

SCIENTIFIC COMMUNICATION

Evaluation of the haematological parameters in *Piaractus mesopotamicus* Holmberg (Osteichthyes, Characidae) with *Argulus* sp. (Crustacea, Branchiura) infestation and treatment with organophosphate

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ABSTRACT. Haematological parameters as erythrocytes, leukocytes and plasma glucose in *Piaractus mesopotamicus* Holmberg, 1887 were analyzed. Fish were parasitized with *Argulus* sp. (Crustacea, Branchiura) and treated with 0.4 mg of thriclorphon 500/L water. The effects of parasitism and the action of the treatment were evaluated. Parasitized fish showed greater number of monocytes ($P>0.05$) and special granulocytic cells ($P<0.01$) in the peripheric blood than the unparasitized (control) fish. Parasitized fish showed lower number of thrombocytes ($P>0.05$). Organophosphate treatment presented significantly reduction ($P>0.05$) in red blood cells (RBC) and hemoglobin.

KEY WORDS. *Piaractus mesopotamicus*, *Argulus*, parasitism, haemathology

Haematological studies on Brazilian fishes associated to the parasitism in culture system (RANZANI-PAIVA *et al.* 1987) or in the nature (RANZANI-PAIVA *et al.* 1997) are rarely observed. In the present study, the authors compare the effects of the natural parasitism with *Argulus* sp. (Crustacea:Branchiura) and the response to the organophosphate treatment. Comparison was performed on treated and untreated pacu *Piaractus mesopotamicus* Holmberg, 1887.

Ten fish with 215.0 ± 39 g of body weight and 19.8 ± 1.1 cm of length, were collected from a pond at Aquaculture Center – CAUNESP, Jaboticabal, São Paulo State, Brazil. Fish presenting the crustacean *Argulus* sp. on their body, were maintained in a 250-litter aquarium.

The ranges of temperature, pH, electric conductivity, and dissolved oxygen were between 27.3 and 28.0°C, 7.5 and 7.6, 186.0 and 190.0 $\mu\text{S}/\text{cm}$ and 4.0 and 4.1 mg/L, respectively.

Fish were submitted twice to 0.4 mg of thriclorphon 500/L of water within a two-day interval. In the fifth day, with the aid of a syringe containing EDTA (10%), 1 ml of the blood was collected from the caudal vein.

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Table I. Haematological parameters of *Piaractus mesopotamicus* parasitized with *Argulus* sp. before and after treatment with 0,0-Dimetil (1-hidroxi-2,2,2-tricloroetil) phosphate.

Parameters	Untreated		Treated
	Control	Parasitized	Parasitized
RBC ($10^3/\mu\text{l}$)	2494.0 \pm 1.0 a	2260.0 \pm 2.5 aA	1922.0 \pm 1.0 B
Hemoglobin (g/%)	10.4 \pm 1.0 a	9.4 \pm 1.0 aA	8.2 \pm 0.5 B
Hematocrit (%)	29.2 \pm 2.0 a	26.8 \pm 3.5 aA	25.2 \pm 3.5 A
MCV (%)	117.6 \pm 0.8 a	119.6 \pm 9.0 aA	133.7 \pm 14.0 A
MCH (pg)	41.8 \pm 2.5 a	42.2 \pm 1.5 aA	43.4 \pm 1.0 A
MCHC (%)	35.5 \pm 1.5 a	35.5 \pm 3.0 aA	32.7 \pm 3.0 A
Glucose (mg/dl)	76.4 \pm 6.5 a	71.8 \pm 5.5 aA	68.8 \pm 10.0 A
WBC (μl)	1360.0 \pm 233.0 a	2400.0 \pm 1770.0 aA	2160.0 \pm 623.0 A
Thrombocytes (%)	82.6 \pm 12.5 a	61.4 \pm 13.0 bA	61.2 \pm 8.0 A
Lymphocytes (%)	12.0 \pm 3.5 a	17.4 \pm 9.0 aA	15.0 \pm 8.0 A
Monocytes (%)	4.2 \pm 0.5 b	13.0 \pm 1.4 aA	9.6 \pm 2.5 A
Neutrophils (%)	1.2 \pm 1.5 a	6.0 \pm 7.7 aA	7.0 \pm 4.0 A
SGC (%)	0.0 \pm 0.0 b	2.2 \pm 1.0 aA	7.2 \pm 5.0 A

(* Mean values followed by the same letter do not differ statistically by the F-test ($P < 0.05$).

The experimental design was in blocks and each fish was considered an individual block (PIMENTEL GOMES 1985).

Blood smear were stained according to ROSENFELD (1947) to differential defense blood cells (leucocytes and trombocytes) counts. Red blood cells (RBC) and white blood cells (WBC) were analyzed in the Neubauer chamber. Hemoglobin and hematocrit determination followed COLLIER (1944) and GOLDENFARB *et al.* (1971) methods, respectively. Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were evaluated according to the method proposed by WINTROBE (1934). Plasma glucose were analysed according to the enzymatic method (Labtest, Glicose God-Ana).

According to the results, *Argulus* infestation were not significant ($P > 0.05$) to RBC and WBC, hemoglobin, hematocrit, MCV, MCH, MCHC, plasma glucose, lymphocytes and neutrophils. However, the parasites presence increase monocyte ($P > 0.05$) and special granulocytic cells number (SGC) ($P < 0.01$). Infestation decreased thrombocytes number ($P > 0.05$) as shown in the table I. Similar studies describes significant changes in the blood analysis of parasitized carp, *Cyprinus carpio* Linnaeus, 1758 (Cyprinidae) (RANZANI-PAIVA *et al.* 1987). RANZANI-PAIVA *et al.* (1989) did not observe changes in the plasma glucose. SHIMURA *et al.* (1983) related significant decrease in the RBC and WBC, hemoglobin and hematocrit of *Oncorhynchus masou* Brevoort (Salmonidae) parasitized with *A. coregoni*. These observations were performed for a ten-day period and plasma glucose showed an increase after 24 hours post-infestation. In the present study, pacu showed lower number of thrombocyte, greater number of monocytes and special granulocytic cells.

Organophosphate treatment provoked significant decrease ($P > 0.05$) in RBC and hemoglobin. Nevertheless, organophosphate treatment had not effect on the other haematological parameters ($P > 0.05$) (Tab. I). On the other hand, RANZANI-PAIVA *et al.* (1987) observed a decrease in the MCV, MCHC, leucocytes total count, neutrophills, special granulocytic cells and monocytes in carps (*C. carpio*).

Data from this study showed that the variation in the haematological parameters of different fish species may occur and more researches on haematology and other common chemotherapeutics utilized in aquaculture systems must be done.

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