

A STUDY ON SOME HEMATOLOGICAL CHARACTERISTICS OF HEALTHY EUROPEAN CATFISH (*Silurus glanis*) and AFRICAN CATFISH (*Clarias lazera*)

Fikri Aydın¹

Hijran Yıldız Yavuzcan¹

Serap Pulatsü¹

Sağlıklı Yayın Balıkları (*Silurus glanis*) ve Karabalıklarda (*Clarias lazera*) Bazı Hematolojik Parametreler Üzerine Bir Çalışma

Özet: Sağlıklı Avrupa yayın balığı (*Silurus glanis*) ve karabalıklarda (*Clarias lazera*) bazı hematolojik parametrelerin normal değişim aralığını belirlemek amacıyla hematokrit, hemoglobün, kırmızı ve beyaz kan hücreleri ile trombosit sayıları ve toplam plazma proteini saptanmış, Wintrobe eritrosit indisi (OAH, OAHb, OAHbY) hesaplanmıştır.

Anahtar Kelimeler : Avrupa Yayın balığı, Karabalık, hemotokrit, hemoglobün

Summary: In European catfish (*Silurus glanis*) and African catfish (*Clarias lazera*), hematocrit, hemoglobin concentration, red blood cells, white blood cells, trombocyte counts, total plasma protein were determined and Wintrobe erythrocyte indices (MCH, MCHC, MCV) were calculated. A normal ranges of some hematological parameters for healthy individuals were presented.

Key Words: European catfish, African catfish, hematocrit, hemoglobin

Giriş

Hematological characteristics are of value in assessing conditions of fish health and disease in fish (Basio and Arago, 1988; Kocabatmaz ve Ekingen, 1982; Kori, Siakpere, 1985; Tisa af al, 1983).

The application of hematological techniques including measurement of hemoglobin concentration, hematocrit, red blood cells (RBC) and white blood cells (WBC) as well as Wintrobe erythrocyte indices have valuable in determining the health of fish and monitoring stress responses (Ezzat at al, 1974; Stoskopf, 1993). Total plasma protein is also clinically important in the health status and nutritional condition of fish (Fida at al, 1988; Johnston at al, 1987).

According to Kocabatmaz and Ekingen (1982), hematocrit, hemoglobin, RBC, WBC, trombocyte, and total plasma protein values in anesthezied *Silurus glanis* were 25.0 3.3 (%), 6.4 1.0 (g/dl), 1.492 0.42 ($\times 10^6/\text{mm}^3$), 11.1 3 ($\times 10^4/\text{mm}^3$), 1.4 (0.2 ($\times 10^4/\text{mm}^3$) and 2.34 0.3 (g%) respectively.

For channel catfish (*Ictalurus punctatus*), total plasma protein, RBC, WBC, hematocrit and hemoglobin were reported as 2.2-4.5 (g/dl), 1.6-2.4 (mil/mm^3), $28.1 \times 10^3/\text{mm}^3$, 22.7-39.3 (%) and 4-8.4 g/dl respectively (Stoskopf, 1993). Moreover, Grizzle (1977) had been determined that, hematocrit, 34.0 1.6 (%), hemoglobin 7.0 0.34 (g/dl), erythrocyte 2.41 0.23 ($\times 10^6/\text{mm}^3$), leucocyte 173 28.0 ($10^3/\text{mm}^3$) for channel catfish (*Ictalurus punctatus*).

Kori-Siakpere (1985) stated that hematological parameters for *Clarias isheriensis* were hemoglobin (g/dl) 14.56, hematocrit (%) 31.62, RBC (mil/mm^3) 1.55 and total plasma protein (g/dl) 3.27.

The difficulty of interpreting hematological profile is caused by many factors such as genetic variation, diet composition and some abiotic environmental conditions (Kocabatmaz and Ekingen, 1982; Kori-Siakpere, 1985).

This descriptive study of the basic blood characteristics is a continuation and addition to knowledge of physiology of European catfish and African catfish.

Material and Method

Source of Fish :Live specimens of *Silurus glanis* (1530±147 g, and 53.33±2.03 cm) and *Ctarias lazera* (588 ±101 g and 43.17±3.35 cm) were obtained from Çifteter-Sakaryabaşı Fish Culture Station. All fish were maintained in pond prior to transfer to laboratory. The range of pond water characteristics were temperature 21.5-22 °C, pH 5.5-6.5, dissolved oxygen 5.80-6.00 mg/l.

The fish were fed with viscera of other fish. All fish was female and considered healthy on the basis of their appearance and the absence of obvious signs of disease.

Blood sampling : Fish were exposed to anaesthesia using Quinaldine to facilitate of handling and blood sampling. Blood samples were drawn by direct cardiac puncture into heparinized syringes.

Blood and plasma analysis : Hematocrit measurements were made immediately by drawing well-mixed samples of blood into heparinized capillary tubes and centrifuging 12500 rpm for 5 minutes (Robert, 1978). Total hemoglobin was determined using cyanomethemoglobin method using Drabkins reagent (Stoskopf, 1993). Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were calculated from hemoglobin, hematocrit values and red blood cell counts. Total plasma protein was measured based on the biuret method (Schaperclaus, 1979).

Results and Discussion

The average values for each measured blood parameters of European catfish (*Silurus glanis*) and African catfish (*Ctarias lazera*) were presented in Table 1 and Table 2 respectively.

In general hematological parameters determined in our study are similar to those reported for *Silurus glanis* (Kocabatmaz and Ekingen, 1982), *Ictalurus punctatus* (Grizzle, 1977) and *Clarias isheriensis* (Kori-Siakpere, 1985). Ne-

vertheless, leucocyte values obtained in this study were lower than the values reported by Kocabatmaz and Ekingen (1982) and Grizzle (1977). This difference can be attributed to many factors such as, species, age, diet and water conditions. Thus, the hematological characteristics of fish can only be meaningful in their environment.

The present study was undertaken to establish a normal hematological profiles of *Silurus glanis* and *Clarias lazera* to provide a basis for comparative surveys. It is hoped that this preliminary study could contribute to knowledge of physiology of these species.

Table 1. Means of hematological parameters for *Silurus glanis*.

Parameter	Mean±SE	Range
Hematocrit (%)	29.75±0.45	27.0-31.0
Hemoglobin (g/dl)	9.02±0.13	8.22-9.38
RBC (mil./mm ³)	1.1±0.51	0.85-1.3
WBC (1000/mm ³)	17.0±1.29	10.0-24.0
Trombocyte (1000/mm ³)	2.40±0.40	0-4.0
MVC (fl)	249.6±10.1	231.5-289.2
MCH (pg)	86.49±5.01	70.5-107.2
MCHC (g/dl)	30.66±0.494	30.0-33.0
Total plasma protein (g/dl)	4.69±0.55	3.40-5.93

Table 2. Means of hematological parameters for *Clarias lazera*.

Parameter	Mean±SE	Range
Hematocrit (%)	33.42±1.27	24.0-43.0
Hemoglobin (g/dl)	9.35±0.34	7.38-12.43
RBC (mit./ mm ³)	1.26±0.87	1.03-1.61
WBC (1000/ mm ³)	35.0±3.48	21.0-54.0
Trombocyte (1000/ mm ³)	1.40±0.52	0-5.0
MVC (fl)	258.7±17.8	188.3-303.7
MCH (pg)	83.52±2.85	74.50-92.40
MCHC (g/dl)	31.2±0.85	28.0-37.0
Total plasma protein (g/dl)	3.53±0.06	3.30-3.79

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