International Journal of
Life Sciences
International Peer Reviewed Open Access Refereed Journal

Int. J. of Life Sciences, 2023; 11 (2): 173-175
ISSN:2320-7817(p) | 2320-964X(o)

Research Article Open Access

Haematological changes in freshwater fish *Wallago attu* infected with Cestode parasites

Gaikwad DM

Department of Zoology, Rajshri Shau College, Pathri, Tq. Phulambri, Aurangabad (M.S). India
Email: dr.dmgaikwad@gmail.com

Manuscript details:

Received: 29.05.2023
Accepted: 28.06.2023
Published: 15.07.2023

Cite this article as:
Gaikwad DM (2023) Haematological changes in freshwater fish *Wallago attu* infected with Cestode parasites, *Int. J. of Life Sciences*, 11 (2): 173-175.

Available online on http://www.ijlsci.in
ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)

ABSTRACT

This study involved 80 freshwater fish of Genus *Wallago attu,* captured from Kaigaontoka. In collected fish, parasite fauna was found. Changes in hematological parameters were also studied between infected and noninfected fish. Haematocrit, haemoglobin concentration, erythrocyte and leukocyte counts, mean cell volume (MCV), mean cell haemoglobin, mean cell haemoglobin concentration lymphocytes, monocytes, and eosinophils were all measured. Few differences were identified between infected and uninfected freshwater fish *Wallago attu.*

Keyword: Haematology, Cestode infection, Freshwater fish

INTRODUCTION

In the heavily stocked pond and aquarium, parasite-borne illnesses are common and result in fish losses (Koyuncu & Toksen, 2010). According to Eissa (2002), fish parasites, which include several kinds of infections that cause deformities, weight loss, death, etc., are the main source of economic losses in aquaculture. In most host-parasite systems, parasites may also influence their hosts' energy metabolism; parasitism speeds up the host's metabolic rate (Devevey *et al*., 2008). In majority of host-parasite systems, parasites may also influence their hosts' energy metabolism; parasitism speeds up the host's metabolic rate (Devevey *et al*., 2008). Haematological indicators are a crucial tool for determining the health of fish. Lowered growth and haematological changes brought on by parasitism may decrease fish's innate resistance to parasites. On the other hand, while numerous parasites may live and occasionally harm their hosts, certain blood characteristics serve as a trustworthy signal (Martins *et al*., 2004).

The present investigation deal with changes in haematological parameters in freshwater fish *Wallago attu* infected with cestode parasites *Gangesia* sp.

MATERIAL AND METHODS

Fish sampling sites

From the month January to June 2020, 42 numbers of freshwater fish *Wallago attu* were collected with body weight (550 ± 0.32) g, length (25 ± 0.12) cm from Kaigaontoka Dist. Aurangabad (M.S) India. The fishes were brought to the laboratory and sacrificed. The alimentary canal of the fish was dissected for examination of cestode parasite. The cestode parasites were collected and further identified as *Gangesia* sp.

Blood analysis

The fishes were taken to the laboratory in large containers, were they identified using the key provided by Jayaram (1999). The fish were acclimatized to standard laboratory conditions for seven hours and were subjected to haematological and helminthes parasitic infection.

RESULTS AND DISSCUSSION

It was verified that RBC count healthy (2.5 ± 0.05), infected (1.90 ± 0.18) showed significant ($P<0.05$) changes in the infected fish as compare to the healthy fish, haemoglobin healthy (12.6 ± 0.38),infected(8.75 ± 0.37) hematocrit healthy(32.82 ± 0.37), infected (23.42 ± 0.53), MCHC healthy (50.14 ± 5.73), infected (46.40 ± 4.50) were significantly decreased ($P<0.05$) than those observed in the healthy fish, were as WBC count healthy (1.84 ± 0.58), infected (2.12 ± 0.08); MCV healthy (123.92 ± 6.25), infected (130.76 ±15.16) and MCH healthy (49.1 ± 0.55), infected (43.2 ± 0.40) values of the healthy fish were lower ($P<0.05$) than those observed in the infected fish. The percentage of differential leucocyte cell count showed an increase ($P<0.05$), particularly in neutrophil healthy (17.70 ± 0.07) , infected (25.61 ± 0.68); basophil healthy 5.32±0.26), infected (12.12±1.12); monocyte healthy (5.22±0.10), infected (7.75±0.25), eosinophil healthy(3.25±0.15), infected(4.17±0.54) and significant decrease in lymphocyte healthy (52.36 ± 1.40), infected(33.02 ± 1.33) ($P<0.05$) in infected fish, in relation to that observed in healthy fish.

In the present study freshwater fishes *Wallago attu* parasitized with cestode had a significant decrease ($P<0.05$) in RBC count, haemoglobin concentration, packed cell volume Table. Similar to the findings of Sabri *et al*., (2009), they evaluated the impact of parasitic infestation on the hematological parameters of the catfish, *Clarias garipienus*. The results showed that parasite causes physiological dysfunction in infested fish by altering hematological parameters that may induce anemia by reducing erythrocytes (RBCs) count, hemoglobin concentration, and packed cell volume.

Table 1: Mean Haematological parameters of *Wallago attu* (Bloch) infected with *Gangesia sp.*

Haematological parameters		Uninfected fish	Infected fish
Total erythrocyte count – RBC (x 10/ mm3)		2.5± 0.05	1.90 ± 0.18
Total leucocyte count – WBC (x 10 4/ mm)		1.84 ± 0.58	2.12 ± 0.08
Haemoglobin content – Hb (g %)		12.6 ± 0.38	8.75 ± 0.37
Packed cell volume – Ht (%)		32.82 ± 0.37	23.42 ± 0.53
Erythrocyte Constant	Mean Corpuscular Volume – M.C.V (µ3)	123.92 ± 6.25	130.76 ±15.16
	Mean corpuscular Haemoglobin M.C.H(µg)	49.1 ± 0.55	43.2 ± 0.40
	Mean Corpuscular Haemoglobin Concentration – M.C.H.C (%)	50.14 ± 5.73	46.40 ± 4.50
Differential leucocyte Count (DLC)	Lymphocyte %	52.36 ± 1.40	33.02 ± 1.33
	Neutrophil %	17.70 ± 0.07	25.61 ± 0.68
	Basophil %	5.32±0.26	12.12±1.12
	Monocyte %	5.22±0.10	7.75±0.25
	Eosinophil %	3.25±0.15	4.17±0.54

Table 1 shows mean hematological values in infected and uninfected *Wallago attu* (Bloch). According to Nnabuchi *et al*., (2015), the infected fishes' hematological manifestations exhibited a significant drop in the content of hemoglobin concentration (Hb), packed cell volume (PCV), and red blood cells. In general, infected fish have larger levels of white blood cells (WBC) than uninfected fish.

Abdul Wahid Shah *et al.,* (2008) also found reduction in RBC count and haemoglobin % in Cyprinus infected with Brothiocephalus. Blanar *et. al.* (2005) confirmed PCV was significantly lower in Artic charr (Salvelinus alpinus) infected by larval D. dentriticum. The current study provides valuable information about haematological changes due to parasitic infection of *Gangesia* Sp. in freshwater fish *Wallago attu*. The entire study reveals that the intensity of infection was responsible for altering the haematology of *Wallago attu*. Increased number of WBC and lymphocytes values may be associated with the defense mechanism and immunological responses against infectious diseases.

Acknowledgement: I would like to thanks the Principal and Management of Rajashri Shahu College, Pathri for providing all the necessary facilities for this research work.

Conflict of interest: The authors declare that they have no conflict of interest.

REFERENCES

Abdul Wahid Shah, Parveen Muni, Sajad Hussain Mir, Sarwar SG and Yousuf AR (2009) Impact of Helminth Parasitism on Fish Haematology of Anchar Lake, Kashmir. *Pakistan Journal of Nutrition*, 8(1).

Agarwal V and Srivastava AK (1976) Effect of cold shock on blood cells in fresh water tropical teleost Colisa fasciatus. Arah. *Anat. Microscop. Morphol. Exptl*., 63: 165-174.

Agarwal (1989) Studies on haematology of trematode infected freshwater fish Rita rita (Ham.). *Indian. J. Helminthol,*41:51-59.

Anderson D and Kolntz GW (1965) Basic Haematology for the fish culturist. *Ann. Northw. FishCult. Conf*.16:38-41.

Baker NF and Douglas JR (1966) Blood alterations in helminth infection. In: E.J.L.n Soulsby (ed.)Biologyof Parasites, AcademicPress, NewYork.

Baker FJ and Silverton RE (1976) Introduction to Medical Laboratory Technology Butterworth London UK pp736.

Blanar C A, Curtis M A, and Chan H .M (2005): Growth, nutritional composition, and hematology of Arctic charr (Salvelinus alpinus) exposed to toxaphene and tapeworm (*Diphyllobothrium dendriticum*) larvae. Arch Environ Contam Toxicol, 48(3):397-404

Blaxhall PC and Daisley KW (1973): Routine haematological methods for use with fish blood. *J. FishBiol*.5: 771-781.

Bondsdroff, B. Von, (1948): Pernicious anemia caused by Diphyllobothrium latum in the light of recent investigations. *Bloods*, 3:91-102.

Devevey Godefroy, Hélène Niculita-Hirzel, François Biollaz, Candice Yvon, Michel Chapuisat and Philippe Christ (2008) Developmental, metabolic and immunological costs of flea infestation in the common vole. *Functional Ecology*, 22, 1091– 1098.

Eissa IAM Dar EL-Nahdda (2002) Parasitic fish infections in Egypt; 1st. El-Arabia Publishing; pp. 52–53.

Jayaram KC (1999) The Freshwater Fishes of the Indian Region. Narendra Publication House, pp.1-551.

Koyuncu CE and Toksen E (2010) Ectoparasitic Diseases in Freshwater Ornamental Fish and Their Treatments. In: 2nd International symposium on sustainable Development, Sarajevo. 683e688.

Martins ML, Tavares-Dias M, Fujimoto RY, Onaka EM and Nomura DT (2004) Haematological alterations of Leporinus macrocephalus (Osteichtyes: Anostomidae) naturally infected by Goezia leporini (Nematoda: Anisakidae) in fish pond. Veterinary Medicine • Arq. Bras. Med. Vet. Zootec. 56 (5).

Nnabuchi Ogechi, Odo Gregory Ejikeme, Christopher Didigwu Nwani, Stephen Ochang, Peace Somdare and Agbakwuo Chidinma Amarachi (2015): Effect of parasites on the biochemical and haematological indices of some clariid (Siluriformes) catfishes from Anambra River, Nigeria. *International Journal of Fisheries and Aquatic Studies* 2015; 3(2): 331-336.

Nnabuchi O, Ejikeme OG, Nwani CD, Ochang S, Somdare P & Amarachi AC (2015) Effect of parasites on the biochemical and haematological indices of some clariid (Siluriformes) catfishes from Anambra River, Nigeria. *Int. J. Fish. Aquat. Studies*; 3(2), 331-336.

Sabri DM, Mohamed AE, Ismail AE and Hafiz MK (2009) Impact of henneguyosis infection on Hematological parameters of catfish (clariasgariepienus), *Int. J. Agric. Biol*., 2, 228-230.