Journal of Genetic and Environmental Resources Conservation, 2015, 3(2):121-125.
www.jgerc.com

Blood components and constituents of Little Egret *Egretta garzetta*

Faris A. Al-Obaidi

Iraq Natural History Research Center & Museum, University of Baghdad, Iraq.
dr_faris07@yahoo.com

Abstract

The objective of this study was to determine some blood components and constituents of native Little Egret (*Egretta garzetta*). A total of twelve (6 males and 6 females) individuals of Little Egret were collected from Al-Tarmiya lakes north of Baghdad city during 2014, half the number were collected at Winter and the other half were collected at Summer. Samples of 1.0 ml of whole blood were taken from the wing vein from individuals to determined electrophoretic pattern of serum proteins in three replicates for each sex within species. Results revealed that the average PCV, red cell count, white cell count and hemoglobin concentration were 35.765, 3.90, 25.17 and 8.80mg/100ml respectively during Winter and 35.32%, 3.33, 24.45 and 7.65mg/100gm respectively during Summer. Protein, uric acid, cholesterol and lipid concentrations were 5.42, 4.33, 206 and 4.01gm/100gm respectively during Winter and 5.18, 4.16, 193 and 3.74gm/100gm respectively during Summer. GOT, GPT and ALP activities were 98, 8.8 and 36.3U/l respectively during Winter and 113, 10.1 and 34.5U/l respectively during Summer. Significant differences ($P<0.05$) were found in blood cellular, biochemical traits and enzymes activity due to season. Also, sex differences ($P<0.05$) were found in blood cellular and biochemical traits, whereas no significant sex differences were found in blood enzymes activity.

Keywords: Little Egret, *Egretta garzetta*, Blood components, Constituents, Iraq.

Introduction

The Little Egret (*Egretta garzetta*) is a small white heron, it's a common native birds of Iraq (Allouse, 1962; Moudhafer *et al.,* 2006). There are three subspecies of Little Egret: first, *Egretta garzetta garzetta*–Europe, Africa, and most of Asia including Iraq. Second, *Egretta garzetta nigripes*–Indonesia east to New Guinea. Third, *Egretta garzetta immaculata*–Australia and non-breeding New Zealand, often considered synonymous with *E. g. nigripes* (BirdLife International, 2008).

The adult Little Egret weighs 350–550gm and about 55–65cm long with an 88–106cm wingspan. Its plumage is all white. The subspecies *garzetta* has long black legs with yellow feet and a slim black bill. In the breeding season, the adult has two long nape plumes and gauzy plumes on the back and breast, and the bare skin between the bill and eyes becomes red or blue. Juveniles are similar to non-breeding adults but have greenish-black legs and duller yellow feet. has yellow feet and a bare patch of grey-green skin between the bill and eyes. The subspecies *nigripes* differs in having yellow skin between the bill and eye, and blackish feet (Chokri and Selmi, 2011; Fasola *et al.,* 2002; Hafner *et al.,* 2002).

Little Egrets are mostly silent but make various croaking and bubbling calls at their breeding colonies and produce a harsh alarm call when disturbed. Its breeding distribution is in wetlands in warm temperate to tropical parts of Europe, Africa, Asia, and Australia. In warmer locations, most birds are permanent residents; northern populations, including many European birds, migrate to Africa and southern Asia. They may also wander north in late summer after the breeding season, which may have assisted its current range expansion. Globally, the Little Egret is not listed as a threatened species (Hoyo, 1992; Holling, 2010).

To our knowledge only very few studies about Little Egret in Iraq, Al-Obaidi and Al-Shadeedi (2013) studied the blood serum proteins and the results revealed that Little Egret blood serum proteins were separated into seven different regions, these bands were pre–albumen, albumen, post–albumen, α-globulin, β-globulin, γ- globulin and transferrin respectively, no significant sex differences were found in serum protein fractions. The aim of this study was to determine some blood components and constituents of native Little Egret.

Material and Methods

A total of twelve (6 males and 6 females) individuals of Little Egret were collected from Al-

Tarmiya lakes north of Baghdad city during 2014, half the number were collected at Winter and the other half were collected at Summer. Samples of 1.0ml of whole blood were taken from the wing vein on the inside of the elbow joint from individuals. The bird was held with its back downward and the wing laterally spread. Removal of a few feathers made the vein visible (Schermer 1967).

Whole blood was drawn from each bird by an insulin syringe needle and put in a 10ml test tube until to clotting. The blood was centrifuged for 5 minutes. The serum was removed by a transfer pipette to clean test tube and frozen.

Blood cellular traits included in this study were packed cell volume (PCV) was determined according to Archer (1965), red blood cell count (RBC) and leucocytes or white blood cell count (WBC) were determined according to Natt and Herrick (1952), hemoglobin concentration (Hb) according to Varley *et al.* (1980). Differential leucocytes count was determine using Wright-Giemsa stain (Shen and Patterson, 1983) and heterophil to lymphocyte ratio (H/L) estimated according to Burton and Guion (1968).

Blood Biochemical traits included were plasma total proteins which was determined by using colorimetric method described by Gornall *et al*. (1949), uric acid was determined according to Henry *et al*. (1982), cholesterol was determined according to Franey and Elias (1968) and plasma lipid was determined according to AOAC (1980).

The activities of GOT, GPT and AP in blood serum were determined photometrical using commercial Bio-test kit (RANDOX).

Statistical analysis was carried out using computerized statistical analysis program (SAS, 2001).

Results and Discussion

The average PCV, red cell count, white cell count and hemoglobin concentration were 35.765, 3.90, 25.17 and 8.80mg/100gm respectively during Winter and 35.32%, 3.33, 24.45 and 7.65mg/100gm respectively during Summer (Table 1). Protein, uric acid, cholesterol and lipid concentrations were 5.42, 4.33, 206 and 4.01 respectively during Winter and 5.18, 4.16, 193 and 3.74100gm respectively during Summer (Table 2). GOT, GPT and ALP activities were 98, 8.8 and 36.3 respectively during Winter and 113, 10.1 and 34.5 respectively during Summer (Table 3).

Significant differences ($P<0.05$) were found in blood cellular, biochemical traits and enzymes activity due to season. Also, sex differences ($P<0.05$) were found in blood cellular and biochemical traits, whereas no significant sex differences were found in blood enzymes activity except ALP.

It is well known that hematological parameters in birds depend on age and sex and that they may also vary due to season or based on time of sampling and, according to some authors, even due to feed (Maxwell and Robertson, 1998; Fudge, 2000). We found most of the differences between males and females in all parameters related to red blood cells (PCV, RBC and Hb). Males showed significantly higher values than females in most parameters, which conforms to similar findings in chicken (Pampori and Saleem, 2007; Pandian *et al.,* 2012), geese (Lazar *et al.,* 1991), turkeys (Mary and Gomathy, 2008), budgerigars (Itoh, 1992), Japanese quail (Mihailov *et al.,* 1999) and common pheasants (Hauptmanova *et al.,* 2006). We assumed that the reason for the difference is a higher level of estrogens in blood of female birds, which reduces the values of red blood cell count. At the same time an opposite effect is caused by testosterone in males (Itoh, 1992), also the significantly increased of cellular blood parameters in males occurred during the period of growth and decreased during the period of reproductive activity (Hauptmanova *et al.,* 2006).

The values were in agreement with the findings of Pampori and Saleem (2007) and Mary and Gomathy (2008). Numerically lower cellular blood parameters during Summer in the present study may be due to the hot temperature in Summer compared with Low temperature during Winter. This might have resulted in changes in blood volume due to hemodilution in Summer and low blood viscosity (Pandian *et al.,* 2012).

Serum transaminase enzymes of glutamic oxaloacetic acid transaminase (GOT), which also called Aspartate aminotransferase (AST) and glutamic-pyruvic acid transaminase (GPT) are type of enzymes that help produce chemical reactions in the body. It is found mainly in the blood but also in certain body tissues, especially the heart and the liver. Alkaline phosphatase (AP) is present in nearly all tissues and organs, in particular liver and in bones, where it is associated with osteoblastic processes. In avian and poultry, males have consistently higher values for AP compared to females (Mauro *et al.,* 1990; Niu *et al.,* 2009; Al-Obaidi and Al-Shadeedi, 2011).

Table (1): Blood cellular traits of Little Egret.

Season	Sex	PCV (%)	RBC (X 10^6/ml)	WBC (X 10^6/ml)	Hb (gm/100ml)
Winter	Males	36.62a	3.47a	25.17a	8.88a
	Females	35.89b	3.31b	25.16a	8.72b
	Average	35.76A	3.90A	25.17A	8.80A
Summer	Males	35.60a	3.39a	24.43a	7.69a
	Females	35.04b	3.27b	24.46a	7.60b
	Average	35.32 B	3.33B	24.45B	7.65B

Different letters among columns revealed significant differences (P<0.05), large letters between season and the small letters between sex.

Table (2): Blood serum biochemical traits of Little Egret.

Season	Sex	Protein (mg/100gm)	Uric acid (mg/100gm)	Cholesterol (mg/100gm)	Lipid (mg/100gm)
Winter	Males	5.43a	4.33a	207a	3.99a
	Females	5.40a	4.34a	204a	4.02a
	Average	5.42A	4.33A	206A	4.01A
Summer	Males	5.17a	4.15a	196a	3.78a
	Females	5.18a	4.17a	190a	3.70a
	Average	5.18B	4.16B	193B	3.74B

Different letters among columns revealed significant differences (P<0.05), large letters between season and the small letters between sex.

Table (3): Blood serum enzymes of Little Egret.

Season	Sex	GOT (U/l)	GPT (U/l)	ALP (U/l)
Winter	Males	97a	8.8a	34.2a
	Females	99a	8.8a	34.9a
	Average	98B	8.8B	34.5B
Summer	Males	112a	10.0a	35.7a
	Females	114a	10.1a	36.9a
	Average	113A	10.1A	36.3A

Different letters among columns revealed significant differences (P<0.05), large letters between season and the small letters between sex.

All heat-stressed birds displayed systemic inflammation and activated biochemical markers included increased plasma levels of blood glutamic oxaloacetic transaminase, glutamic pyruvic transaminase and alkaline phosphatase; increased levels of glutamate, glycerol and lactate/pyruvate ratio; and decreased striatal levels of partial pressure of oxygen and local cerebral blood flow, which were all observed during heat stress (Chen *et al.,* 2006). High environmental temperature, causing hyperthermia, leads to a sequence of physiological and metabolic changes resulting from the need to cool the body temperature or a sequence of metabolic events originated from the hyperthermia. In the birds, as well as other animals, one way of cooling the body is accomplished by panting and evaporative cooling, with eventual loss of carbon dioxide and development of respiratory alkalosis (Bogina *et al.,* 1996).

The increased activities in renal enzymes, following a long-term hyperthermia, include alkaline phosphatase, probably because of having an important role in the kidney function. This change could be associated with the increased of metabolic activities required to adjust blood pH, compensating and neutralizing the developing respiratory alkalosis caused by panting and hyperventilation in the process of cooling the body

(Bogina *et al.*, 1997; Chen *et al.*, 2006).

Conclusion

To our knowledge only very few studies about Little Egret in Iraq, to estimated large-scale geographical variation among populations in blood traits, so this results will provide a new data for Ornithologists in Iraq.

References

Al-Obaidi, F.A. and Al-Shadeedi, Sh.M.J. 2011. Effect of season on serum enzymes activity of Collared dove (*Streptopeliadecaocto*) and Laughing dove (*Streptopelia senegalensis*). Res. Opin. Anim. Vet. Sci.,1(3): 130-132.

Al-Obaidi, F.A. and Al-Shadeedi, Sh.M.J. 2013. Identification of electrophoretic pattern of Little Egret *Egretta garzetta* blood protein as a species classification. Proceeding of the 2nd Scientific Conference of Genetic and Environment, Baghdad, Iraq, 19 – 20 March 2013: 295-300.

Allouse, B. 1962. Birds of Iraq. Vol. I. (in Arabic). Al-Rabita Press, Baghdad.

AOAC, 1980. Official Methods of Analysis. 13th ed., Association of Official Analytical Chemists. Washington, D.C.

Archer, R.K. 1965. Hematological techniques for use on animals. Black Well Scientific Publications, Oxford.

BirdLife International 2008. *Egretta garzetta*. In: IUCN 2008. IUCN Red List of Threatened Species. Downloaded on 9 February 2009. Database entry includes justification for why this species is of least concern.

Bogina, E.; Pehb, H.C.; Avidara, Y.; Israeli, B.; Kevkhayea, E.; Lombardic, P. and Cahanerd, A. 1997. Sex and genotype dependence on the effects of long-term high environmental temperatures on cellular enzyme activities from chicken organs. Avian Pathol., 26: 511-524.

Bogina, E.; Avidar, Y.; Pech-Waffenschmidt, V.; Doron, Y.; Israei, B.A. and Kevkhayev, E.P. 1996. The relationship between heat stress, survivability and blood composition of the domestic hen. European J. Clin. Chem. Clin. Biochem., 34: 963-469.

Burton, R.R. and Guion, C.W. 1968. The differential Leucocyte blood count: Its precision and individuality in the chicken. Poultry Sci., 47: 1945-1949.

Chen, C.M.; Hou, C.C.; Cheng, K.C.; Tian, R.L.; Chang, C.P. and Lin, M.T. 2006. Activated protein C therapy in a rat heat stroke model. Critic. Care Med., 34(7):1960-1966.

Chokri M.A. and Selmi, S. 2011. Factors Affecting colony size and reproductive success of Little Egret *Egretta garzetta* in the Sfax Salina, Tunisia Waterbirds, 34(2): 234-238.

Fasola, M.; Hafner, H.; Keyser, Y.; Bennets, R.E. and Cezilly, F. 2002. Individual dispersal among colonies of Little Egrets *Egretta garzetta*. Ibis 144: 192–199.

Franey, R.J. and Elias, A. 1968. Serum cholesterol measurement based on ethanol extraction and ferric chloride-sulfuric acid. Clin. Chem. Acta, 2: 255-263.

Fudge, A.M. 2000. Laboratory Medicine: Avian and Exotic Pets. W.B. Saunders Company, Philadelphia.

Gornall, A.C.; Bardwill, C.J. and David, M.M. 1949. Protein determination in fluids. J. Biol. Chem., 177: 751.

Hafner, H.; Fasola, M.; Voisin, C. and Kaiser, Y. 2002. Little Egret *Egretta garzetta.* BWP update. The J. Birds Western Palearctic, 4: 1–19.

Hauptmanova, K.; Maly, M. and Literak, I. 2006. Changes of hematological parameters in common pheasant throughout the year. Vet. Med., 51:(1): 29–34.

Henry, R.J.; Sobel, C. and Kim, J. 1982. Determination of uric acid. In Fundamentals of Clinical Chemistry. N.W. Tietz, ed., W.B. Saunders Company, London.

Hoyo, J.D. 1992. Handbook of the Birds of the World, vol. 1. Barcelona: Lynx ed., pp. 412. ISBN 84-87334-10-5.

Holling, M. 2010. Rare breeding birds in the United Kingdom in 2008. British Birds, 103: 482–538.

Itoh, N. 1992. Some hematological values in budgerigars. J. Rakuno Gakuen University, 17: 61–64.

Lazar, V.; Pravda, D. and Stavkova, J. 1991. Analysis of the sources of variability of the hematological characteristics of geese (in Czech). Zivocisna Vyroba, 36: 517–523.

Mary, P. and Gomathy, V.S. 2008.Hematological and blood chemicals in male and female turkeys of different age groups. Tamilnadu J. Vet. Anim. Sci., 4: 60-66Maxwell, M.H. and Robertson, G.W. 1998. The avian heterophil leucocyte: A review. World Poult. Sci. J., 54: 155–178.

Mihailov, R.; Lasheva, V. and Lashev, L. 1999. Some hematological values in Japanese quails. Bulgarian J. Vet. Med., 2: 137–139.

Moudhafer, A.S.; Porter, R.F.; Langman, M. Christensen, B.; Schiermacker-Hansen, P. and Al-Jebouri, S. 2006. Field Guide To The Birds of Iraq. (in Arabic). Nature of Iraq and BirdLife International Press, Baghdad.

Natt, M.P. and Herrick, C.A. 1952. A new blood diluent for counting the erythrocytes and the

leucocytes of the chicken. Poultry Sci., 31: 735-738.

Pampori, Z.A. and Saleem Iqbal 2007. Hematological, serum chemistry and electrocardiographic evaluation in native chicken of Kashmir. International J. Poult. Sci., 6: 578.

Pandian, C.; Thangapandiyan, M.; Omprakash, A.V.; Thyagarajan, D. and Babu, M. 2012. Effect of season on hematological profile and erythrocyte indices in white leghorn layers. Tamilnadu J. Vet. Anim. Sci., 8(6): 389 – 392.

Schermer, S. 1967. The blood morphology of laboratory animals. 3rd ed., F.A. Davis Co., Philadelphia.

SAS, 2001. SAS / TAT Users Guide, SAS Institute Inc, Cary, NC, USA.

Shen, P.F. and Patterson, L.T. 1983. A simplified wright`s stain technique for routine avian blood smear staining. Poultry Sci., 62: 923–924 .

Varley, H.; Gowenlock, A.H. and Bell, M. 1980. Practical Clinical Biochemistry. 5th ed., William. Heinemann Medical Books Ltd., London.