Haematological Abnormality In Coilia Dussumeiri Carrying Nematodes Uran, West Coast, India

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Abstract :
The present investigation is an attempt to study the effect of nematode parasites on haematology of marine fish Coilia *dussumeiri* (Valenciennes). The study was carried out during 2020-2021 at Uran Dist. Raigad, west coast of Maharashtra, India. The nematode infection showed a significant reduction in Haemoglobin content and RBC indicating anemic condition count whereas increase in WBC number. Furthermore anemia and leukocytosis indicates fish to be on diseased state.

Keywords: Nematode, Infection, Haematology, Anaemia, Fish

Introduction

Fish being cheapest source of proteins for human consumption in India, also fishery plays key role in economy of coastal people. Fish is prone to diseases like parasitism. It can also be a good host for parasite multiplication that can be acquired by other organisms through the ingestion of raw or inadequately cooked fish containing the larvae of the parasite (Salcedo et. al;.2009). However, comparable studies on health and disease in fishes so far made in India are very few. Nematode causes an economic threat to the market value of fish, through consumer attitudes towards the presence of these parasites within food products (Muluken et. al; 2020**)**. The increasing importance of fish as rich source of proteins and playing important role in agricultural economy of the country the present study was undertaken.

Fish does not only serve as the host for different parasites but some parasitic forms cause serious damage to the tissue and also alters the haematology of the host. Blood is a good indicator to determine the health of an organism (Joshi *et al*., 2002). Hence, the haematological parameters are important in diagnosing the functional status of the fish (host) infested by nematodes parasites (Joshi *et al*., 2002) and also to evaluate the physiological condition and nutritional status of fish (Chagas and Val, 2003). Jha and Akela (2003) have explained haematological alterations in *H. fossilis* with response to nematode infection and Sinha and Mishra (2011) have explained effect of nematode infection on haematological parameters of *Anabas testudineus* (Bloch). Haematology is used as an index of fish health in various fish species to detect physiological changes during different stress conditions like exposure to pollutants, diseases, metals hypoxia etc. Therefore, the present study was designed to compare the haematological parameters of nematode infested and non-infested *Coilia dussumeiri.* For the purpose of present investigation, *Coilia dussmeiri* (Valenciennes), was chosen during 2020-2021since it is an ample available fish at Uran, Dist. Raigad west coast of Maharashtra, India.

Materials and Method

Collection of fish specimens

Live specimens of *Coilia dussmeiri* were collected from the local fisherman of Uran. The specimens were brought to the laboratory and examined morphologically and internally for the occurrence of nematode parasites.

Collection of parasite

Fish specimens were dissected out in physiological saline (0.75% NaCl) for collecting Parasites and record for male and female fish infested and non-infested was maintained. Nematodes were collected from the body cavity. The parasitic worms collected were fixed in hot 70% alcohol containing 10% of glycerin and examined according to the routine parasitological techniques and proper record was maintained.

Haematological studies

For haematological parameters, the blood samples were taken from the caudal peduncle with the help of 2 ml disposable syringe. The blood was kept in properly labeled glass bulbs containing a drop of 10% EDTA solution as anticoagulant. The hemoglobin content was estimated by routine Sahli's method.

Blood films

The count of erythrocytes and leucocytes was carried out by using haemocytometer. The RBC and WBC counting methods were based on the dilution of obtained blood with dilution fluids in RBC and WBC counting pipettes. Individual cells were then counted in the counting chamber (Haemocytometer).

Result and Discussion:

TABLE NO.1

Blood parametr	Male		Female	
	Uninfected	Infected	Uninfected	Infected
RBC number (x 10^6/mm^3)	2.446 ±0.162	2.086 ± 0.212	2.164 ± 0.252	1.852 ± 0.284
Haemoglobin (g/100ml)	8.94 ± 1.14	7.86 ± 0.854	8.30 ± 0.658	8.16 ± 0.944
WBC (x 10^3/mm^3)	3.24 ± 0.84	3.94 ± 0.72	3.12 ± 0.88	3.78± 0.68

The data on the hematological values of both infected and non infected *Coilia dussumieri* infected with nematode is presented in Table 1. The observations are as follows:-

1) Decrease in the RBC count in both male and female (15-19%) indicating anemia.
2) Significant decrease in Haemoglobin content in infected both male and female.
3) Highly significant increase in leucocyte count in both male and female (22%) in both infected male and female.

DISCUSSION:

Since blood takes part in all biochemical processes either directly or indirectly, manifestation of the disease is expected to bring alteration in various factors of blood. To investigate the fish blood factors and their changes, the normal rate of these factors must be initially measured in healthy fish. In the present study the blood parameters including Hb, RBC count were found higher in healthy non infected *Coilia dussumieri.* The lower value of these parameters in infected *Coilia dussumieri* was in accordance with previous results (Shah, et. al.2009,) and (Genc, et. al; 2005). Omprakash *et al*., (2002) has explained decreased haemoglobin in certain fishes of Kabara Lake. Jha and Akela (2003) have explained effects of nematode infection on haematological parameters of *H. fossilis.*, whereas Sinha and Mishra (2011) has explained similar decrease of haemoglobin in male/female nematode infection in fish *Anabas testudineus.* Observation made in infested *Coilia dussumieri* in relation to erythrocytes, leucocytes and haemoglobin counts get confirmations from the work done by various parasitologists like Saxena and Chauhan (1993) found increase in lymphocyte count in *Heteropneutus fossilis* infected with *Lucknowia indica*. The reduction in RBCs count and Hb value in the infected catfish occurred as a result of the parasitic infestation that often leads to anemia (Martins *et al*., 2004). 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. The WBC count was found to be enhanced due to parasitic infestation, as WBCs are key components of innate immune defense and leukocytes are involved in the regulation of immunological function in the organism (Gallardo et. ai; Ballarin et. ai;).

The present investigation agrees these reports. It is revealed that the parasitic burden has marked variation in the blood of infected host *Coilia dusumeriri.* The erythrocyte count is decreased resulting in anemic condition. The W.B.C. count increased is believed to be associated with defense mechanism and immunological response (Sastry, 1971) of the host against the establishments of infections.

The haemoglobin content is decreased with reduced R.B.C's reveals very interesting features why infected fish show 'restlessness'. This fact confirms to the report of Hartman and Lessler (1964).

Conclusion:

The nematode infection in the present study is responsible for haematological manifestations in fish, which are quite comparable to those in mammals (Johansson *et. al.,* 1974), particularly with respect to total and differential leucocyte count which may be diagnostic. Effect of these nematode parasites on man, if any, further study is required.

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