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PATHOLOGICAL EFFECT OF CESTODAL INFESTATION ON BLOOD PARAMETERS OF FRESHWATER MURRELS

Pinky Kaur[1]*and Rekha Shrivastav[2]

[1]*Department of Zoology and Applied Aquaculture, Barkatullah University Bhopal (M.P.)*
[2]*Department of Zoology, Sarojini Naidu Govt. Girls P.G. College Bhopal (M.P.)*

E-mail: pkaur.18@gmail.com

ABSTRACT

Present study was conducted to investigate the pathological effect of cestodal infestation on blood parameters of Freshwater murrels, *Channa punctatus* and *C. striatus*. The percentage of prevalence of cestodal infection in *C. punctatus* and *C. striatus* was calculated to 34.38% and 28.0% respectively. Examination of haematological parameters of infected freshwater murrels revealed significant decrease in the amount of haemoglobin 3.70±0.60g/100 ml and 4.06±0.43g/100 ml in *C. punctatus* and *C. straitus*, respectively. Similarly both the host species showed marked decrease in the number of erythrocytes count, and inverse increase in the count of lymphocytes and granuolocytes.

Keywords – Cestodal infection, Haematological, Freshwater murrels, Pathology

INTRODUCTION

Fish health management is the concept of proactively regulating the host, pathogen and environment to maximize the optimal condition for sustained growth and health. In order to get better nutrition from fishes, they must be free from diseases and mishandling. Fish diseases may be due to parasitic or non-parasitic causes. Among the parasites that infect freshwater fishes, helminths form the most diversified group. Parasitic diseases of fishes are very common all over the world. Globally the parasites (defined broadly as infectious agents of diseases) are responsible for 19% of human mortality (World Health Organization, 2004). The helminths exhibit highly diverse ecological inter-relationship and the most complicated host relationship. Endoparasitic helminths, with indirect life cycles, involve one or more hosts. Fishes are one of such hosts that act as either definitive, paratenic (transport) or intermediate host in the life cycle of many helminth parasites.

Blood is a good indicator to determine the health of an organism (Joshi *et al*., 2002). It also acts as a pathological reflector of the whole body. Hence, the haematological parameters are important in diagnosing the functional status of the fish (host) infected by helminth parasites (Joshi *et al*., 2002) and also to evaluate the physiological condition and nutritional state of fish (Chagas and Val, 2003). For purpose of present investigation, two species of freshwater murrels were chosen since it is a hardy, edible and amply available fish at Bhopal.

MATERIAL AND METHODS

Collection of host fishes and helminth parasites:

The host fish were brought to the laboratory either in live condition from the local fish markets. The fishes were examined for the presence of helminth parasites by adopting the methods employed by Mayer and Olsen (1975), Cable (1977) and Madhavi *et al*. (2007).

Fish specimens were dissected out in physiological saline (0.75% NaCl solution) for collecting helminth parasites. Cestodes collected from intestine were fixed in AFA solution (alcohol - 85 ml, formalin – 10 ml and acetic acid – 5 ml) kept individually on plain slide, covered with coverslip and slight pressure was exerted on the coverslip to press the specimen slightly and stained with aceto-carmine to prepare permanent slides. Taxonomical identification of helminths parasites was done by adopting the works of Yamaguti (1959).

Haematological Analysis:

The haematological parameters of fishes infested by helminth parasites were compared with those of apparently healthy fishes. For this purpose, the blood samples were taken from the caudal peduncle and heart with the help of 3 ml glass syringe. Collected blood samples were put in eppendrof tubes with the anticoagulant (EDTA @2 mg/l of blood). R.B.C. were counted with the help of haemocytometer. Haemgolobin concentration was measured by using haemogolobinometer.

Blood smears were prepared and stained with Leishman's stain for the differential count of WBC viz. Eosinophils, Basophils, Neutrophils, Lymphocytes and Monocytes by adopting the methodology of Anderson (2003).

RESULTS AND DISCUSSION

During the course of investigation, in non-infected specimens of *Channa punctatus*, the total haemoglobin content, number of erythrocytes, granulocytes and lymphocytes were observed to be 6.52±0.43g/100 ml, 2.44±0.22x10^6/mm^3, 123.0±5.09x10^3/mm^3 and 68.0±4.4 x10^3/mm^3, respectively.

In infected *Channa punctatus*, the haemoglobin content recorded was 3.70±0.60g/100 ml. the number of erythrocytes, granulocytes and lymphocytes was 1.28±0.37x10^6/mm^3, 142±6.1x10^3/mm^3 and 87.4±3.9 x10^3/mm^3 respectively (Table. 1).

In non-infected specimens of *Channa striatus*, the total haemoglobin content, number of erythrocytes, granulocytes and lymphocytes were observed to be 6.58±0.51g/100 ml, 2.24±0.42x10^6/mm^3, 125.8±3.76 x10^3/mm^3 and 69.0±5.7 x10^3/mm^3, respectively.

In infected *Channa striatus*, the haemoglobin content was 4.06±0.43g/100 ml. The number of erythrocytes, granulocytes and lymphocytes was

Table-1 Haematological parameters of un-infected and infected *C. punctatus* parasitized by *Senga* sp. (values expressed in Mean values ±SD).

S.No.	Parameters	Un-infected	Infected
1.	Total Haemoglobin	6.52±0.43g/100ml	3.70±0.60g/100 ml
2.	Erythrocytes	2.44±0.22 x10^6/mm^3	1.28±0.37x10^6/mm^3
3.	Granulocytes	123.0±5.09x10^3/mm^3	142.6±6.1x10^3/mm^3
4.	No. of lymphocytes	68.90±4.4 x10^3/mm^3	87.4±3.9 x10^3/mm^3

Table-2. Haematological parameters of un-infected and infected *C. straitus* parasitized by *Senga* sp. (values expressed in Mean values ±SD)

S.No.	Parameters	Un-infected	Infected
1.	Total Haemoglobin	6.58±0.51g/100ml	4.06±0.43g/100 ml
2.	Erythrocytes	2.24±0.42 x10^6/mm^3	1.12±0.52x10^6/mm^3
3.	Granulocytes	125.8±3.76x10^3/mm^3	141.0±5.4x10^3/mm^3
4.	No. of lymphocytes	69.0±5.7 x10^3/mm^3	85.2±4.3x10^3/mm^3

$1.12\pm0.52x10^6/mm^3$, $141.0\pm5.4x10^3/mm^3$ and $85.2\pm4.3\ x10^3/mm^3$, respectively **(**Table. 2).

Observation made in infected *C. punctatus* and *C. striatus* in relation to erythrocyte, lymphocyte and granulocyte counts get confirmations from the work of Engelherdt *et al*. (1989) who studied the haematological changes in rainbow trout infected with *Proteocephalus neglectus*. Saxena and Chauhan (1993) found increase in lymphocyte count in *Heteropneutus fossilis* infected with *Lucknowia indica*. According to Lebelo *et al*. (2001) and Hassen (2002), the increase in WBCs count occurred as a pathological response since these WBCs play a great role during infestation by stimulating the haemopoietic tissue and immune system by producing antibodies and chemical substances working as defense against infection. Whereas decrease in RBCs count, Hb value and packed cell volume in the infected catfish occurred as a result of the parasitic infestation that often leads to anemia (Martins *et al*., 2004).

Khurshid and Ahmad (2012) studied the impact of helminth parasitism (cestode, trematode and acanthocephalan) on haematological profile of *Schizothorax spp.* and *Cyprinus spp*. and concluded that mechanical injury caused by invasion of parasite in host tissue lead to side tracking of iron and responsible for erythropoiesis and could also lead to deficiency of vitamin B-12 and folic acid.

Mahmoud and Ahmed (2013) investigated blood parameters of catfish (*Clarias lazera*) infected with nematode *Contacceacum* sp. and *Corallobothrium solidum*. Shah *et al.* (2009) also revealed an increase in eosinophils due to helminth parasitism in fish. Kaur *et al.* (2012) investigated histopathological and haematological parameters on *Nandus nandus* (Ham.) parasitized by metacercariae of *C. complanatum* (Rud. 1819) and revealed the significant increase in lymphocytes and granulocytes. The same results were observed during present investigation on freshwater murrels.

CONCLUSIONS

The present work indicates that the cestode parasites are extensively distributed in gut of edible freshwater fish. Being parasitic in nature, they damage the organ on which they subsist. Due to the occurrence of these parasites, the physiological activities of the victimized fishes are hindered and their growth is retarded which cause economic loss to the fishery industry.

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