral and pelvic fin origin	7.0	5.7
28	Distance between pelvic and anal fin origin	7.5	5.1

Fish teratology due to developmental error has been described earlier by Dutta and Tilak (1962), Saxena and Tyagi (1978), Dutta (1989-90), Dutta and Malhotra (1986), Dutta *et al.* (1995 and 2005), Shekhar and Dutta (1993) and Gupta *et al.* (2000). Thus from the above discussion, it is concluded that fish anomalies are very complex and cannot be assigned to any single factor but a complex of factors operating in the water body.

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