



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research  
Vol. 10, Issue, 07(F), pp. 33824-33826, July, 2019

**International Journal of  
Recent Scientific  
Research**

DOI: 10.24327/IJRSR

## Research Article

### EFFECT OF NEMATODE INFECTION ON HAEMATOLOGICAL PARAMETERS OF *CLARIAS BATRACHUS*

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DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1007.3761>

#### ARTICLE INFO

##### Article History:

Received 06<sup>th</sup> April, 2019  
Received in revised form 14<sup>th</sup> May, 2019  
Accepted 23<sup>rd</sup> June, 2019  
Published online 28<sup>th</sup> July, 2019

#### ABSTRACT

The haematological parameters are influenced by a number of physical chemical and biological factors. Nematode (Round worm) infection in *Clarias batrachus* caused haematological changes. It led to reduction in the haemoglobin content and packed cells volume (PCV), and caused erythropenia and leucocytosis. The parasitic infection causes reduction in haemoglobin content and PCV due to erythropenia. On the contrary, leucocytosis was due to nematode infestation.

#### Key Words:

Nematode infection, *Clarias batracus*,  
Erythropenia, Leucocytosis.

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#### INTRODUCTION

All groups of animal kingdom are suffering from pathological symptoms of different sorts of parasitic infestation. Like all other animals fishes also suffer from attack of various parasites and causes diseases. During this way helminthes infect various species of fishes. A variety of freshwater fish become infected with the fluxes which is very small in size and is enclosed in small cyst lying just beneath the skin. Studies on these fish infection and disorders constitute the field of fish pathology with etiological, morphological, physiological, prophylactic and therapeutic aspects.

A number of reports are available regarding the effect of different parasites on different histological and histopathological parameters of different species of fishes (Omeji *et al.*, 2018; Abdul, *et al.*, 2009; Okpasuo *et al.*, 2016 and Mahmoud *et al.*, 2011). Some workers reported spatial distribution of 6 parasite species in 5 species of fishes due to down stream changes and the effect of biotic and abiotic factors on endoparasites (Decker *et al.*, 2001). Omprakash *et al.*, (2002) has explained parasite fauna of certain fishes of Kabara lake. Similarly Jha and Akela (2003) has explained haematological alterations in *H. fossilis* with response to nematode infection and Sinha and Mishra (2011) has explained effect of nematode infection on haematological parameters of *Anabas testudineus* (Bloch). The present study was also

undertaken to spray more knowledge on effect of nematode infection on haematological parameters of selected fish.

#### MATERIALS AND METHODS

The experimental fish *Clarias batrachus* was collected from the local paddy fields and were brought in the laboratory. They were acclimatized for a fortnight. After blood sampling of experimental fishes, population dynamics of endoparasites, particularly the nematodes was done. Blood was calculated directly from the cauda dorsalis of the fish perfectly lean and dry plastic syringe. The blood collection was made with EDTA as an anticoagulant contained in the syringe as the clotting time of blood was found very short in fishes.

Haemoglobin concentration (in gm/100 ml of blood) was estimated by Sahli's Acid-Haematin method as described by Darmady and Davenport (1954) and routine haematological methods for use with fish blood by Blaxhall and Diasley, 1973.

#### RESULTS AND DISCUSSION

The haemoglobin content was quantitatively determined in *Clarias batrachus* both in healthy and nematode infected groups including both sexes. The mean body weight of control male fishes was  $71.49 \pm 1.296$  gms whereas these of infected ones was  $77.75 \pm 0.823$  gms. In healthy male fishes the minimum and maximum concentration of haemoglobin were determined to be 13.8 gm% and 16.5 gm% respectively,

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whereas, the mean concentration of haemoglobin in all the ten experimental fishes was recorded to be  $14.89 \pm 0.306$  gm% (Table 1). Nematode infection caused a sharp fall in the concentration of haemoglobin in fish. In infected group of fishes the maximum and minimum haemoglobin contents were determined to be 12.50gm% and 6.40 gm% respectively, whereas, the mean value was  $8.76 \pm 0.747$  gm%. The intensity of infection was determined. The maximum and minimum intensity of infection were 16 and 2 respectively. There was found a negative and direct correlation between the intensity of infection and the concentration of hemoglobin in fishes *i.e.* an increase in the intensity of infection caused a decrease in the level of hemoglobin concentration (Table 1).

In the present investigation, nematode infection caused percentage falls were recorded to be 41% and 33% in males and females respectively. (Table 1 and 2). It was found negative and linear correlation existed between the intensity of infection and the haemoglobin content in both sexes of *Clarias batrachus*. Scanty reports are available regarding nematode infection on the haemoglobin content. However, some works have traced out in different countries by different authors. (Abdul *et al.*, 2009; Mahmoud *et al.*, 2011; Okpasuo *et al.*, 2016 and Omeji *et al.*, 2018).

**Table 1** Showing effect of intensity of nematode infection on haemoglobin content of male *Clarias batrachus*

S.No.	Healthy Fish		Infected Fish		Intensity of Infection
	Body Wt. (in gms.)	Haemoglobin (in gms%)	Body Wt. (in gms.)	Haemoglobin (in gms%)	
1	65.40	14.40	80.50	12.30	02
2	65.50	14.10	80.00	12.00	03
3	68.10	14.00	79.10	8.50	04
4	70.60	16.50	80.00	8.50	07
5	70.00	16.10	80.00	7.60	10
6	72.20	15.50	79.10	7.20	11
7	74.15	13.80	76.20	7.10	13
8	75.40	14.10	75.00	7.50	10
9	75.80	14.40	74.10	6.50	15
10	77.75	16.00	73.50	6.40	16
Mean	71.49	14.89	77.75	8.76	9.1
SD $\pm$	4.100048	0.967905	2.602786	2.363979	4.7
SE $\pm$	1.296549	0.306088	0.823073	0.747556	1.486270

F. Value = 51.82\*\*

**Table 2** Showing effect of intensity of nematode infection on haemoglobin content of female *Clarias batrachus*

S.No.	Healthy Fish		Infected Fish		Intensity of Infection
	Body Wt. (in gms.)	Haemoglobin (in gms%)	Body Wt. (in gms.)	Haemoglobin (in gms%)	
1	74.00	14.00	81.40	11.40	01
2	73.50	13.20	80.50	10.00	02
3	73.00	13.00	80.00	8.70	03
4	72.30	12.60	78.00	8.50	05
5	71.00	11.70	76.10	7.50	07
6	69.40	11.30	75.20	7.00	09
7	67.00	11.10	73.00	6.80	11
8	64.00	10.80	73.70	6.60	12
9	64.50	10.00	73.00	6.20	14
10	64.70	10.00	72.50	6.00	18
Mean	69.34	11.77	76.34	7.87	8.2
S.D. $\pm$	3.78	1.307707	3.2317796	1.673947	5.306599
S.E. $\pm$	1.19534	0.413533	1.02197849	0.529348	1.678094

F. Value = 30.3\*\*

The intensity of infection was determined in female specimens also. It varied between 1-18. The average body weight of healthy female was  $69.34 \pm 1.195$  gms and those of infected fishes was  $76.34 \pm 1.021$  gms. In control fishes the hemoglobin content varied between 10.0% & 14.0 gm%, whereas, the mean value was  $11.77 \pm 0.413$  gm%, Nematode infection was found to cause significant ( $P < 0.01$ ) decrease in the concentration of hemoglobin in female *Clarias batrachus*. The hemoglobin content varied between 11.40 and 6.0 gm% in infected fishes. However, the mean value was recorded to be  $7.87 \pm 0.529$  gm%. The intensity of infection exhibited a significant impact upon the concentration of hemoglobin. A rise in the intensity of infection led to decrease in hemoglobin content. Thus a direct and negative correlation existed between the level of hemoglobin and the intensity of nematode infection (Table 2).

Omprakash *et al.*, (2002) has explained decreased haemoglobin in certain fishes of Kabara lake. Jha and Akela (2003) has explained effects of nematode infection on haematological parameters of *H. fossilis*. Hussain (2006) has explained the decreased haemoglobin content in *H. fossilis*. Sinha (2010) has explain similar decrease in haemoglobin content under helminth infection of *Calotes versicolor* in around Patna, whereas Sinha and Mishra (2011) has explained similar decrease of haemoglobin in male/female nematode infection in fishes *Anabas testudineus*.

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### How to cite this article:

Shashi Bhushan Shashi.2019, Effect of Nematode Infection on Haematological Parameters of *Clarias Batrachus*. *Int J Recent Sci Res.* 10(07), pp.33824-33826. DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1007.3761>

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