Egypt. Poult. Sci. Vol. (44) (I): (111-122) (2024) **(2305-1255)**

Egyptian Poultry Science Journal

http://www.epsj.journals.ekb.eg/

ISSN: 1110-5623 (Print) – 2090-0570 (Online)

EVALUATE THE IMPACT OF SELECTION FOR BODY WEIGHT ON GROWTH PERFORMANCE IN ALEXANDRIA LOCAL CHICKENS

Safaa A.M. Ali[1] , Kosba M.A.[2], Amira E. Eldlebshany[2], Manal M. Abd El-Rahman[3] and Ahmed S.A. Soliman [2]

[1] Dept. of Poult. Prod., Fac. Of Agri., Omdurman Islamic Univ., Sudan.

[2] Dept. of Poult. Prod., Fac. Of Agri., Alex. Univ., Egypt.

[3] Dept. of Plant Patho., Fac. Of Agri., Dam.Univ., Egypt.

Corresponding author: Amira E. Eldlebshany2 Email: amiraeldlebshany @yahoo.com

Received: 15/02/2023 Accepted: 30 /03/2024

ABSTRACT: This experiment was aimed to investigate gain of selection for body weight at 8 wks and its impact on some growth characteristics and performance in Alexandria local chickens. A total of 1041 selected and 1003 control chicks were produced in first generation from mating selected 11 sires & 110 dames and random mating 10 sires &100 dames, respectively. The results were summarized that high selection differential 78.82 g. of base generation which caused high selection gain 60.65 g. for selection criterion (BW8). Realized heritability of selected experiment was estimated 0.77 for BW8. Selection for BW8 was improved body weights with significant differences at hatch, 4 and 12 weeks of ages by 3.23, 29.06 and 145.66 g. , respectively. The same trends of significant improvement were appeared for body weight gain through the periods from hatch to 4 (0-4), 4-8, 8-12 and 0-12 wks of ages by 0.92, 1.13, 3.04 and 1.70 g/d, respectively. Besides that, Selection for BW8 was improved shank length, breast length and breast width at 8 wks of age by 1.11, 0.83 and 1.55 cm, respectively. The corresponding values at 12 wks of age were found 1.06, 1.05 and 1.68 cm, respectively. On the other hand, results were shown highly significant effect of sex on body weight at studied ages. Also, highly significant effects of sex were found on daily weight gain, shank length, breast length and width. These results were indicated that males had higher growth performances than females. Growth curves for selected and control lines were confirmed that selected line was improved in growth performance from day-old to 12 wks of age compared by control line. From these results, we can extrapolate that selection for body weight at 8 wks of age had direct and correlated improvements on growth performance of Alexandria chickens.

Keywords: Selection, Body weight, Growth performance, Local chickens.

INTRODUCTION

Chickens are an important source of white animal protein due to their efficient food conversion compared with other species of farm animals (Kosba et al., 2002; Iraqi et al., 2000; Saleh et al., 2008). Body weight is considered one of the important quantitative genetic traits that have a clear impact on the growth performance of chickens. Numerous experiments have been conducted to use different methods to improve growth performance. Experiments have shown that individual selection for body weight at different ages is an effective selection criterion.

Selection for improved growth and body weight has been a major focus in poultry breeding programs worldwide (Chambers, 1990; Havenstein et al., 2003). Genetic selection has proven to be an effective approach for enhancing growth performance and increasing body weights in various chicken lines and breeds. Local chicken breeds, which are well-adapted to their respective environments, have also been targeted for selection efforts aimed at improving their growth traits.

Local developed strains were considered significant as one of the sources of white meat in Egypt. These strains exhibited a low growth rate and poor feed efficiency, resulting in lower meat yield compared to commercial broiler strains (Kosba, 1966). Although local breeds are highly adapted to Egyptian environmental conditions and has high viability and good taste, which causes breeders to prefer local strains. Several studies have reported significant improvements in body weight and growth traits in Alexandria chickens through the application of selection programs aimed at enhancing these traits (Mashal, 2018; Hasan, 2019; Fouad et al., 2023). Moreover, the Alexandria breed is a locally developed chicken line in Egypt, known for its adaptability to the region's harsh environmental conditions. Moreover, Alexandria chickens have exhibited relatively low growth rates and body weights compared to commercial broiler strains (Eltanahi et al., 2011). To address this limitation, selection breeding programs have been implemented to improve the growth performance of this local breed. Researchers confirm that the body weight trait had high heritability (h^2) and high positive correlation coefficients with many growth traits like growth rate, daily weight gain, and body measurements (Abd El-Karim and Ashour, 2014; Nassar et al., 2018; Abuzaid et al., 2019; Boutrous, 2021; Fouad et al., 2023). The aim of the present study is to evaluate the effect of selection for body weight at 8 weeks on body weight and growth performance of Alexandria local chickens

MATERIAL AND METHODS

This Experiment was carried at the Poultry Research Center, Poultry Production Department, Faculty of Agriculture, Alexandria University, during season 2018 – 2020, with the cooperation of the Genetic engineering and biotechnology lab in the Faculty of Agriculture Damanhur University.

The Experimental Plan:

Two generations, base and selected generations were done for experimental flocks to obtain the data.

The Mating Plan:

A total of 13 males and 130 females were consisted base population of Alexandria meat line by random mating generation after crossing of Gimmizah breed cock and Alexandria hens by Ahmed (2018). After sexual maturity, the base population divided into two groups as control and selected lines. Then first generation was carried out by choosing selected parents according to their body weight at 8 wks of ages (X± S.D) from selected group for mating and was producing the selected line and leaves the second group to random mating for obtaining the control line.

Flock Management:

At hatching the chicks were pedigreed by wing-banded, weighted brooded in floor brooders at a starting temperature of 32℃ for the first week after hatching, and then decreased 2-3℃ each week thereafter. At eight weeks of age, the chicks were sexed, weighted, and moved to rearing houses. All experiment parents and hatching eggs received the same managerial treatments for selected and control lines.

Feed and Water were *ad libitum* throughout the experiment, the birds were fed a starter diet

(19% crude protein and 2800 kcal/kg) from day-old to 8 weeks of age, followed by a grower diet (15% crude protein and 2700 kcal/kg) until 20 weeks of age. Finally, they received a production diet (17% crude protein and 2850 kcal/kg) until the end of the production phase.The Chicks were vaccinated against Newcastle disease at 1, 4, 8 and 22 weeks of age, using Hitchner B1 and Lasota, in drinking water (Bioteke Company). At 9 and 18 day of age the chicks were vaccinated against Gumboro disease in drinking water (Bioteke Company).

Studied Traits:

The following traits were studied for each Mating:

Growth Traits:

Body Weight: The individual body weight was recorded to the nearest gram at hatch (BW0), four (BW4), eight (BW8) and twelve (BW12) for each sex and line.

Daily Weight Gains (DG): The weight gains during specific periods, including from one day old to 4 wks (DG_{0-4}), from 4 to 8 wks (DG_{4-8}), from 8 to 12 wks (DG_{8-12}), from day old to 8 wks (DG_{0-8}) and from day old to 12 wks (DG_{0-12}) were calculated for each line and sex using the following formula:

Daily Gain (gm/d) = (w2- w1) / period

Where:

W1= The weight at the beginning of the period.

W2= The weight at the end of the period.

Growth curves: Growth curves for different groups of selected and control lines for the progeny generation were obtained by regression of body weight values on different ages at weighing from one-day old to 12 weeks of ages.

Shank Length (SL) is the measurement of the tarsometatarsus length, extending from the top of the flexed hock joint to the spur of either leg at eight (SL 8) and twelve (SL 12) weeks of age for each sex and line.\

Breast Length (BL): Measured as the depth from the first thoracic vertebra to keel and measured outside the body at eight (BL 8) and twelve (BL 12) of age for each sex and line.

Breast Width (BWD): was measured as the circumference of the body around the deepest region of the breast at eight (BWD 8) and twelve (BWD 12) of age for each sex and line.

Selection Parameters:

Selection Differential (SD):

The magnitude of the selection differential depends on two factors, the proportion of the population included among the selected group and the phenotypic standard deviation of the character. Selection differential at two selection generations was obtained according to Falconer (1989) as follows:

$SD = X_p - X_0$

Where:

X_p = The selected parents` mean.

X_0 = The population mean.

Selection Intensity (i):

Selection intensity in standard units through different generations of selection was calculated according to Falconer (1989) as follows:

$$\mathbf{i} = \frac{\mathbf{SD}}{\boldsymbol{\delta P}}$$

Where:

SD = The Selection differential.

δP = The phenotypic standard deviation of the trait.

Direct and correlated selection responses (R):

The responses of selection for high body weight at 8 wks of age (selection criterion) and growth traits from generation to generation were estimated according to Guill and Washburn (1974) as follows:

R = (Means of selected progeny – Means of previous selected population) – (Means of control progeny – Means of previous control population).

Realized Heritability (h^2_r):

The realized heritability (h^2_r) was estimated from selection experimental according to Falconer (1989) as follows:

$$h^2_r = \frac{R}{SD}$$

where:

R = actual response of selection.

SD = selection differential.

Statistical Analysis:

The statistical analyses of data in the first selection generation were carried out by using

(SAS, 2009). Data were analyzed by suitable model, the application of the least significant ranges among different line means was done according to Duncan (1955). Statistical Model was used as follows:

$Y_{ijk} = \mu + L_i + S_j + (LS)_{ij} + e_{ijk}$

Where:

Y_{ijk} : Observation of the Individual $_{ijk}$.

μ: Overall Mean.

L_i: Fixed Effect of i^{th} line (i = 1 and 2).

S_j: Fixed Effect of j^{th} sex (j = 1 and 2).

$(LS)_{ij}$: Interaction between line and sex.

e_{ijk}: Random Error.

RESULTS AND DISCUSSION

Effect of line and sex on body weight:

Least-square means of line and sex effects from hatch to 12wks of age are shown in Table (1). Line had highly significant effect ($p< 0.00001$) for body weight at different studied ages. The mean values of body weight at hatch, 4, 8 and 12 wks were 38.6, 247.8, 723.5 and 1138.7 g. respectively for selected line. The corresponding values were 34.5, 218.9, 667.2 and 994.9 g. for control line. The results indicated that the selected line had high body weight at different studied ages compared by control line. This result may be due to that the selection for BW_8 has been effective in improving growth performance in the selected line.

Same results were obtained by Ramadan *et al*., (2014); EL-Karim *et al*., (2014); Ashour *et al*., (2015); EL-Ghar et al., (2016); Nassar *et al*., (2018); Gwaza *et al*., (2018); Abuzaid *et al*., (2019); (Hassan, 2019); and Sapkota *et al*., (2020).

Sex had highly significant effect ($p < 0.00001$) for body weight at 4, 8 and 12 wks of ages. This is expected due to the inherent differences in growth patterns between males and females. The means were 37.5, 239.4, 712.4 and 1111.8 g. for male at hatch, 4, 8, and 12 wks of age respectively. The corresponding values for females were 35.5, 227.4, 678.4 and 1021.8 g. respectively. The results reflect that male had higher body weight than female from hatch to 12 wks of age. This opinion is acceptable to many researchers Olutunmogun *et al*., (2016); Abuzaid et al., (2019) and Boutrous (2021**).**

Effect of line and sex on daily weight gain:

Main effect of line and sex for daily weight gain and their interaction were presented in Table (2). Results indicated highly significant differences between each of lines and sexes. The selected line exhibited superior daily weight gain compared to the control line across the various studied periods. Additionally, males showed higher daily weight gain throughout the experimental periods compared to females. The period with the highest daily weight gain was observed from 4 to 8 weeks (DG4-8) of age, surpassing the periods from hatch to 4 weeks (DG0-4) and from 8 to 12 weeks (DG8-12) of the experiment. Specifically, the DG4-8 values were 16.9 g/day for the selected line and 16.9 g/day for males.This result may be due to moderate and high positive genetic correlations between body weight at 8 weeks and daily gain across various chicken populations. The existence of a favorable genetic correlation is attributed to the pleiotropic effects of genes influencing both traits, as well as the physiological and developmental linkages between body weight and growth rate (Chambers, 1990). The studies with agreement for these results were Khalil (2010); Momoh *et al*., (2010); Amin *et al*., (2013); Iraqi *et al*., (2013); Mahmoud & EL-Full, (2014); EL-Attrouny *et al*., (2017), (2020); and Rahayu *et al*., (2021).

Effect of line and sex on body measurements:

Shank length, breast length and breast width at 8 and 12 weeks in selected and control lines for male and female of Alexandria chickens were found in Table (3). Highly significant differences for sex effect on all studies body measurements were recorded, thus males had higher shank length, breast length and breast width than females. Also, the selected line had higher shank length, breast length and breast width than control line with significant differences at studied ages. These results showed that improvement in body

measurements were related by selected of body weight at 8wks of age. Youssoa *et al*., (2010); Ojedapo, 2013; Egena *et al*., (2014); El-Karim *et al*., (2014); Ramadan *et al*., (2014); EL-Ghar *et al*., (2016); Hassan, (2019); Abuzaid *et al*., (2019); Butrous, (2021); and Negash, (2021) were found same trend of improving body measurements with body weight selection.

Direct and Correlated Selection Response:

The results of selection were clear at direct and correlated selection response which were shown in Table (4 & 5 and 6)

Table (4) presented selection differential, selection intensity, direct selection response and realized heritability of selection experimental for BW8. These results showed improvement in BW8 after one generation of selection by 60.65 gm. This direct response may be due to high selection differential (78.82 gm). High realized h^2 (0.77) was found for these traits at selected line. The previous results confirmed that selection for BW_8 had a high direct response which was caused by dominance of genetic factors on this trait. These results were agreement by many authors as El-Attrouny *et al*., (2021); Sultana *et al*., (2021); Abdelhady *et al*., (2022); Guisso Taffa *et al*., (2022); and Rizk *et al*., (2022). The correlated selection response for body weight (g) at different ages and daily weight gain (g/d) during different periods of experimental were shown in Table (5). There were increasing in body weight at 0, 4 and 12 wks by 3.23, 29.1 and 145.7 g., respectively. Moreover, daily weight gain values were increasing by 0.92, 1.13, 3.04 and 1.70 g/d for DWG0-4, DWG4-8, DWG8-12 and DWG0-12, respectively. The results revealed enhancements in both body weight and daily weight gain over the course of the experiment. These improvements were attributed to the emphasis on BW8 in the selection process. Similar findings were reported by Hermiz & Abdullah (2020), El-Attrouny et al. (2020), and Fouad et al. (2023).These studies have explored the positive correlated responses across diverse chicken populations. These responses were linked to the moderate to high positive genetic correlations between 8-week body weight and growth traits at other ages within the population.The magnitude of these correlated responses could be influenced by factors such as selection intensity, the strength of genetic correlations, and the heritabilities of the involved traits (Falconer and Mackay, 1996). The consistent positive correlated responses reported across various studies highlight the effectiveness of indirect selection for daily gain through direct selection for increased 8-week body weight.

The correlated selection response for body measurements (SL, BL and BRW) at 8 and 12 weeks of ages of selection experimental were shown in Table (6). There were increasing at 8 wks of age for shank length, breast length and breast width by 1.11, 0.83 and 1.55 cm., respectively. The corresponding values at 12 wks of ages were 1.06, 1.05 and 1.68 cm., respectively. The results indicated that selection for BW8 caused improvement at all body measurements (SL, BL and BRW) at 8 and 12 weeks of ages. This result indicated that breast width was the most effected body measurements than shank length and breast length when selected for BW8. These improvements at shank and breast may be help birds to carry more muscles which caused increase body weight at different ages. Boutrous *et al*., (2021) reported that when we make improvement for body weight, it is going to improve body measurements in Gimmizah chickens.

Due to the positive genetic correlations between these traits, improvements in body measurements are expected as a consequence of selection for higher 8-week body weight. The magnitude of the correlated responses can be influenced by factors such as the selection intensity, the strength of the genetic correlations, and the heritabilities of the traits involved (Falconer and Mackay, 1996). Growth curves of live body weight for selected and control lines from one-day old to 12 wks of age were presented in Figure (1). These curves described the growth for each line which appeared that high growth for selected line related to low growth for control line. The increases in growth performance were clear at the end of experimental period. So, we can extrapolate that individual selection of BW at 8 Wks of age in Alexandria chickens was caused improvement for growth performance.

Table (1): Live Body weight from hatch to 12 weeks in selected and control lines for male and female of Alexandria chickens.

Lines	Age			
	Hatch	**4 wks**	**8 wks**	**12 wks**
Selected	38.6 ^{A} ± 0.11	247.8 ^{A} ± 2.14	723.5 ^{A} ± 6.24	1138.7 ^{A} ± 13.74
Control	34.5 ^{B} ± 0.12	218.9 ^{B} ± 2.13	667.2 ^{B} ± 6.25	994.9 ^{B} ± 14.10
Sex				
Male ♂	37.5^{A} ± 0.15	239.4 ^{A} ± 2.75	712.4 ^{A} ± 7.10	1111.8 ^{A} ± 14.33
Female ♀	35.5^{B} ± 0.09	227.5 ^{B} ± 1.67	678.4 ^{B} ± 4.67	1021.7 ^{B} ± 9.56
Line*sex				
Selected ♂	39.3^{A} ± 0.22	250.6^{A} ± 4.06	748.3^{A} ±10.34	1189.8^{A} ± 20.35
Selected ♀	37.9^{B} ± 0.13	245.1^{B} ± 2.39	698.7^{B} ±18.70	1087.5^{B} ± 13.51
Control ♂	35.8^{C} ± 0.21	228.1^{B} ± 3.83	676.3^{B} ±16.30	1033.7^{C} ± 20.74
Control ♀	33.2^{D} ± 0.14	209.7^{C} ± 2.50	658.0^{B} ± 9.05	956.1^{D} ± 15.35
Probability				
Line	< 0.00001	< 0.0001	< 0.0001	< 0.0001
Sex	0.0398	< 0.0001	< 0.0001	< 0.0001
Line*Sex	0.0238	0.0344	0.0437	0.0382

Table (2): Daily weight gain (DWG g/d) from periods 0-4 to 0-12 weeks in selected and control lines for male and female of Alexandria chickens.

Lines	Age			
	DWG_{0-4}	**DWG_{4-8}**	**DWG_{8-12}**	**DWG_{0-12}**
Selected	7.5 ^{A} ± 0.08	16.9 ^{A} ± 0.17	14.8 ^{A} ± 0.34	13.1 ^{A} ± 0.16
Control	6.6 ^{B} ± 0.07	16.0 ^{B} ± 0.18	11.7 ^{B} ± 0.36	11.4 ^{B} ± 0.17
Sex				
Male ♂	7.2 ^{A} ± 0.10	16.8 ^{A} ± 0.20	14.3 ^{A} ± 0.37	12.8 ^{A} ± 0.17
Female ♀	6.8 ^{B} ± 0.06	16.1 ^{B} + 0.13	12.3 ^{B} ± 0.25	11.7 ^{B} ± 0.11
Line*sex				
Selected ♂	7.6 ± 0.54	17.8^{A} ± 0.29	15.8^{A}+ 0.54	13.7^{A} ± 0.24
Selected ♀	7.4 ± 0.38	16.2^{B} ± 0.19	13.9^{B} ± 0.37	12.5^{B} ± 0.16
Control ♂	6.8 ± 0.46	16.1^{B} ± 0.29	12.8^{C} ± 0.55	12.8^{B} ± 0.25
Control ♀	6.3 ± 0.21	16.0^{B} ± 0.19	10.6^{D} ± 0.41	10.6^{C} ± 0.18
Probability				
Line	< 0.0001	< 0.0001	0.0091	< 0.0001
Sex	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Line*Sex	0.3566	0.0344	0.0376	0.0277

Table (3): Body Measurements at 8 and 12 weeks in selected and control lines for male and female of Alexandria chickens.

Lines	Age					
	SL_8	**SL_{12}**	**BRL_8**	**BRL_{12}**	**BRW_8**	**BRW_{12}**
Selected	$7.4^{A} \pm 0.03$	$8.2^{A} \pm 0.05$	$12.7^{A} \pm 0.05$	$15.7^{A} \pm 0.07$	$12.4^{A} \pm 0.05$	$15.4^{A} \pm 0.09$
Control	$6.3^{B} \pm 0.03$	$7.1^{B} \pm 0.06$	$11.9^{B} \pm 0.06$	$14.6^{B} \pm 0.09$	$10.8^{B} \pm 0.06$	$13.8^{B} \pm 0.09$
Sex						
Male ♂	$7.7^{A} \pm 0.03$	$8.5^{A} \pm 0.06$	$12.9^{A} \pm 0.06$	$16.6^{A} \pm 0.08$	$12.3^{A} \pm 0.06$	$15.2^{A} \pm 0.10$
Female ♀	$6.0^{B} \pm 0.02$	$6.7^{B} \pm 0.04$	$11.6^{B} \pm 0.05$	$13.8^{B} \pm 0.07$	$10.9^{B} \pm 0.04$	$13.9^{B} \pm 0.08$
Line*sex						
Selected ♂	$7.9^{A} \pm 0.05$	$8.7^{A} \pm 0.08$	$13.5^{A} \pm 0.08$	$16.6^{A} \pm 0.11$	$13.2^{A} \pm 0.09$	$15.9^{A} \pm 0.14$
Selected ♀	$6.8^{C} \pm 0.04$	$7.6^{B} \pm 0.06$	$11.8^{C} \pm 0.07$	$14.8^{B} \pm 0.09$	$11.5^{B} \pm 0.06$	$14.7^{B} \pm 0.11$
Control ♂	$7.3^{B} \pm 0.05$	$8.3^{A} \pm 0.09$	$12.5^{B} \pm 0.09$	$16.5^{A} \pm 0.13$	$11.4^{B} \pm 0.09$	$14.4^{B} \pm 0.15$
Control ♀	$5.3^{D} \pm 0.04$	$5.9^{C} \pm 0.07$	$11.3^{C} \pm 0.07$	$12.8^{C} \pm 0.11$	$10.3^{C} \pm 0.07$	$13.1^{C} \pm 0.11$
Probability						
Line	0.0014	0.0341	0.0135	0.0028	< 0.0001	0.0003
Sex	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Line*Sex	0.0125	0.0402	0.0498	0.0454	0.0356	0.0352

SL 8, BL 8, BC 8, SL 12, BL 12, and BC 12: shank length, breast length and breast width at 8 and 12 weeks of ages, respectively.

Table (4): Least square means for body weight at 8 weeks of age of control and selected lines, selection differential, selection intensity, direct selection response and realized heritability of selection experimental.

Gen.	Control line	Selected line	Selected parent	Selection differential	Selection intensity	Selection response	Realized h^2
Base	713.41	709.05	787.87	78.82	0.82	-	-
G_1	667.21	723.50	-	-	-	60.65	0.77

G_1: The First Generation.

Table (5): Correlated responses for body weight (g) at different ages and daily weight gain (g/d) during different periods of experimental

Traits	Generation (s)	Control line	Selected line	Correlated response	%
BW_0	Base	38.02	38.92	-	8.50
	G_1	34.47	38.60	3.23	
BW_4	Base	246.15	245.97	-	11.81
	G_1	218.92	247.80	29.06	
BW_{12}	Base	1095.32	1093.44	-	13.30
	G_1	994.94	1138.60	145.66	
DWG_{0-4}	Base	7.43	7.39	-	12.41
	G_1	6.59	7.47	0.92	
DWG_{4-8}	Base	16.69	16.54	-	6.76
	G_1	16.01	16.99	1.13	
DWG_{8-12}	Base	13.64	13.73	-	22.26
	G_1	11.70	14.83	3.04	
DWG_{0-12}	Base	12.59	12.55	-	13.47
	G_1	11.43	13.10	1.70	

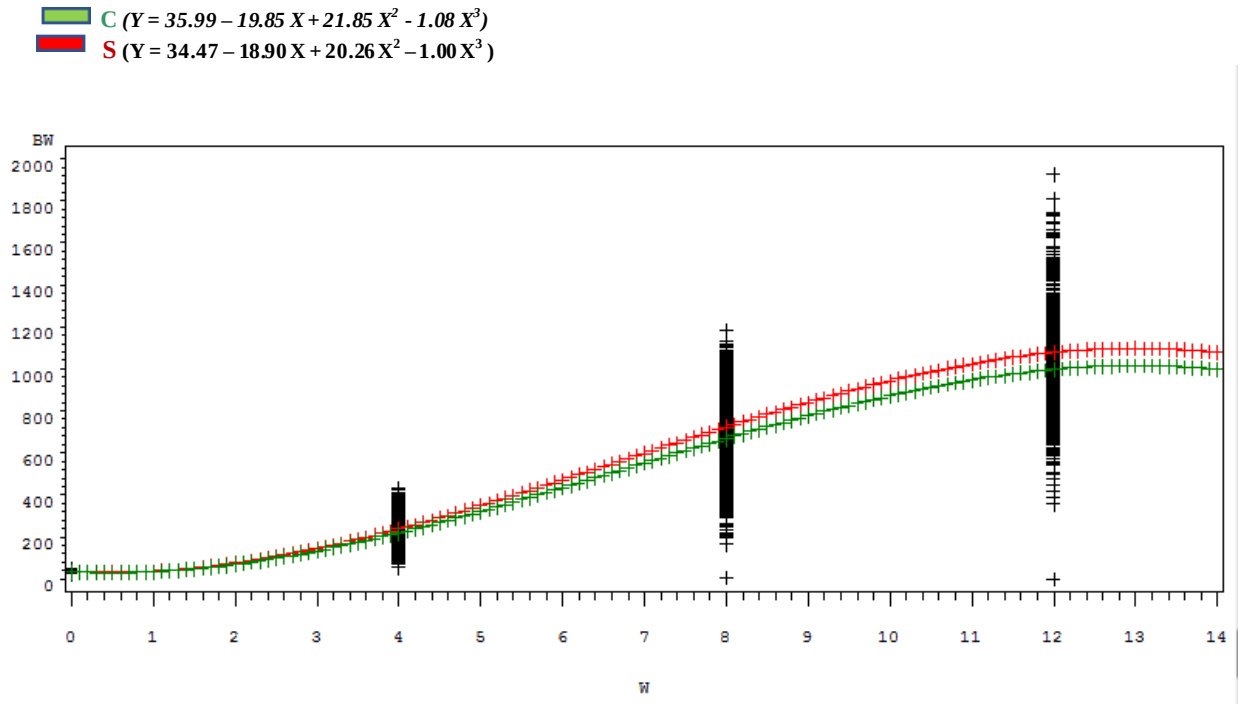
BW_0, BW_4 and BW_{12}: Body weights at hatch, 4 and 12 weeks of ages.
DWG_{0-4}, DWG_{4-8}, DWG_{8-12}, and DWG_{0-12}: Daily weight gain from periods 0-4, 4-8, 8-12, and 0-12 weeks.
G_1: The First Generation.

Table (6): Correlated responses for body measurements (cm.) (SL, BL and BRW) at 8 and 12 weeks of ages of selection experimental.

Traits	Generation (s)	Control line	Selected line	Correlated response	%
SL_8	Base	7.33	7.31	-	15.14
	G_1	6.33	7.42	1.11	
BRL_8	Base	11.76	11.74	-	7.06
	G_1	11.87	12.68	0.83	
BRW_8	Base	12.18	12.14	-	12.73
	G_1	10.84	12.35	1.55	
SL_{12}	Base	7.79	7.77	-	13.61
	G_1	7.13	8.17	1.06	
BRL_{12}	Base	14.39	14.37	-	7.30
	G_1	14.68	15.71	1.05	
BRW_{12}	Base	13.49	13.45	-	12.45
	G_1	13.75	15.39	1.68	

SL_8, BL_8, BRW_8, SL_{12}, BL_{12}, and BRW_{12}: shank length, breast length and breast width at 8 and 12 weeks of ages, respectively. G_1: The First Generation.

Figure (1): Growth Curves of live body weight for selected and control lines with different age in Alexandria chickens.



BW: Body Weight
W: Age at weeks.

S: Selected line
C: Control

REFERENCES

Abdelhady, M., Abdellatif, M. A., & Roushdy, K. 2022. Phenotypic and Genotypic Changes in Growth Measures of Selected and Control Line Over Generations in Dandarawi Chicken. *Assiut Journal of Agricultural Sciences*, 53(5), 185-202

Abuzaid, M., Abdellatif, M., & Abdelfattah, M. 2019. Direct response due to selection for body weight at eight weeks of age in Dandarawi chicken: body weight and conformation. *Egyptian Poultry Science Journal*, 39(2), 501-517.

Amin, E. M., Kosba, M. A., Amira, E. E., & El-Ngomy, M. A. 2013. Heterosis, maternal and direct additive effects for growth traits in the Alexandria chickens. *Egyptian Poultry Science Journal*, 33(4): 1033-1051.

Ashour, A. F., Badwi, Y. K., El-Karim, A., & Ragaa, E. 2015. Effect of selection for body weight on egg production, egg quality, fertility and hatchability traits in El-salam chicken strain in Egypt. *Journal of Animal and Poultry Production*, 6(12): 781-796.

Boutrous, N. G. 2021. genetic response of some body males measurements and reproduction for gimmizah chickens selected for body circumference. *Egyptian Poultry Science Journal*, 41(3): 507-523.

Chambers, J. R. 1990 Genetics of growth and meat production in chickens. In R. D. Crawford (Ed.), Poultry Breeding and Genetics (pp. 599-643). Elsevier.

Duncan, D. B. 1955. Multiple range and multiple F tests. biometrics, 11(1), 1-42.

Egena, S. S. A., Ijaiya, A. T., & Kolawole, R. 2014. An assessment of the relationship between body weight and body measurements of indigenous Nigeria chickens (Gallus gallus domesticus) using path coefficient analysis. *Livestock Research for Rural Development*, 26(3), 114-118.

El-Attrouny, M. M., Iraqi, M. M., & Mohamed, S. A. H. 2021. The estimation of genetic parameters for body weight, body dimension, and carcass traits in four Egyptian chickens strains. *Journal of World's Poultry Research*, 11(2), 230-240.

El-Attrouny, M. M., Iraqi, M. M., Khalil, M. H., & El-Moghazy, G. M. 2017. Genetic and phenotypic evaluation of growth traits in selection experiment performed in synthesized Benha chickens. *Annals of Agric. Sci.,* Moshtohor, 51(1), 33-42.

El-Attrouny, M. M., Manaa, E. A., & Ramadan, S. I. 2020. Genetic evaluation and selection correlated response of growth traits in Japanese quail. *South African Journal of Animal Science*, 50(2), 325-333.

El-Ghar, A., Sh, R., & El-Karim, A. 2016. Effect of early selection for body weight, keel length and breast circumference on egg production traits in inshas strain of chickens. *Egyptian Poultry Science Journal*, 36(2), 375-387.

El-Karim, A., Ragaa, E., & Ashour, A. F. 2014. Effect of selection for body weight on body measurements and carcass traits in El-Salam strain of chicken in Egypt. *Journal of Animal and Poultry Production*, 5(8), 459-471.

Eltanany, M., Philipp, U., Weigend, S., & Distl, O. 2011. Genetic diversity of ten Egyptian chicken strains using 29 microsatellite markers. Animal genetics, 42(6), 666-669·

Falconer, D. S. 1989. Introduction to Quantitative Genetics, Ed. 3. Longmans Green/John Wiley & Sons, Harlow, Essex, UK/New York.

Fouad, H. A., El-dlebshany, A., Moustafa, M., Abd EL-Hamid, A. E. H., & Altahawy, W. 2023. Effect of Selection for Skeletal Traits on Body Weight in Alexandria Local Chickens. *Journal of Agricultural and Environmental Sciences*, *22*(2), 122-142.

Guill, R. A., & Washburn, K. W. 1974. Genetic changes in efficiency of feed utilization of chicks maintaining body weight constant. *Poultry Science*, *53*(3), 1146-1154.

Guisso Taffa, A., Issa, S., Mahamadou, C., Moula, N., & Detilleux, J. 2022. Heritability and genetic correlation of niamey's local chicken growth (Niger). *Open Journal of Genetics*, 12(04).

Gwaza, D. S., Dim, N. I., & Momoh, O. M. 2018. Effects of sire additive genetic variance on growth rate within and between populations of Nigerian local chicken ecotypes. *J Res Rep Genet*. 2018; 2 (2): 1-5 J Res Rep Genet 2018 Volume 2 Issue, 2.

Hasan, O. A. 2019. Efficiency of crossing for growth traits and DNA molecular analysis in chicken (Master Dissertation, *thesis, Faculty of Agriculture, Alex. University, Egypt*).

Havenstein, G. B., Ferket, P. R., & Qureshi, M. A. 2003. Growth, livability, and feed conversion of 1957 versus 2001 broilers when fed representative 1957 and 2001 broiler diets. Poultry Science, 82(10), 1500-1508.

Hermiz, H. N., & Abdullah, M. S. 2020. Genetic and non genetic parameters for body weights of two Iraqi local chickens. *The Iraqi Journal of Agricultural Science*, 51(1), 323-332.

Iraqi, M. M., El-Labban, A. F. M., & Khalil, M. H. 2000. Estimation of breeding values and their accuracies animal model analysis for growth traits in three local strains of chickens. *Egyptian Poultry Science Journal*, 20 (4): 981-1002.

Iraqi, M. M., Khalil, M. H., & El-Attrouny, M. M. 2013, October. Estimation of crossbreeding components for growth traits in crossing Golden Montazah with White Leghorn chickens. *In VI th international conference: Balnimalcon* (pp. 3-5).

Khalil, M. H. M. A. 2010. Selection and correlated response of some performance traits before and after random mating in Alexandria chickens (*Doctoral dissertation, Ph. D. Thesis, Faculty of Agriculture, Alex. University, Egypt*).

Kosba, M. A. 1966. Analysis of an experiment on selection for economic traits in chickens. M.sc Thesis, *Faculty of Agriculture, Alexandria University, Egypt.*

Kosba, M. A.; Farghaly, M. H.; El-Deen, M.B, M. and Abd El-Halim, H. A.2002. Selection and genetic analysis of some egg production traits in local chickens. Egypt. *Poultry Science*, 22: 681-696.

Mashal, S. K. 2018. Efficiency of crossing for growth traits and DNA molecular analysis in chicken (Master Dissertation, *thesis, Faculty of Agriculture, Alex. University, Egypt*).

Momoh, O. M., Nwosu, C. C., & Adeyinka, I. A. 2010. Comparative evaluation of two Nigerian local chicken ecotypes and their crosses for growth traits. *International Journal of Poultry Science*, 9(8), 738-743.

Nassar, F. S.; El-Komy, E. M. & Abdou, A. M. 2018. Effect of selection for high live body weight on heritability, phenotypic and genetic correlation estimates for productive performance in local broiler breeders. *Bioscience Research*, 15 (4), 3357-3366.

Negash, F. 2021. Application of principal component analysis for predicting body weight of Ethiopian indigenous chicken populations. *Tropical Animal Health and Production*, 53(1), 104.

Ojedapo, L. O. 2013. Evaluation of body weight and other linear parameters of Marshall broiler for repeatability estimates. *International Journal of Applied Agriculture and Apiculture Research*, 9(1-2), 175-181.

Olutunmogun, A. K., Umar, A. U., Adeyinka, I. A., Adejoh-Ubani, E. O., Nwagu, B. I., Abdulahi, I., ... & Haruna, H. M. 2016. Fertility, body weight and survivability of two lines of broiler stock under selection. *Nigerian Journal of Animal Production*, 43(1), 19-27.

Rahayu, F. F., Depison, D., & Gushairiyanto, G. 2021. Performance of Kampung Super chicken and Bangkok chicken first generation (G1) until the age of 12 weeks. *Livestock and Animal Research*, 19(3), 326-336.

Ramadan, G. S., Moghaieb, R. E., El-Ghamry, A. A., El-Komy, E. M., Nassar, F. S., Abdou, A. M., ... & Stino, F. K. R. 2014. Effect of selection for high live body weight on slaughter performance of broiler breeders. *Egyptian Poultry Science Journal*, 34, 289-304

Rizk, A.M., Ramadan, G.S., Abdou, A.M., EI-Weshahy, O.A., and Rashed, O.S. 2022. Productive performances of tanta g-2 genotype selected for high body weight. *Egyptian poultry science journal*. 42(1): 1-16.

Saleh, K., Younis, H. H., Rizkalla, H. E., & Ragaa Abd El-Krim, E. 2008. Direct and correlated response of selection for improving body weight in El-Salam chickens. Egypt. *Poult. Sci*, *28*, 431-454.

Sapkota, S., Kolakshyapati, M. R., Devkota, N. R., Bhattarai, N., & Gorkhali, N. A. 2020. Selective breeding to improve productive and reproductive performances and survivability of indigenous Sakini chicken. *Journal of Nepal Agricultural Research Council*, 6, 62-69.

SAS ® 2013. Statistical Analysis Software. Users' Guid Statistics Version 9.4 (9.4). *SAS Institute Inc.*

Sultana, S., Faruque, S., Bhuiyan, M. S. A., & Bhuiyan, A. K. F. H. 2021. Progress in the Performance of Indigenous Chickens Selected for Economic Traits in Bangladesh. *Journal of Agriculture. Food and Environment (JAFE)| ISSN (Online Version)*, 2708-5694

Youssao, I. A. K., Tobada, P. C., Koutinhouin, B. G., Dahouda, M., Idrissou, N. D., Bonou, G. A., ... & Tixier-Boichard, M. 2010. Phenotypic characterisation and molecular polymorphism of indigenous poultry populations of the species Gallus gallus of Savannah and Forest ecotypes of Benin. *African Journal of Biotechnology*, 9(3).

الملخص العربى

تقييم أثر الإنتخاب لوزن الجسم على أداء النمو فى دجاج إسكندرية المحلي

صفاء عبد الله نصر[١]، محمد كسبه[٢]، أميرة إسماعيل الدلبشاني[٢]، منال عبد الرحمن[٣]، أحمد سليمان أحمد[٢]

[١] قسم إنتاج الدواجن, كلية الزراعة – جامعة أم درمان الإسلامية, السودان.
[٢]قسم إنتاج الدواجن، كلية الزراعة – جامعة الاسكندرية ، الاسكندرية – مصر.
[٣]قسم امراض النبات، كلية الزراعة – جامعة دمنهور ، دمنهور – مصر.

الهدف من إجراء هذه التجربة هو معرفة تأثير الإنتخاب لوزن الجسم عند عمر ٨ أسابيع على بعض صفات النمو والأداء في دجاج إسكندرية المحلي. حيث تم إنتاج ١٠٤١ كتكوت منتخب و ١٠٠٣ كتكوت كنترول في الجيل الأول من تزاوج ١١ أب منتخب و ١١٠ أم منتخبه و التزاوج العشوائي لعدد ١٠ أباء و ١٠٠ أم على الترتيب. وقد أظهرت النتائج أن الفارق الانتخابي للصفة المختارة للإنتخاب (BW_8) كان مرتفع ٧٨,٨٢ جرام خلال الجيل الأساسي وذلك نتج عنه عائد الانتخاب بمقدار ٦٠,٦٥ جم وتم تقدير المكافئ الوراثي المحقق لصفة BW_8 من تجربة الانتخاب بـ ٠,٧٧ . وقد أدى الانتخاب لوزن الجسم عندعمر ٨ أسابيع BW_8 إلى تحسين أوزان الجسم بفروق معنوية عند الفقس، وأعمار ٤ و١٢ أسبوعًا بمقدار ٣,٢٣ و٢٩,٠٦ و١٤٥,٦٦ جم. ، على الترتيب. و قد ظهر نفس الاتجاه من التحسين المعنوى لصفه الزيادة اليوميه لأوزان الجسم خلال الفترات من الفقس إلى ٤ (٤-٠)، ٨-٤، ١٢-٨ و٠-١٢ أسبوع من العمر بمقدار ٠,٦٢، ١,٤٥، ١,١٥ و ٠,٩٦ جم / يوم على الترتيب. بالإضافة إلى ذلك، أدى الانتخاب لوزن الجسم عند عمر ٨ أسابيع BW_8 لتحسين كلا من طول الساق وطول الصدر وعرض الصدر عند عمر ٨ أسابيع بمقدار ١,١١ و٠,٨٣ و١,٥٥ سم على الترتيب. وقد كانت القيم المقابلة عند عمر ١٢ أسبوعًا ١,٠٦ و١,٠٥ و١,٦٨ سم على الترتيب. من ناحية أخرى أظهرت النتائج وجود تأثير معنوي كبير للجنس على وزن الجسم في الأعمار المدروسة. كما تم العثور على تأثيرات مهمة للغاية للجنس على الزيادة اليومية لوزن الجسم وطول الساق وطول وعرض الصدر. وقد أشارت هذه النتائج إلى أن الذكور لديهم أداء نمو أعلى من الإناث. كما أكدت منحنيات النمو لكلا من خطى المنتخب والكنترول، أن الخط المنتخب تحسن في أداء النمو من عمر يوم إلى ١٢ أسبوع من العمر مقارنة بخط الكنترول. من خلال هذه النتائج، يمكننا استنتاج أن الانتخاب لوزن الجسم عند عمر ٨ أسابيع كان له تأثيرات مباشرة ومرتبطة نتج عنه تحسين أداء النمو لدجاج اسكندرية المحلى.