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STUDY OF THE EFFECT OF THE GENETIC GROUP, EGG WEIGHT, AND THEIR INTERACTION ON THE PRODUCTIVE PERFORMANCE OF QUAIL BIRDS DURING THE GROWTH STAGE

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ABSTRACT

The aim of this study was to determine the effect of the genetic groups (three of local quails different with feather color, which are white, black and brown) and the egg weight (three classes of eggs are heavy, medium and light) and the interaction between them on productive performance during the growth phase (0-6 weeks of age). Eggs were individually weighed and graded into three groups: heavy (11.5-12.4g), medium (10.5-11.4g), and light (9.5-10.4g) inside each genetic group. The results of the statistical analysis showed a significant effect ($p \leq 0.05$) of the genetic group (feather color), egg weight and their interaction on the productive performance during the total breeding period.The brown birds had significantly higher values of body weight, weight gain, carcass characteristics and better feed conversion ratio in all analyzed weeks. The birds which hatched from heavy eggs showed higher value of body weight, weight gain, carcass characteristics, feed consumption and better feed conversion ratio. Brown birds which hatched from heavy eggs had higher value of body weight, weight gain and carcass characteristics, while brown birds which hatched from medium eggs had better feed conversion ratio. We can therefore consider brown quail as the best for fattening purposes.

Keywords : Feather color, egg weight, performance, Japanese Quail.

Introduction

In order to cover high market demands from animal protein, it became so necessary to diversify the breeding of animals particularly those having quick money cycle like Quails. So, quail fields could serve as an alternative instrument to meet protein needs and reduce the demand on chicken production. Moreover, the improvement of quail breeding was began to shut out their zootechnical characteristics very interesting such as the early of the bird related meat production (about 5 weeks of age), and its short generation interval compared to other avian species. In addition to that, Japanese quail exhibits diversity in morphological and phenotypic characteristics (Egahi, *et al.*., 2010) precisely in form including feather color (Badubi *et al.*., 2006). In fact, the genetics of Japanese quail̓s feather got both interests such as a biological standpoint for comparative studies between avian species, and a zootechnical standpoint for determine commercial lines or crosses (Minvielle *et al.*., 2007). A selection program not only affects the egg performance but also the feather color which depends upon different genes and there has been a strong likelihood of linkage of various feather color with quantitative traits that need to be explored (Delmore *et al.*., 2016). Genotype effect (feather color) showed significantly heavier body weight for brown compared to white Japanese quail at 7, 14 and 21 days of age (Eissa *et al.*, 2014). Al-kafajy *et al.* (2018) reported that the brown line had significantly higher body weight in most analyzed weeks of growing period as well as carcass dressing than other lines. Hakan, *et al.* (2015) indicated that different feather colors had a significant effect on live weight, feed intake, feed conversion ratio and carcass characteristics. In meat strain quails, the quality of the egg precisely egg weight has been reported as an important factor for economic breeding and propagation of the population (Kumaril *et al.*, 2008). A study showed that egg sizes had significantly influenced ($p<0.0001$) all parameters measured during the experimental periods. However, birds hatched from large sized eggs were suitable for better hatchling weight, whereas chickens hatched from small egg sizes were relatively better for hatchability, feed efficiency during growing stage, Chickens hatched from medium egg sizes were principally better for weight gain during brooder and grower stages with minimum feed efficiency, In conclusion; egg weight significantly affected the overall characteristics of chickens from day old to 50 weeks of age and the effect of egg weight only diminish for mortality after brooder stage (Kebede,2018). The performance potentiality of the chicken depends, in part, on egg quality which is an important parameter for embryogenesis as well as for one-day old chick quality and growth (Ewonetu, 2017). Other factors that affect hatchability of a breeding hen include genetic constitution of the embryo, disease, egg size, age and shell quality (King'ori, 2011). The average body weight of the quail produced from heavier eggs (large 11.51-12.50 g and jumbo: >12.51 g) was significantly higher than those from the smaller eggs (<10.51 g) (Petek, 2003). The different genotypes quail (yellow and wild-type or brown) showed a significant difference on egg quality particularly on eggs weight which females with brown feather carried out the high weight (N'dri Aya *et al.*, 2019). This came as confirmation of what Al-Neemy *et al.*

(2014) was noted that phenotypic group of quail had significant effect ($p \leq 0.0001$) on traits : live body weight, weight gain, feed conversion ratio, relative growth, production index and dressing percentage for group with brown feather. Therefore, the aim of the present study was conducted to examine the effect of genetic factors influencing feather color and egg weight on quail's performance during growing period.

Materials and Methods

This study was conducted in the quail birds unit of the General Authority for Agricultural Research / Nineveh Research Station fields in Errachidia, and continued for the period from 7/11/2019 to 21/12/2019 with the aim of studying the effect of the genetic group and egg weight on the productive performance of quail during the growing stage. Hatching eggs were obtained from the main clan herd, where eggs were collected depending on the external appearance of the mothers (color feathers), which was divided into three groups (white, black and brown). Eggs were individually weighed and graded into three groups: heavy (11.5-12.4g), medium (10.5-11.4g), and light (9.5-10.4g) inside each hereditary group. 216 birds were divided into three different egg weight factors, which are (heavy, medium and light) by 72 birds / weight. Each group included three duplicates at a rate of 24 birds each one. Birds were fed on one feed as shown in Table (1), it was according to the decisions of the National Research Council (NRC, 1994), and it was a growth diet with a protein ratio of 22.84% and a metabolic energy of 2998 Kcal/Kg that the birds were fed for the period 1-42 days, feed and water were provided *ad libitum*. After the fattening period (42 days age) 54 birds (18 birds from each color, by 6 birds from each egg weight group) were slaughtered. During the study, weekly live body weight, weight gain, feed consumption, feed conversion ratio and carcasses characteristics (carcass weight, breast weight, thigh weight, wings weight, bag weight, neck weight and carcass yield %) were determined. The feed conversion ratio was calculated as feed consumption / weight gain.

Table 1 : Composition of quail feeds during the experiment (%).

Ingredient %	Grower feed
Corn	50
Wheat	9
Soybean meal(44% crude protein)	30
Protein concentrate	5
yeast	2
Premix	1
Vegetable oil	2
Limestone	1
Calculated Value	
Crude Protein %	21.6
Metabolic Energy, kcal/kg	2932
Energy/Protein	136

Results and Discussion

The results of the statistical analysis showed a significant effect ($p \leq 0.05$) of the genetic group (feather color), egg weight and their interaction on the productive performance during the total breeding period. About live body weight, for genetic group, a remarkable difference was observed regarding the overall superiority of brown group which had highest weight at (6 week) followed by white group then black group, this came as confirmation of what Al-Neemy *et al.* (2014) and Hakan *et al.* (2015) was noted.

For egg weight effect, this study found significantly higher values for body weight for birds that hatching from heavy eggs than medium then light eggs during total breeding period as showing in table (2), these results were consistent with what (Petek, 2003) indicated. As for the interaction, it was the highest living weight of those birds that hatched from heavy eggs with brown feathers, as it reached (202.49 g), it didn't differ significantly from birds that hatched from heavy weight eggs with white feathers. Similarly, with regard to weight gain, in table (3) a significant effect was observed for genetic group, egg weight and the interaction between them, as the highest weight gain during the total breeding period was the share of brown and hatching birds from high-weight eggs.

It is noticed that the highest weight gain during the total period was shown by brown quail, which reached 190.11 g, followed by white quails 178.60 g, then black quail 173.29 g shearing grams, respectively. The hatched birds of heavy weight eggs showed the highest total weight gain, in which they were significantly superior to those of medium and light eggs hatched, reaching 189.14, 182.98 and 169.87 g, respectively. As for interaction, the highest weight gain during the total period was for brown quail hatched from heavy weight eggs, reaching 194.46 g, but the lowest weight gain for black quail hatched from lightweight eggs was 163.27g.

As for the feed consumption, the genetic group, the egg weight and the interaction between them had a significant effect on this trait shown in table (4).

During the total period of breeding, the results showed that black quail consumed significantly higher quantities of feed than brown quail, but it did not significantly differentiate what white quail consumed, as it reached 585.95, 589.30 and 578.01 g for white, black and brown, respectively. The hatched birds from heavy weight eggs consumed the highest amounts of feed compared to those hatched birds of medium weight eggs, and these in turn consumed significantly higher quantities of feed than the hatched birds from lightweight eggs, as the amounts of feed consumed during the total period of breeding reached 595.97, 585.31 and 570.78 g, respectively. As for the interaction, the group of black quail hatched from heavy-weight eggs was the highest in their consumption of feed during the total period, reaching 605.85 g, while the brown quail hatched from medium-weight eggs consumed the least amount of feed, which reached 566.86g. Table (5) showed the feed conversion ratio (fcr) of the groups in the 0-6 week period which was significantly affected ($p \leq 0.05$) by the color variant, egg weight and the interaction between them.

Brown quail showed the best efficiency in food conversion in which it was significantly superior compared to white quail, which in turn significantly outperformed black quail, as the food conversion factor reached 3.04, 3.29, and 3.40 g feed /g weight gain, respectively. The hatched birds of heavy and medium weight eggs had a significantly lower feed conversion ratio than the birds hatched from lightweight eggs, reached 3.16, 3.21 and 3.37 g /g. These results were consistent with what (Petek, 2003) and (Kebede, 2018) was indicated. As for interaction, the brown birds hatched from medium eggs had lower feed conversion ratio (2.96 g/g) compared with the white and black birds hatched from lightweight eggs which had higher feed conversion ratio (3.52 and 3.45 g/g) respectively. For carcass traits, it was observed from the statistics analysis for the data of this study that color feather variation had a significant effect ($p \leq 0.05$) on most carcass traits as shown in table (6).

Table 2 : Mean ± SE of genetic group, egg weight and their interaction effect on live body weight (g).

Treatments		**Genetic Group Effect**						
		W0	**W1**	**W2**	**W3**	**W4**	**W5**	**W6**
White		7.37±0.24 a	26.93±0.94 a	65.75±1.92 a	106.28±2.44 ab	138.23±2.96 b	163.84±3.88 b	185.96±4.80 b
Black		7.38±0.23 a	25.21±0.90 a	63.88±1.80 a	103.13±1.81 b	136.27±1.66 b	160.92±1.87 b	180.67±2.81 c
Brown		7.33±0.24 a	25.38±1.08 a	64.41±1.91 a	108.45±2.53 a	145.22±2.40 a	171.52±2.41 a	197.44±1.98 a
Egg Weight Effect								
Heavy		8.11±0.12 a	28.71±0.49 a	70.79±0.81 a	112.45±1.58 a	146.44±1.53 a	172.98±2.18 a	197.25±2.47 a
Med ium		7.34±0.10 b	25.73±0.61 b	64.37±0.78 b	106.55±1.51 b	140.93±2.04 b	166.98±2.33 b	190.32±2.39 b
Light		6.62±0.09 c	23.09±0.71 c	58.88±0.38 c	98.84±1.00 c	132.34±1.69 c	156.32±1.98 c	176.49±3.69 c
Genetic Group x Egg Weight Interaction								
White	Heavy	8.14±0.25 a	29.46±0.93 a	72.25±1.77 a	114.36±1.71 a	147.29±1.57 a	176.17±3.46 a	201.11±1.72 a
	Med.	7.32±0.24 cd	26.43±1.50 ab	64.74±1.33 c	106.27±1.13 b	138.71±2.11 b	164.25±3.07 b	188.30±1.61 bc
	Light	6.65±0.22 fe	24.90±1.42 bc	60.25±1.67 de	98.21±1.32 e	128.68±3.30 d	151.10±1.68 c	168.49±1.15 d
Black	Heavy	8.17±0.22 a	28.35±0.68 a	70.45±0.99 a	108.18±3.24 ab	141.27±1.59 ab	165.71±1.37 b	188.16±1.77 bc
	Med.	7.25±0.19 cd	24.54±0.54 bcd	62.25±0.80 cd	102.73±1.60 e	136.02±1.68 bc	162.27±2.37 b	183.85±1.44 c
	Light	6.72±0.18 def	22.74±0.92 cd	58.93±1.42 de	98.47±1.62 e	131.52±1.98 cd	154.77±1.72 c	169.99±1.25 d
Brown	Heavy	8.03±0.22 ab	28.31±1.05 a	69.67±1.39 ab	114.82±1.71 a	150.76±0.44 a	177.05±1.86 a	202.49±2.48 a
	Med.	7.46±0.10 bc	26.22±0.94 ab	66.11±1.02 bc	110.66±2.76 ab	148.07±1.68 a	174.42±2.76 a	198.83±2.20 a
	Light	6.49±0.12 f	21.63±0.56 d	57.41±1.21 e	99.86±2.63 de	136.82±1.58 bc	163.08±1.84 b	190.99±1.31 b

W0-W6=body weight at 1-35 days of age and a,b,and c = Means within the same effect with different letters are significantly differed in the same column.

Table 3 : Mean ± SE of genetic group, egg weight and their interaction effect on weight gain (g).

Genetic Group Effect								
Treatments		W0- W1	W1- W2	W2- W3	W3- W4	W4- W5	W5 - W6	W1 - W6
White		19.56± 0.72 a	38.82±1.26 a	1.01±40.53 ab	1.36±31.95 a	1.81±25.62 a	1.83±22.12 ab	4.6±178.6 b
Black		17.83 ± 0.74 b	1.03±38.67 a	1.06±39.25 b	1.66±33.15 a	0.81±24.65 a	1.63±19.75 b	2.62±173.29 c
Brown		18.06 ± 0.87 b	1.21±39.02 a	1.7±44.03 a	1.54±36.77 a	1.20±26.30 a	1.93±25.92 a	1.82±190.11 a
Egg Weight Effect								
Heavy		20.6±0.41 a	42.08±0.78 a	41.66±1.76 a	33.99±1.65 a	25.54±1.42 a	24.28±0.80 a	2.51±189.14 a
Med ium		18.39±0.59 b	38.64±0.78 b	42.18±1.4 a	34.38±1.36 a	26.05±0.95 a	23.34±1.77 a	182.98±2.35 b
Light		16.47±0.69 c	35.65±0.65 c	39.96±1.10 a	33.5±1.98 a	23.98±1.48 a	20.17±2.33 a	3.71±169.87 c
Genetic Group x Egg Weight Interaction								
White	Heavy	21.33±0.8 a	42.79±1.64 a	42.11±2.31 a	32.93±1.44 a	28.88±4.02 a	24.94±3.39 c	192.97±1.96 a
	Med.	19.11±1.27 ab	38.31±1.43 abc	41.53±1.30 a	32.44±2.18 a	25.54±2.06 a	24.04±1.96 abc	180.98±1.44 bc
	Light	18.25±1.21 abc	35.36±0.47 c	37.95±0.41 a	30.47±3.77 a	22.42±2.46 a	17.38±2.8 bc	161.84±1.01 d

Black	Heavy	20.19±0.58 ab	42.10±0.32 ab	37.73±2.88 a	33.09±4.83 a	24.44±0.68 a	22.45±2.39 abc	179.99±1.06 bc
	Med.	17.29±0.73 bcd	37.71±1.29 bc	40.48±1.78 a	33.29±1.65 a	26.25±0.69 a	21.58±2.68 abc	176.60±1.46 c
	Light	16.02±1.09 cd	36.19±1.27 c	39.54±0.37 a	33.05±2.62 a	23.25±2.15 a	15.22±1.83 c	163.27±1.06 d
Brown	Heavy	20.28±0.83 a	41.36±2.01 ab	45.15±3.09 a	35.94±2.06 a	26.29±1.59 a	25.44±3.09 ab	194.46±2.67 a
	Med.	18.76±1.02 abc	39.89±1.50 abc	44.55±3.67 a	37.41±2.87 a	26.35±1.82 a	24.41±4.91 abc	191.37±2.18 a
	Light	15.13±0.66 d	35.83±1.73 c	42.40±3.01 a	36.96±3.92 a	26.26±3.38 a	27.92±2.77 a	184.5±1.43 b

a,b,and c = Means within the same effect with different letters are significantly differed in the same column.

Table 4 : Mean ± SE of genetic group, egg weight and their interaction effect on Feed consumption (g).

Treatments		W1	W2	W3	W4	W5	W6	W1 - 6
Genetic Group Effect								
White		34.89±1.31 a	74.95±1.29 a	98.32±1.34 a	111.63±1.6 ab	124.75±1.59 a	141.21±2.63 b	585.75±5.6 ab
Black		35.08±1.32 a	71.28±1.6 b	100.26±1.94 a	115.78±1.67 a	125.67±1.26 a	141.24±3.68 b	589.3±7.20 a
Brown		33.58±1.35 a	66.68±1.33 c	92.83±1.67 b	109.18±1.55 b	123.84±1.98 a	151.9±2.55 a	578.01±3.9 b
Egg Weight Effect								
Heavy		37.19±1.27 a	74.46±1.53 a	97.62±2.42 a	112.41±2.09 a	126.29±1.12 a	148.99±1.31 a	596.97±4.54 a
Med ium		34.6±1.06 ab	70.48±1.56 b	98.73±1.61 a	112.47±2.02 a	123.25±1.99 a	145.78±1.44 a	585.31±5.6 b
Light		31.76±0.93 b	67.97±1.68 b	95.05±1.64 a	111.71±1.43 a	124.72±1.57 a	139.57±5.19 b	570.78±3.45 c
Genetic Group x Egg Weight Interaction								
White	Heavy	35.75±2.32 ab	77.16±2.71 a	100.52±3.42 a	109.34±2.79 ab	127.89±1.7 a	147.33±2.24 bc	597.99±9.52 ab
	Med.	36.19±2.49 ab	75.09±2.52 a	97.56±1.95 ab	113.66±3.38 ab	123.88±3.8 ab	143.85±2.17 c	590.22±4.28 ab
	Light	32.74±2.32 ab	72.61±1.03 ab	96.88±1.57 ab	111.88±2.58 ab	122.48±2.28 ab	132.46±3.57 d	569.05±6.54 cd
Black	Heavy	38.87±2.5 a	76.7±1.49 a	98.98±5.57 ab	117.16±4.12 a	126.91±1.79 a	147.23±1.11 bc	605.85±6.52 a
	Med.	33.79±1.34 ab	67.92±1.5 b	103.23±1.9 a	116.88±1.73 ab	127.45±2.29 a	149.59±1.53 bc	598.85±0.16 ab
	Light	32.57±1.32 ab	69.21±1.95 b	98.56±1.94 ab	113.31±2.99 ab	122.66±1.93 ab	126.89±1.72 d	563.2±4.47 d
Brown	Heavy	36.96±2.28 a	69.51±0.43 b	93.36±3.66 ab	110.74±3.24 ab	124.06±2.22 ab	152.44±2.33 b	587.07±4.97 abc
	Med.	33.81±1.91 ab	68.44±2.18 b	95.41±2.73 ab	106.87±2.87 b	118.44±2.73 b	143.9±2.65 c	566.86±6.8 d
	Light	29.96±0.87 b	62.09±0.58 c	89.72±2.03 b	109.95±2.46 ab	129.01±2.62 a	159.37±2.33 a	580.09±2.47 bcd

a, b, and c = Means within the same effect with different letters are significantly differed in the same column.

Table 5 : Mean ± SE of genetic group, egg weight and their interaction effect on feed conversion ratio (g feed/g weight gain).

Treatments	W0 - 1	W1 - 2	W2 - 3	W3 - 4	W4 - 5	W5 - 6	W1 - 6
Genetic Group Effect							
White	1.80 ± 0.11 a	1.94 ± 0.05 a	2.44 ± 0.08 a	3.55 ± 0.16 a	5.07 ± 0.36 a	6.79 ± 0.65 a	3.29 ± 0.07 b
Black	1.98 ± 0.07 a	1.85 ± 0.04 a	2.56 ± 0.06 a	3.57 ± 0.20 a	5.14 ± 0.17 a	7.46 ± 0.49 a	3.40 ± 0.02 a
Brown	1.87 ± 0.05 a	1.71 ± 0.04 b	2.13 ± 0.08 b	3.01 ± 0.13 A	4.79 ± 0.24 a	6.12 ± 0.44 a	3.04 ± 0.04 c
Egg Weight Effect							
Heavy	1.81 ± 0.06 a	1.77 ± 0.05 b	2.37 ± 0.10 a	3.37 ± 0.19 a	4.86 ± 0.24 a	6.35 ± 0.42 a	3.16 ± 0.06 b
Med ium	1.90 ± 0.09 a	1.83 ± 0.04 ab	2.36 ± 0.09 a	3.31 ± 0.14 a	4.79 ± 0.20 a	6.52 ± 0.46 a	3.21 ± 0.07 b
Light	1.95 ± 0.10 a	1.90 ± 0.06 a	2.40 ± 0.09 a	3.44 ± 0.22 a	5.36 ± 0.33 a	7.50 ± 0.69 a	3.37 ± 0.06 a
Genetic Group x Egg Weight Interaction							

White	Heavy	1.67 ± 0.06 a	1.81 ± 0.11 bc	2.41 ± 0.21 abc	3.33 ± 0.9 a	4.63 ± 0.74 a	6.15 ± 0.89 a	3.10 ± 0.08 cde
	Med.	1.92 ± 0.24 a	1.96 ± 0.01 ab	2.35 ± 0.09 abc	3.52 ± 0.11 a	4.95 ± 0.5 a	6.09 ± 0.63 a	3.26 ± 0.05 bc
	Light	1.82 ± 0.25 a	2.05 ± 0.01 a	2.55 ± 0.07 ab	3.79 ± 0.48 a	5.62 ± 0.73 a	8.13 ± 1.58 a	3.52 ± 0.06 a
Black	Heavy	1.92 ± 0.08 a	1.82 ± 0.05 bc	2.63 ± 0.05 a	3.70 ± 0.56 a	5.20 ± 0.08 a	6.72 ± 0.75 a	3.37 ± 0.05 ab
	Med.	1.97 ± 0.16 a	1.80 ± 0.04 bc	2.56 ± 0.16 ab	3.53 ± 0.16 a	4.86 ± 0.21 a	7.12 ± 0.76 a	3.39 ± 0.05 ab
	Light	2.06 ± 0.18 a	1.92 ± 0.11 abc	2.49 ± 0.07 abc	3.48 ± 0.34 a	5.37 ± 0.49 a	8.55 ± 0.88 a	3.45 ± 0.01 a
Brown	Heavy	1.83 ± 0.12 a	1.69 ± 0.08 c	2.08 ± 0.06 c	3.09 ± 0.10 a	4.75 ± 0.25 a	6.18 ± 0.80 a	3.02 ± 0.07 de
	Med.	1.80 ± 0.03 a	1.71 ± 0.03 c	2.17 ± 0.19 bc	2.89 ± 0.25 a	4.55 ± 0.37 a	6.35 ± 1.13 a	2.96 ± 0.04 e
	Light	1.98 ± 0.04 a	1.74 ± 0.09 bc	2.14 ± 0.17 bc	3.05 ± 0.34 a	5.08 ± 0.66 a	5.83 ± 0.61 a	3.15 ± 0.04 cd

a, b, and c = Means within the same effect with different letters are significantly differed in the same column.

Table 6 : Mean ± SE of genetic group, egg weight and their interaction effect on carcass characteristics.

Treatments		Live weight(g)	Carcass weight(g)	Breast weight(g)	Thigh weight(g)	Wings weight(g)	Neck weight(g)	Back weight(g)	Carcass dressing %
White		157.19 ±4.97 b	114.34 ± 3.93 b	40.01 ±1.48 c	27.04 ±1.07 b	10.21 ±0.20 b	8.65 ±0.58 a	28.41±1.21 b	77.42 ±0.24 a
Black		161.09 ±3.76 b	117.81 ±3.20 b	42.89 ±1.42 b	26.75 ±0.69 b	10.36 ±0.25 b	8.90 ±0.27 a	28.88 ±1.09 b	77.62 ±0.45 a
Brown		184.38 ±8.76 a	133.88 ±6.66 a	46.98 ±1.85 a	31.44 ±1.61 a	12.30±0.46 a	8.38 ±1.07 a	34.77 ±2.05 a	77.04 ±0.36 a
Egg Weight Effect									
Heavy		178.82 ±5.13 a	132.79 ±3.68 a	47.89 ±1.34 a	30.88 ±0.97 a	11.04 ±0.55 a	9.50± 0.25 a	33.47 ±1.06 a	78.52 ±0.24 a
Med ium		167.10 ±9.72 b	120.71 ±6.94 b	41.31± 1.97 a	28.68 ±1.64 a	10.99 ±0.57 a	9.23 ±0.79 a	30.51 ±2.54 b	77.05 ±0.16 b
Light		156.75 ±4.28 b	112.53 ±3.10 c	40.71± 1.01 a	25.68 ± 0.76 a	10.85 ±0.16 a	7.21 ±0.70 a	28.08 ±0.76 c	76.51 ± 0.25 b
Genetic Group x Egg Weight Interaction									
White	Heavy	170.98 ± 2.99 b	126.15 ± 1.10 b	44.19± 0.72 bc	30.67 ±0.23 b	9.63±0.02 c	9.74 ±0.40 a	31.92 ± 0.22 c	78.03 ± 0.511 bc
	Med.	146.31 ± 0.70 d	106.37 0.59 c	36.24 ±0.59 d	26.31 ±0.30 cde	10.32 ±0.21 bc	8.53 ±1.03 a	24.97 ± 0.37 d	77.51 ± 0.10 bcd
	Light	154.31±11.32 bcd	110.52 ± 8.65 c	39.63 ±3.07 cd	24.15 ±1.56 e	10.71 ±0.42 bc	7.69± 1.33 a	28.35 ± 2.27 cd	76.74 ± 0.20 de
Black	Heavy	169.66 ± 3.16 bc	127.43 ± 2.45 b	47.40 ±1.40 ab	28.21 ±0.72 bc	10.33±0.19 bc	9.24±0.26 a	32.27 ± 1.70 c	79.22 ± 0.21 a
	Med.	150.03 ± 2.36 cd	108.13 ± 2.28 c	39.15 ±2 cd	24.62 ±0.27 de	9.74 ±0.50 bc	8.69 ±0.32 a	25.94 ± 0.19 d	76.97 ± 0.14 cde
	Light	163.60 ± 7.31 bcd	117.86 ± 4.33 bc	42.16 ±0.97 c	27.45 ± 1.25 cd	11.02 ±0.27 b	8.79 ±0.77 a	28.45 ± 1.07 cd	76.67 ± 0.66 de
Brown	Heavy	195.83 ± 8.90 a	144.79 ± 6.83 a	52.10 ±1.87 a	33.77 ± 1.73 a	13.17± 0.36 a	9.54± 0.68 a	36.22 ± 2.19 b	78.31 ± 0.10 ab
	Med.	204.96 ± 7.09 a	147.64 ± 5.24 a	48.54± 0.97 ab	35.11 ± 0.70 a	12.92 ±0.85 a	10.46±2.30 a	40.63 ± 0.43 a	76.68 ± 0.34 de
	Light	152.35 ± 1.33 bcd	109.21 ± 0.60 c	40.34 ±0.42 cd	25.45 ±0.30 cde	10.82 ±0.14 bc	5.15 ±0.05 b	27.46 ± 0.57 d	76.13 ± 0.40 e

a,b,and c = Means within the same effect with different letters are significantly differed in the same column.

This observation was exhibited in the brown quail as it had shown highly values in the carcass weight, breast weight, thigh weight, wings weight and back weight with the exception of neck weight and carcass dressing % which did not show any significant differences. These results are consistent with what Al-Khafajy *et al.* (2018) indicated. Regarding egg weight, it was observed that birds hatched from heavy weight eggs gave a significantly higher values in live body weight, carcass weight, back weight and dressing ratio. As for the interaction, the brown birds which hatched from heavy-weight eggs showed a significant superiority in all carcass traits, as it gave the highest values.

References

Al-Kafajy, Fadhil Rasol, Mohammed Baqur Sahib Al-Shuhaib, Ghadeer Salah Al-Jashami, and Tahreer Mohammed Al-Thuwaini (2018). Comparsion of Three Lines of Japanese Quails Revealed a Remarkable Role of Plumage Color in the Productivity Performance Determination. J. World Poult. Res. 8(4): 111-119.

Al-Neemy, Majid Ahmed Sabri, Thaeer Mohammed Abd Al-Bake and Faris Thanoon Ahmed, (2014). Effect Of Genetic Group And Added Fat Source In Grower Ration On Some reproductive Traits Quail. Journal of Tikrit University for Agriculture Sciences, 14(2): 283-294.

Badudi, S.S.; Rakereng, M. and Marumo, M. (2006). Morphological characteristics and feed resources available for indigenous chickens in Botswana. Livestock Research for Rural Development, 18 (1).

Delmore, K.E.; Toews, D.P.; Germain, R.R.; Owens, G.L. and Irwin, D.E. (2016). The Genetics of Seasonal Migration and Plumage Color. Current Biology, 26(16): 2167-2173.

Eissa, E.A.; Gihan, S.F.; Bothaina, Y.F.M. and Ensaf A. El-Full (2014). Productive Performance and Molecular Genetic Characterization of Brown and White Japanese Quail Genotypes Using RAPD and $ISSR_S$-PCR Markers. Egypt. J. Genet. Cytol., 43: 73-98.

Egahi, J.O.; Dim, N.I.; Momoh, O.M. and Gwaza, D.S. (2010). Variations in qualitative traits in the Nigerian local chicken. International Journal of Poultry Science, 9(10): 978-979.

Ewonetu, K.S. (2017). Effect of egg size on hatchability and subsequent growth performance of Fayoumi Chicken. Journal of Agricultural Science, 9: 116-122.

Hakan, I.; Bunyamin, S.; Turgay, S.; Ahmet, Y.S. and Mehmet, R.T. (2015). Comparison of fattening performance, carcass characteristics, and egg quality characteristics of Japanese quails with different feather colors. Revista Brasilera

Kebede Senbeta Ewonetu, (2018). Effect of Egg Weight on post-Hatch Performance of White Leghorn Chicken Breed from Day-old to Laying Age. Journal of Poultry Research 15(2): 16-22.

King'ori, A.M. (2011). Review of the factors influence egg fertility and hatchability in Poultry. International Journal of Poultry Science, 10: 483-492.

Kumaril, P.; Gupta, B.R.; Prakash, B.G. and Reddy, M.R.A. (2008). A study of egg quality traits in Japanese quails. Journal of Veterinary and Animal Sciences, 4(6): 227-231.

Minvielle, F.; Gourichon, D.; Ito, S.; Inoue-Murayama, M. and Riviere, S. (2007). Effect of the dominant lethal Yellow mutation on reproduction, growth, feed consumption, body temperature, and body composition in Japanese quail. Poultry Science, 86 (8): 1646-1650.

N'dri, A.L.; Nguessan, A.E.; Constance, Ahouchi, V.S.; Koua, B.H.W.; Adepo-Gourene, A.B. (2019). Effect of plumage color modifier genes and storage duration on egg qualities traits of Japanese Quail (Cortunix Japonica) reared in subtropical climate. International Journal of Sciences :Basic and Applied Research (IJSBAR) 43(1): 136-146.

Vali, N.; Edriss, M.A. and Rahmani, H.R. (2005). Genetic parameters of body and some carcass traits in two quail strains. Int. J. of Poult. Sci., 4(5): 296-300.

NRC. National Rrsearch Council. 1994. Nutrient requirements of poultry. 9th rev. ed. National Research Council National Academy Press, Washington, D.C.

Petek, M.H. Baspinar and Ogan, M. (2003). Effects of egg weight and length of storage on hatchability and subsequent growth performance of quail. South African Journal of Animal Science, 33(4): 242-247.