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Short Communication

Male Catfish *Rita rita* has higher Haemoglobin Concentration than Female Fish

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Authors' Contributions
SJ performed the experimental work. NTN supervisor the study and presented the idea. PK anlysed the data. YMJ collected the samples and did field study

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ABSTRACT

Hematological analysis of blood of *Rita rita,* showed significant differences between total erythrocytes count, hemoglobin concentration and erythrocyte sedimentation rate of the two sexes. Male fish had total erythrocytes 5.05 ± 0.5 × 10^6 and hemoglobin content 11.5 ± 1.5 g/in ml compared to 4.04 ± 0.5 × 10^6 and 7.3 ± 1.3 g/in ml in the female. The female fish had significantly higher values of ESR in comparison of male. It may be due to different plasma viscosity and specific gravity of the erythrocyte is responsible for different ESR values.

Fish live in very intimate contact with their environment and are very susceptible to minor physical and chemical change in the surrounding. These changes can alter their physiology which may be assessed by blood parameters. The use of hematological indices in assessment of fish physiology was proposed by Hesser (1960), since then hematology has been used as an index of fish health status in a number of fish species to detect physiological changes, as a result of exposure to different environmental conditions such as handling, pollutants, metals, hypoxia, anaestehtics, season and acclimation (Blaxhall, 1972; Ogbulie and Okpokwasili, 1999; Alwan *et al*., 2009). No published information is available on the hematological variation in catfish *Rita rita* from Pakistan. Earlier various workers have published hematological studies on carps, channa and tilapia species from Pakistan and elsewhere. On the contrary very few studies are available on the catfish like (Ahmed and Banerji, 1984; Sardar *et al*., 1999) on *Clarias batrachus* and (Willam *et al*., 2016; Deghayem *et al*., 2017) on *Clarias gariepinus*. The aim of hematological studies was to monitor the health status and screening of blood parameters of wild *R. rita* in relation to sex from Indus River near Jamshoro. The present communication will help future researcher for further study on the hematological variation in different seasons especially during breeding season.

Materials and methods

For hematological studies blood samples from fish of size ranged from 21.0-33.5cm and 139-500 g in length and weight for both the sexes, respectively, were collected during March-May 2016 from Indus River near Jamshoro Sindh, Pakistan. Total 100 samples were procured and preserved for subsequent studies. Samples for blood analysis were obtained through heart puncture by sterilized syringe.

Hemoglobin was enumerated as recommended through Sahli hemogloblenometer (Hesser, 1960) and expressed in g% in broad day light from lower to the top of the measuring tube through graduation mark of miniscus. The rate of red blood sedimentation (ESR) was measured by the distance erythrocyte had sedimented in scale from top of the hematocrit tube and were enumerated as mm/h. The total erythrocyte and leucocytes counts were made with the Neubauer counting chamber.

Results and discussion

Table I show the various hematological parameters of the male and female fish. Total erythrocytes count and hemoglobin concentration was found to be higher in male compared to female (5.05 ± 0.5 × 10^6 and11.5 g/100 ml and 4.04 ± 0.5 × 10^6 and 7.3 g/100 ml, respectively). On the contrary female showed significantly higher values of erythrocyte sedimentation rate than male (4.5 and

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5.5mm/h). Rest of the parameters showed no significant variation between the sexes.

Table I.- Hematological indices of male and female catfish, *Rita rita* from Indus River near Jamshoro.

Parameters	Male (n=50)	Female (n=50)
	Mean (Range)	Mean (Range)
Length (cm)	27.2 ± 5.5[2] (21.0 - 33.5)	27.2 ± 5.5[2] (21.0 - 33.5)
Weight (g)	319.5 ± 35.0[2] (139 – 50)	319.5 ± 35.0[2] (139 – 500)
Hb (g/100 ml)	11.5[a1] ± 1.5[2] (10.0 - 13.0)	7.3[b1] ± 1.3[2] (6.0 - 8.6)
ESR (mm/h)	4.5[b1] ± 0.5[2] (4 – 5)	5.5[a1] ± 0.5[2] (5 – 6)
TEC (× 10^6)	5.05[a1] ± 0.5[2] (4.5 - 5.1)	4.04[b1] ± 0.5[2] (3.5 - 4.5)
TLC (×10^3)	28.05[a1] ± 0.5[2] (27.5 - 28.1)	28.5[a1] ± 0.5[2] (27.5 - 28.5)
Differential count (%)		
Large Lymphocytes	2.5[a1] ± 0.3[2] (2.3 - 2.8)	2.5[a1] ± 0.3[2] (2.3 - 2.8)
Small Lymphocytes	69[a1] ± 1.0[2] (68.0 -70.0)	69[a1] ± 1.0[2] (68.0 - 70.0)
Thrombocytes	14.5[a1] ± 1.5[2] (12.0 - 16.5)	14.5[a1] ± 1.5[2] (12.0 - 16.5)
Monocytes	1.5[a1] ± 0.04[2] (1.2 - 1.6)	1.5[a1] ± 0.04[2] (1.2 - 1.6)
Neutrophils	24.5[a1] ± 1.0[2] (23.5 - 25.5)	24.5[a1] ± 1.0[2] (23.5 - 24.5)

[1]Figures in the same row having same superscripts are not significantly ($p<0.05$) different when compared on the basis of Duncan's new Multiple Range test. [2]Standard deviation.

Narejo *et al.* (2001) recorded hemoglobin concentration was higher in male (9.65% of blood and female 7.95%) in *Monopterus cuchia* and in male *Pangasius sutchi*, Rashid *et al.* (2002) recorded the range of Hb 6-10% with a mean of 8.45% of blood from Bangladesh. Willam *et al.* (2016) studied the hematological difference in African catfish *Clarias gariepinus* reared in pond and river from Nigeria Ranged of Hb were found to between 12.12-12.94% in both environments. Deghayem *et al.* (2017) and Odo *et al.* (2017) observed Hb values in African catfish *Clarias gariepinus* from Saudi Arabia. The ranged of hemoglobin was between 11.83-13.67%. The above ranges are in accordance with the present study. It could be due to accessory breathing organ in the experimental fish.

Conclusion

It was observed that value of total erythrocytes count and hemoglobin concentration was found to be significantly higher in case of male (5.05 ± 0.5 × 10^6 and 11.5.0% and 4.04 ± 0.5 × 10^6 and 7.0%) then female. Erythrocyte Sedimentation Rate was found more in female (5.5mm/h and 4.5mm/h) than male. Leucocyte and differential count did not show significant difference between the sexes.

Statement of conflict of interest

Authors have declared no conflict of interest.

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