

Effect of Age and Gender on the Body Weight and Some Physiological parameters of Local chickens

Milad A. Badi 1

Khalid C.K. Al-Salhie 2

Asaad Y. Ayied 2

2,1Department of Animal production, College of Agriculture, University of Basrah , Basrah, Iraq

*Corresponding author's e-mail: miladali901@gmail.com

Milad A. Badi:miladali901@gmail.com

Khalid Al-Salhie: khalid.chillab@uobasrah.edu.iq

Asaad Y. Ayied: asaad.yheia@uobasrah.edu.iq

Abstract

The current study aimed to investigate the effect of age and gender on body weight and some physiological parameters of local chickens. A total of 136 birds were used in this study., The parameters were taken from males and females at 2, 4, 6, and 8 months of age. The parameters include body weight, FSH, LH hormones, cholesterol, and triglycerides. The results showed that males recorded a high body weight compared to females at 4 and 8 months. The results showed a significant increase ($P \leq 0.05$) in the concentration of FSH in the blood serum of males compared to females at the age of 4 months. There was a significant increase ($P \leq 0.05$) in the concentration of triglycerides and cholesterol in the serum of males compared with females at two months. It can be concluded that the local chicken males grow faster than the females. On the other hand, males recorded higher levels of FSH, cholesterol, and triglycerides than females.

Keywords :Physiological traits, Body weight, Local chickens

Introduction

The local chicken is considered one of the most widespread farm animals and is distinguished by its mixed genetic makeup[13]. Chickens have domesticated long ago, leading to genetic and phenotypic developments to help them adapt to the surrounding environment. These circumstances resulted in communities of birds with inherited and similar morphological and physiological characteristics within the same species [7]. Local breeds are good genetic resources characterized by their ability to adapt to challenging environmental conditions and resistance to some diseases [5]. The Iraqi local chicken is one of the breeds classified for egg production [14]. However, its productive performance is weak compared to the international standard breeds [6]. The characteristic of body weight is one of the

important economic traits in poultry farming that is controlled by multiple factors. Understanding the factors affecting growth will provide an opportunity to improve birds' productive and physiological performance. Body weight can be defined as the size of the animal and its general condition, and the difference in body weight in the herd can be due to genetic reasons and environmental factors [11]. In a study conducted by [11] in Iraq using three local lines with ISA Brown. It was found that different lines significantly affect body weight in chickens at different ages, also reported significant differences in body weight at different ages using different breeds and lines of chickens. Gender was a significant source of variation in chicken performance, including body weight and growth rate [8].In Nigeria [3] found that males generally outperformed females of Ross and Anka strains at 6 and 9 weeks of age.

Excelled of males could be due to their ability to dominate during feeding and hormonal differences leading to faster muscle deposition in males than in females. The current study aimed to investigate the effect of some physiological parameters on the body weight of local chickens.

Materials and methods

The current study was conducted at a poultry farm in Wasit province, and laboratory tests were completed in the laboratories of the College of Agriculture/ University of Basrah for the period from 11/20/2020 to 9/30/2021. by rearing 136 local chicks at the age of one week and continued until the age of eight months. During this period, study samples were collected from both sexes at the age of 2, 4, 6 and 8 months. Chicks were reared on the floor in a half-open hall, divided by iron cutters and mesh wires equipped with air vacuums. The appropriate environmental conditions were provided for ventilation, heat and lighting. Water and feed. As he followed the preventive nutritional program used in raising laying hens.

Blood samples: Blood samples of five males and five females were collected from birds from the wing vein at 2, 4, 6 and 8 months using a 1 ml medical syringe in tubes free of anticoagulant to estimate some biochemical traits. The serum was separated from the other blood components using a centrifuge for 15 minutes at a speed of 3000 rpm. After that, the serum was preserved by freezing until the required examinations were performed.

Body weight: Weight (grams) was recorded using an electronic scale at the ages included in the study.

FSH and LH: According to the FSH and LH hormone concentration, using the ready-made measuring kit prepared by the American company Monobind Inc, using the ELISA technique to perform the examination, and following the leaflet attached to the (Kit.)

Triglyceride and Cholesterol: The concentration of triglycerides and cholesterol

in blood serum was estimated using the ready-made kit manufactured by the French company Biolab and followed the steps in the leaflet attached to the kit. The absorbance of the samples was measured using a spectrophotometer at a wavelength of 500 nm .

Triglyceride concentration (mg/mL 100) = sample absorbance / absorbance of standard solution x 200

Cholesterol concentration (100 mg/mL) = sample absorbance/standard absorbance x 200

Statistical Analysis: The data were analyzed using a statistical package (SPSS version 26.0 2019), analysis of variance was used for two factors, and the means were compared using the least significant difference.

Results and discussion

Table (1) indicates that there is a significant difference ($P \leq 0.05$) between males and females in the average body weight at the ages of (4 and 8) months. [4] Males are more effective in gaining weight in local chickens because of the effect of the gene on the sex chromosomes or because the sex hormones affect the bird's live body weight. [4] indicated in his study that males significantly excelled in females' growth traits at different ages. [1] confirmed the significant superiority of males over females in average body weight in four breeds of chickens, the broiler rose breed, the white breed, a local Iraqi breed, and the cochon breed and measurements. When protein concentration is high in the blood, it spreads to the membranes of the target cells to enter the cytoplasm by diffusion, then unites with its receptors spread in the cytoplasm of the target cells, then passes to the nucleus to bind with its attachment points. It activates the cloning process to produce "mRNA", which is released heading to the ribosomes to enhance the translation process to make the new protein [15]. The male sex hormone (testosterone) is one of the anabolic hormones [12]. Sex is also one of the reasons for the variation in the productive performance of chickens [2]. In Nigeria [3] found that males

generally outperformed females of Ross and Anka strains at 6 and 9 weeks of age. Excelled of males could be due to their ability to dominate during feeding and hormonal differences leading to faster muscle deposition in males than in females

Table (1) Mean of live body weights of local chickens according to gender and age (mean \pm standard deviation)

Traits	gender	Age (month)			
		2	4	6	8
weight (g)	females	488 \pm 60.1 6	893.2 ^B \pm 24.49	1300 \pm 184.5	1651 ^B \pm 75.65
	males	503.8 \pm 23. 55	1217.4 ^A \pm 99.35	1398 \pm 197.2 2	1858.8 ^A \pm 99. 60
	significant	N.S	*	N.S	*

Vertically different letters mean that there are significant differences at the level of ($P \leq 0.05$).

N.S means no significant differences.

The sex hormones FSH and LH

The results in Table (2) indicate that there is a significant increase ($P \leq 0.05$) in the concentration of FSH hormone in the serum of males compared with females at the age of 4 months. At the same time, there was no significant difference between males and females in the concentration of FSH hormone in serum at ages (2, 6, and 8) months. It is clear from the results that there is no significant difference between males and females in the concentration of the LH hormone in the blood serum at the different ages of the study. The results are consistent with that of [17] in their study on the effect of age at the first egg on reproductive

performance and hormone level in Chinese Pekingese chickens between levels of the hormones LH and FSH did not differ significantly in different age groups, and with the research of [10] about the breed of local Nigerian chickens, between the levels of hormones LH and FSH reached 4.35, 4.93 (ng/ml) at the age of sexual maturity and agreed with the findings of [2] in his study on the effect of cross-breeding between male Iraqi local chickens with Luman females. No significant differences were recorded in the sex hormones at the age of maturity in the first generation of hybrid.

Table (2) Concentration of FSH and LH (IU/L) in local chicken males and females at different ages (mean \pm standard deviation.)

Traits	gender	Age(month)			
		2	4	6	8
FSH	females	3.22 \pm 0.44	5.04 ^b \pm 0.15	6.44 \pm 0.54	7.60 \pm 0.53
	males	3.77 \pm 0.46	5.55 ^a \pm 0.51	6.19 \pm 0.56	7.58 \pm 0.86
	significant	N.S	*	N.S	N.S
LH	females	1.53 \pm 0.21	3.47 \pm 0.23	4.87 \pm 0.12	6.14 \pm 0.10
	males	1.65 \pm 0.19	3.82 \pm 0.17	4.95 \pm 0.09	6.20 \pm 0.13
	significant	N.S	N.S	N.S	N.S

Vertically different letters mean that there are significant differences at the level of ($P \leq 0.05$.)

N.S means no significant differences.

Triglyceride and cholesterol

According to Table 3 findings, there is no significant difference in triglyceride levels in blood serum at the various study ages between males and females. The findings show that at 2 months, the concentration of triglycerides and cholesterol in the blood serum of males is significantly higher than that of females ($P < 0.05$). The current findings aligned with those of [9], who found that at 40 days of age, male quail had significantly

higher serum cholesterol concentrations than female quail. At the ages of (4, 6 and 8) months, there was no apparent difference between males and females in the serum cholesterol levels. These findings agreed with those of [16], who found no statistically significant difference between males and females in the levels of cholesterol in Japanese quail birds' blood serum.

Table (3) Means of triglyceride and cholesterol concentration (mg/100 mL) of male and female local chicken at ages 2-8 months (\pm standard deviation.)

Traits	gender	Age (month)			
		2	4	6	8
Triglyceride	females	87.80 ^b \pm 3.98	94.23 \pm 2.17	101.24 \pm 1.17	110.30 \pm 1.75
	males	91.16 ^a \pm 3.32	96.79 \pm 1.41	104.71 \pm 1.35	110.99 \pm 2.85
	significant	*	N.S	N.S	N.S
cholesterol	females	80.19 ^b \pm 1.44	88.57 \pm 1.95	96.43 \pm 3.93	104.37 \pm 3.70
	males	94.69 ^a \pm 3.05	103.59 \pm 8.70	115.57 \pm 3.27	117.52 \pm 3.69
	significant	*	N.S	N.S	N.S

Vertically different letters mean that there are significant differences at $P \leq (0.05)$ level.

N.S means no significant differences.

Conclusions

It can be concluded that the local chicken males grow faster than the females. On the other hand, males recorded higher levels of FSH, cholesterol, and triglycerides than females. These findings conclude that local hens' body weight, LH and FSH hormone levels, cholesterol, and triglyceride levels are all influenced by age and gender. To enhance reproductive and productive performance, we advise doing research and other studies on local chickens, as well as studies on crossbreeding local chickens with other breeds.

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