

## GENETIC CHARACTERIZATION OF BODY WEIGHT TRAITS IN ROCKY PARTRIDGE CHICKS

Kadhim S. Mohammed<sup>1</sup>

Researcher

<sup>1</sup>Faculty of Science/ Soran University-Soran/Iraq<sup>2</sup>Coll. of Agric. Engine. Science/Salahaddin University-Erbil/Iraq

E-mail: Kadhim.Mohammed@soran.edu.iq

Yousif M. S. Al-Barzinji<sup>2</sup>

Prof.

Yousif.Noori@Su.Edu.Krd

### ABSTRACT

The study was conducted on 118 partridges (*Alectoris graeca*) chicks in order to find the effect of non-genetic factors and genetic evaluation of live weight and carcass of this bird. The results showed a highly significant superiority of the weights of males over females in most age stages ( $437.71 \pm 4.40$  vs  $375.90 \pm 3.66$  g/ bird at marketing age) and daily weight gain (ADG) from one day to marketing age ( $4.70 \pm 0.06$  vs  $4.01 \pm 0.04$  g/ day/bird). The breeding values (BLUP) of birds for marketing weight ranged from -135.4 g/bird to 56 g/bird. Significant differences were recorded between groups of birds with high and low BLUP values in the average live weight at market ( $464.21 \pm 11.03$  vs  $352.80 \pm 6.47$  g/bird) and carcass weight ( $349.48 \pm 7.46$  vs  $265.91 \pm 6.08$  g/bird). Males also outperformed females significantly in live weight at marketing and carcass weight. The results also showed a positive and significant correlation between the daily weight gain rate and weights at different ages except for the age on the one day, which were negative and not significant. Also, high correlations were recorded between live body weight at marketing and carcass weight, but the correlation between live weight and dressing ratio was not significant. The wide variation in BLUP values and the presence of high differences between birds with high and low BLUP values indicates the possibility of developing and increasing the weight of these birds through selection and breeding process.

Key words: BLUP, Sex, daily gain, carcass, correlation, marketing weight.

مصطفى والبرزنجي

مجلة العلوم الزراعية العراقية -2022:53(6):1289-1297

التوصيف الوراثي لصفات وزن الجسم في الحجل الصخري (*Alectoris graeca*)يوسف محمد صالح نوري البرزنجي<sup>2</sup>كاظم صديق محمد مصطفى<sup>1</sup>

أستاذ

باحث

<sup>1</sup>قسم علوم الحياة /كلية العلوم /جامعة سوران - سوران /العراق<sup>2</sup>قسم الثروة الحيوانية /كلية علوم الهندسة الزراعية / جامعة صلاح الدين -أربيل/العراق

المستخلص

أجريت هذه الدراسة على 118 أفرخ حجل لمعرفة تأثير العوامل غير الوراثية والتقييم الوراثي للوزن الحي والذبيحة لهذا الطائر. أظهرت النتائج تفوقاً معنوياً عالياً لأوزان الذكور على الإناث في معظم المراحل العمرية ( $437.71 \pm 4.40$  مقابل  $375.90 \pm 3.66$  غم / طائر في عمر التسويق) وزيادة الوزن اليومية (ADG) من يوم واحد إلى عمر التسويق ( $4.70 \pm 0.06$  مقابل  $4.01 \pm 0.04$  غم / يوم / طائر). تراوحت قيم التربية (BLUP) لوزن الطيور عند التسويق من -135.4 غم / طائر إلى +56 غم / طائر. تم تسجيل فروقات معنوية بين مجموعات الطيور ذات القيم العالية والمنخفضة BLUP في متوسط الوزن الحي عند التسويق ( $464.21 \pm 11.03$  مقابل  $352.80 \pm 6.47$  غم / طائر) ووزن الذبيحة ( $349.48 \pm 7.46$  مقابل  $265.91 \pm 6.08$  غم / طائر). كما تفوق أداء الذكور معنوياً على الإناث في الوزن الحي عند التسويق و وزن الذبيحة. كذلك أظهرت النتائج وجود علاقة ارتباط موجبة ومعنوية بين معدل زيادة الوزن اليومي والأوزان في مختلف الأعمار ما عدا العمر عند أول يوم والتي كانت سالبة وغير معنوية. كما تم تسجيل إرتباطات عالية بين وزن الجسم الحي عند التسويق ووزن الذبيحة ، ولكن الارتباط بين الوزن الحي ونسبة التصافي لم يكن معنوياً. يشير المدى الواسع في قيم الـ BLUP و وجود فروقات عالية بين الطيور ذات القيم العالية والمنخفضة لـ BLUP إلى إمكانية تطوير وزيادة وزن هذه الطيور عند التسويق من خلال عملية الانتخاب والتكاثر.

الكلمات المفتاحية: BLUP، الجنس، الزيادة الوزنية اليومية، وزن الذبيحة، الأرتباط.

Received:23/5/2021, Accepted:4/8/2021

## INTRODUCTION

Rock partridge (*Alectoris graeca*) has become a popular alternate source of human food. Partridges are grown for hunting tourism, natural balance protection, and meat production Yilmaz and Tepeli (31). Partridges are appreciated for their medicinal and health-promoting properties, delicious taste, and high-quality meat. Partridge industry needs meat products to please consumers Wen *et al* (28). It's thought that partridge meat is healthful. The energy content of the breast muscles of partridges is lower than that of Japanese quail, comparable to that of pheasants, and greater than that of guinea fowl and chukar Vitula *et al* (27). Partridges are characterized by high dressing percentage. The proportion of eviscerated carcass with neck in pre-slaughter weight ranges from 64.9% to 71.3% Večerek *et al* (26). Partridge muscles have chemical components that make them nutritious (proteins, fats, pigments, glycogen, and many others) Uscebrka *et al* (25). High protein (240 g/kg) and minimal fat make partridge meat delicate and tasty Wfodarczyk *et al* (29). Rock partridges have developed the genetic potential to produce meat. Kirikçi *et al* (17) indicated that the carcass weight of rock partridge at 12 weeks' old maintained in captivity was  $309.73 \pm 14.93$  g (female) and  $342.00 \pm 17.99$  g (male) (5). Observed that rock partridge at 12 weeks of age weighed  $425.50 \pm 32.89$  g of live weight and  $305.78 \pm 28.30$  g of carcass weight. Yamak *et al* (30) reported that the carcass weight of partridge at 14 weeks of age reserved with captivity was 454.50 g (male) and 372.20 g (female). Kokoszynski *et al* (18) reported that the carcass weight in grey partridge was  $218.20 \pm 55.70$  g and  $216.00 \pm 56.70$  g in male and female, respectively Putra and Kırıkçı (22). In avian species, sex affects growth more with age Halil and Özbeyaz (8). Genetic evaluation of individuals best linear unbiased prediction (BLUP) (10,11) of additive genetic value is an approach that is being used in many different disciplines. Even though they were created for livestock breeding programs Kerr (16). The BLUP process combines selection index with least squares to estimate breeding values (9). BLUP is expected to be superior to less complex techniques of

breeding value estimation, but its advantage and practicability rely on the structure and selection scheme of a poultry breeding programmed Dempfle (6). Best Linear Unbiased Prediction (BLUP) has been widely used in genetic evaluation of poultry species (19,23). This research was aimed the productive performance of rock partridge and their genetic evaluation to developing them through selection.

## MATERIALS AND METHODS

This study was carried out at the Science Faculty Farm of University Soran. As research material, 400 partridge chicks obtained from breeder partridges egg were used in this study and putted in an incubator like a refrigerator (Çimuka HB175S Turkey) and incubated for 21 days at 37.5°C and 59 % relative humidity. Until the 24<sup>th</sup> days of incubation, the hatching machine was maintained at 37°C and 72 % relative humidity (22). After a 24-days incubation period, 290 eggs were hatched, then 118 one day-old rock partridge chicks were randomly selected. In this investigation, a total of 69 male and 49 female partridge chicks were used, for a period of 12 weeks, the chicks were raised in an eight-floored cage, they were divided into eight groups randomly, each with about fourteen chicks. On the first day, the ambient temperature was set at 33°C, then it was lowered by 3°C per week until it reached 20°C (24). Infrared heaters were used for heating, while incandescent bulbs were used for lighting. Throughout the trial, a 24-hour lighting regime was used. The birds were provided with a starter diet (23% CP and 2850 kcal of ME/kg during 0-12 weeks. Feed and fresh drinking water were provided ad libitum. The chicks were weighed using an electronic scale with a sensitivity of 0.01 g (4). Each groups of birds were weighed till three weeks after hatching. and then they were marked or numbered individually by attaching a plastic tag to the leg of each chick to permit individual identification and sexing was performed as from 8 weeks of age, during 4-12 weeks' birds were individually weighed weekly, and also feed consumption (FC) were recorded weekly (Daily feed intake per groups were measured and recorded weekly). The chicks' starting body weight was measured, followed by weekly measurements until the

end of the study, when final body weights were recorded. After 8h of fasting and recording their live weight, at 12 weeks of age, 32 partridges (14 males, 10 females) were slaughtered in which the seven heaviest (high BLUP values) and the seven smallest male (lowest BLUP values), the five heaviest (high BLUP values) and the five smallest female (lowest BLUP values) partridges and the other 8 partridges were selected randomly (4 males, 4 females) from medium BLUP values. After the process of bleeding and plucking, the weight of each bird was recorded. After plucking the carcass, it was dissected and eviscerated by removing the internal organs that are uneatable as well as the head and the shank Akinleye (3), and thighs, breast, wing, and total edible organs (heart, liver and gizzard) weights were recorded as percentages of hot-carcass weights. Carcass analysis was done with a method reported by Jones (15). For the purpose of data analysis, the SAS (20) procedure known as PROC GLM was used. Fixed effects: Partridge level production, sex of partridge was fitted in the following model:

$$Y_{ijk} = \mu + P_i + S_j + \varepsilon_{ijk}$$

Where:  $Y_{ijk}$  = one day weight, 1 month weight, 2 month weight, 3 month weight and ADG of  $n$  partridge, of  $i$  level production ( $P_i$ ,  $i=1$  high, 2 medium and 3 low); of  $j$  sex of partridge ( $A_j$ ,  $j=1$  male and 2 female),  $\mu$  = Population mean;  $\varepsilon_{ijk}$  = random error. It was assumed that was normally and independently distributed with mean zero and variance. The correlation coefficient was also determined by PROC CORR in SAS (20) software among body weight traits in partridge (20). The BLUP approach, which was introduced by Henderson (12), was used to analyse genetics of partridge for a variety of different performance characteristics (12). The Mixed Model (fixed + random effects) of SAS (20) software was used for this purpose.

## RESULTS AND DISCUSSION

In order to evaluate the weight of chicks, their average weight for five groups; including: One-day age, one-month age, two months' age, three months' age and ADG was calculated according to their sex that is presented in Table 1.

**Table 1. Mean  $\pm$  S.E for the effect of sex on body weight in Rock Partridges.**

Factor	Mean $\pm$ S.E Body weight traits (g/ bird)					
	One day age	One month age	Two months age	Three months age	ADG	
Sex	Female	4.69 $\pm$ 0.17	112.08 $\pm$ 1.43 b	273.24 $\pm$ 2.84 b	375.90 $\pm$ 3.66 b	4.01 $\pm$ 0.04 b
	Male	4.95 $\pm$ 0.17	119.76 $\pm$ 1.46 a***	303.41 $\pm$ 3.17 a***	437.71 $\pm$ 4.40 a***	4.70 $\pm$ 0.06 a***

\*\*\* its mean significant difference at  $P \leq 0.001$ . The same letter at same column means non-significant differences

The mean weight of female chicks in one-day age group was  $14.69 \pm 0.17$  vs.  $14.95 \pm 0.17$  for male chicks, which did not differ significantly from each other, while the average weight of female and male chicks in one-month age group was  $112.08 \pm 1.43$  and  $119.76 \pm 1.46$ , this respectively shows that male chicks are on average 7.68 g which more than female chicks there were significant differences. In the third group, i.e. Two months' age group, the average weight of male chicks ( $303.41 \pm 3.17$ ) is 30.17 g more than the average weight of female chicks ( $273.24 \pm 2.84$ ), which considered as significant differences. The differences in mean weight of male chicks ( $437.71 \pm 4.40$ ) and female chicks ( $375.90 \pm 3.66$ ) in other group (Three months'

age) was almost twice the previous group or 61.81 g, which considered as significant differences, therefore it could be concluded that the weight of male chicks in this group is significantly higher than female chicks. Regarding the last group, ADG group, although the average weight of male chicks ( $4.70 \pm 0.06$ ) is only 0.69 g higher than the average weight of female chicks ( $4.01 \pm 0.04$ ), this partial difference is considering significant differences. In pursuit of our analysis, production levels are classified into three values: high, median and low, and the amount of body weight in grams per bird, carcass weight in grams per bird and dressing in percent were calculated and shows in Table 2 for all three chicks' sex classes.

**Table 2. Mean ± S.E for the effect of group and sex on carcass traits in Rock Partridges.**

Factor		Mean ± S.E		
		Body weight (g/ bird)	Carcass weight (g/ bird)	Dressing (%)
Production levels	High	464.21 ± 11.03 a***	349.48 ± 7.46 a***	75.35 ± 0.42 a
	Median	395.37 ± 13.88 b	289.17 ± 2.96 b	75.35 ± 0.27 a
	Low	352.80 ± 6.47 c	265.91 ± 6.08 c	73.39 ± 1.83 a
Sex	Female	374.91 ± 11.64 b	283.66 ± 9.39 b	75.62 ± 0.53 a
	Male	430.76 ± 14.41 a***	319.86 ± 2.65 a***	74.32 ± 0.93 a

\*\*\* its mean significant at  $P \leq 0.001$ . The same letter in the same column means non-significant differences

The average body weight in high-level of production is  $464.21 \pm 11.03$ , which decreases to  $395.37 \pm 13.88$  at median level of production, and then increases to  $352.80 \pm 6.47$  at the lowest level of production, which is non-significant. This index is  $374.91 \pm 11.64$  in female chicks and  $430.76 \pm 14.41$  in male its significant. carcass weight index in high level production is equal to  $349.48 \pm 7.46$  which in the average level of production reached  $289.17 \pm 2.96$  and in continue with a slight slope decreases to  $265.91 \pm 6.08$  in low level of production and this trend is non-significant This index is  $283.66 \pm 9.39$  for female chicks

versus  $319.86 \pm 2.65$  for male chicks, therefore it is significant. The last index is dressing that is  $75.35 \pm 0.42$  in high level production and reaches  $75.35 \pm 0.27$  in median level production with a tiny change, and finally decreases to  $73.39 \pm 1.83$  in low level production, which considered as significant. This index is  $75.62 \pm 0.53$  for female chicks and  $74.32 \pm 0.93$  for male chicks; the difference of 1.3% between them is not significant. The correlation coefficient among body traits in rock partridges is calculated over time for chicks regardless of their sex and is shown in Table 3.

**Table 3. Correlation coefficient among body traits in Rock Partridges.**

Traits	One day	One month	Two month	Three month	ADG
One day	1	0.19	-0.001	0.004	-0.02
One month		1	NS	NS	NS
			0.70	0.53	0.52
Two month			1	0.86	0.86
				0.86	0.86
Three month				1	0.99
					0.99
ADG					1

\* its mean significant at  $P \leq 0.05$ , \*\*\* its mean there are significant difference at  $P \leq 0.001$ , NS: non-significant.

The correlation coefficient of ADG with body traits of one day is -0.02, which is inverses and insignificant, but with body traits of one month, body traits of two months and body traits of three months is 0.52, 0.86 and 0.99 respectively which that is direct and significant. Body traits of three months with body traits of one day had a very weak correlation coefficient (0.004) which did not significant, but its correlation with body traits of one month and body traits of two months is 0.53 and 0.86 respectively, which are positive,

highest significant. The correlation coefficient of body traits of two months with body traits of one day is very weak (-0.001), inverse and did not significant, while its correlation coefficient with body traits of one month it is 0.7 which is positive, highest significant. At the end of this section, the results show that body traits of one day with body traits of one month have a positive and relatively weak correlation (0.19) but significant. The results of correlation coefficient among carcass traits in rock partridges are presented in Table 4.

**Table 4. Correlation coefficient among carcass traits in Rock Partridges**

Traits	Live weight	Carcass weight	Dressed
Live weight	1	0.96	-0.15
Carcass weight		1	NS
			0.14
Dressed			1
			NS

\*\*\* its mean there are significant difference at  $P \leq 0.001$ , NS: non-significant

The correlation coefficient of dressed with live weight and carcass weight are -0.15 and 0.14, respectively that first one is inverse and last one is direct, but both are not significant, while the correlation coefficient of carcass weight with live weight is very strong and positive (0.96) also it is significant. The study findings revealed that although the average weight of male and female chicks did not vary significantly at one day of age, at other ages, male chicks were noticeably heavier than female chicks on average. To this regard, the findings in the study by Çağlayan *et al* (4) indicated that live weights and carcass yields of male and female partridges were 458.54 and 407.18 g, 74.59 and 76.07 %, breast and thigh percentage were determined as 34.66- 35.11 % and 28.14-26.20 % for male and female partridges respectively that confirms the results. Çağlayan *et al* (4) further shown in their research that body measurements increased with advancing age, at weeks 6 and 14, there were significant changes in live weights, by the second week, there was a very significant correlation between all body measurements and live weight. Putra *et al* (22) conducted a more extensive investigation, the findings were revealed that the asymptotic weight, inflection of weight, and inflection of age values in rock partridges with all models were 442.57-513.25 g; 188.69-221.29 g; and 5.48-6.69 weeks, respectively. The results of Agnieszka *et al* (1) found no gender influences on grey partridge slaughter analysis (1). Male and female chicks were measured by Nowaczewski *et al* (21) at 3rd, 6th, 9th, 12th, and 15th weeks of age. Except for wing length, which was measured during the third week of development, there were no significant differences in any traits measured at any age between the sexes. The study findings are in line with those of other investigations, which suggests that the animal's breed could be had a role in the study's findings. Partially different samples and environmental variables are to responsible for the findings of this study comparison with other research. Male chicks grow more on average each day than female chicks. While the difference is not insignificant. At various levels of production, the body weight and carcass weight indices of chicks vary, but the high-level production

value is always greater than the other two levels. The dressing index, on the other hand, displays a noticeable decrease tendency from the production high level to other levels. The indices were also examined according to the chicks' sex, and the results showed that the body weight and carcass weight indices in male chicks were significantly higher than in female chicks, but dressing index in female chicks was higher than in male chicks, but the difference did not significant. It is also confirmed that sex has a significant effect on body weight in quail (13,14,2). In their research Yamak *et al* (30) found that the partridge production system a significant effect on both slaughter traits and meat quality. According to the findings of a research by Gertonson *et al* (7) ready-to-cook yields (from live weights) were comparable for male and female birds, for birds between 14 and 20 weeks old, total cooked yields, which ranged from 80 to 85 %, were similar for males and females. This section's findings could be vary due to environmental conditions, including how the chicks are fed, changes in the quality of food fed to chicks that did not use the same brand throughout the trial are a noise variable that may have produced periodicity in the findings. This study finding vary from earlier research, although the differences between male and female chicks is still noticed due to biological issues. The results also showed that the relationship between ADG and one-month, two-month, and three-month body characteristics is direct and highest significant correlation with three-months body traits, which is close to 1, while body traits of three months with body traits of one day have a very weak and non-significant correlation, but its correlation with body traits of one month is significant. The relation between two and one-day body traits was weak, inverse, and non-significant, whereas it was positive, strong, and significant with one-month body traits. The correlation between dressed index and live weight index is inverse and between dressed index and carcass weight index is direct, but neither is significant. However, the correlation between carcass weight and live weight is highly significant. Males exhibited considerably longer keels and shanks than females at 36 weeks, according to study

findings compared to those of the current work by Wfodarczyk *et al* (29). Males and females did not vary in carcass weight, dressing percentage, and component percentage. 36-week-old males and females had similar textural and rheological characteristics. This species showed little sexual dimorphism. Although the statistics produced in this research could be vary from other studies, the correlation among chick age and ADG is clear, showing that with rising chick age, the expected index also increases. This study correlation had a direct and significant

correlation. Concerning several non-significant correlations in this research, the growth trend is upward, and it was not visible, its significance has not been confirmed, although similar findings have been found in earlier studies. In the following, the results for BLUP values for three months 'weight of rock partridge bird are shown in Table 5. As mentioned in the previous section, 118 chicks were examined that BLUP values for average daily gain of rock partridge bird are shown in Table 6.

**Table 5. BLUP values for three months' weight of rock partridge bird**

No. of Bird	BLUP	No. of Bird	BLUP	No. of Bird	BLUP
95	56.0000	53	-23.2000	82	-76.6000
71	40.2000	94	-27.0000	73	-77.2000
22	38.4000	114	-28.4000	10	-77.9000
40	38.4000	80	-28.8000	11	-78.8000
61	27.0000	29	-29.4000	38	-79.5000
5	25.2000	77	-30.0000	108	-80.2000
98	24.4000	93	-30.9000	113	-80.4000
46	21.6000	81	-32.0000	25	-81.2000
12	20.9000	32	-32.6000	110	-81.2000
44	20.5000	14	-34.4000	118	-82.2000
106	15.8000	112	-34.9000	51	-83.0000
65	13.9000	34	-38.4000	84	-83.6000
79	13.9000	68	-39.9000	86	-84.6000
2	12.6000	101	-41.1000	52	-86.5000
107	11.1000	24	-42.2000	75	-88.4000
58	8.9000	102	-42.4000	35	-89.000
100	6.4000	49	-43.2000	120	-89.4000
16	4.4000	17	-43.7000	39	-89.6000
109	3.8000	26	-43.8000	15	-91.7000
111	3.5000	18	-45.5000	4	-91.8000
19	2.5000	115	-45.5000	41	-91.9000
67	2.0000	7	-46.1000	119	-92.4000
64	1.5000	45	-50.4000	59	-92.5000
117	1.1000	63	-56.0000	43	-96.1000
121	0	78	-56.2000	20	-96.6000
97	-1.1000	85	-57.6000	31	-97.9000
30	-1.9000	74	-58.7000	89	-99.2000
105	-1.9000	66	-63.0000	6	-99.7000
83	-5.0000	99	-63.2000	42	-101.00
116	-5.7000	13	-64.2000	28	-104.70
104	-6.7000	70	-65.4000	33	-106.20
60	-8.1000	27	-66.9000	55	-106.20
91	-11.8000	48	-68.1000	88	-113.80
23	-12.7000	1	-69.5000	87	-116.10
9	-15.9000	96	-69.7000	50	-119.60
103	-18.4000	21	-71.7000	37	-125.40
62	-19.2000	69	-72.2000	3	-134.60
8	-19.5000	72	-73.1000	56	-135.40
90	-21.5000	76	-75.1000		
92	-22.9000	36	-75.4000		

Table 6. BLUP values for average daily gain of rock partridge bird

No. of Bird	BLUP	No. of Bird	BLUP	No. of Bird	BLUP
71	1.3588	80	0.3405	51	-0.4262
95	1.3055	103	0.3122	108	-0.4495
98	1.3022	77	0.2972	1	-0.4628
46	1.2705	14	0.2588	10	-0.4762
40	1.2655	29	0.2322	84	-0.4762
65	1.1972	114	0.2305	35	-0.4778
61	1.1905	90	0.2172	25	-0.4878
100	1.1088	18	0.2005	21	-0.4895
22	1.0272	92	0.2005	72	-0.5028
5	0.9988	34	0.1605	75	-0.5162
44	0.9755	32	0.1488	11	-0.5445
67	0.9372	53	0.1088	119	-0.5528
105	0.8472	112	0.06717	38	-0.5578
106	0.8005	102	0.06551	41	-0.5945
104	0.7855	115	0.02551	13	-0.6112
107	0.7838	94	0.01551	118	-0.6112
79	0.7555	26	-0.00949	70	-0.6162
12	0.7205	101	-0.05783	120	-0.6345
8	0.6922	24	-0.06783	6	-0.6412
117	0.6788	66	-0.07283	4	-0.6678
60	0.6722	74	-0.1495	39	-0.6845
2	0.6555	7	-0.1545	82	-0.6962
111	0.6505	76	-0.1662	52	-0.7228
83	0.6272	45	-0.1995	42	-0.7545
30	0.6022	63	-0.2045	15	-0.8128
19	0.5888	99	-0.2212	33	-0.8162
97	0.5822	49	-0.2295	43	-0.8362
91	0.5722	78	-0.2312	87	-0.8412
64	0.5638	27	-0.2395	20	-0.8778
116	0.5538	17	-0.2412	31	-0.8878
68	0.5422	86	-0.2895	59	-0.8945
23	0.4855	85	-0.3228	28	-0.9345
109	0.4838	113	-0.3795	88	-0.9578
121	0.4605	110	-0.3878	56	-0.9912
9	0.4405	73	-0.3962	37	-1.1528
93	0.4372	48	-0.3995	3	-1.1562
16	0.4055	36	-0.4012	50	-1.2295
81	0.3922	96	-0.4028	55	-1.2528
62	0.3905	69	-0.4112		
58	0.3722	89	-0.4212		

**CONCLUSION**

The results of this study sex of the Rock Partridge has a significant effect on the productive performance of weights, and that there is a wide range of breeding values represented in the values of the BLUP for the weights of birds at marketing, the possibility of accelerating, developing and developing the weights of these birds by conducting the selection of the best birds and mating between

them to obtain generations with high production efficiency is higher than it is now.

**REFERENCES**

- 1- Agnieszka, W., M. Lukasiewicz, N. Mroczek-Sosnowska, J. Niemiec, B. Popczyk, and M. Balcerak. 2014. Effect of sex on results of slaughter analysis of grey partridge *Perdix perdix*. Annals of Warsaw University of Life Sciences-SGGW. Animal Science. 53: 67-72
- 2- Ahmed, L. S. and Y. M. S. AL-Barzinji. 2022. Detection of quantitative loci correlation

- with growth traits in local quail using PCR-RFLP technique. Iraqi Journal of Agricultural Sciences. 53 (1): 16-26
- 3- Akinleye, S. B., E. A. Iyayi, and K. D. Afolabi. 2008. The performance, haematology and carcass traits of broilers as affected by diets supplemented with or without biomin a natural growth promoter. 4 (4): 467-470
- 4- Çağlayan, T., K. Kirikçi, A. Günlü, and S. Alaşahan. 2011. Somebody measurements and their correlations with live weight in the rock partridge (*Alectoris graeca*). African Journal of Agricultural Research. 6 (7): 1857-1861
- 5- Cetin, O. 2000. Fattening performance and carcass characteristics of rock partridges (*A. graeca*) at different killing ages. Journal of Poultry Research. 2 (1): 41-44
- 6- Dempfle, L. 1982. The applicability of BLUP in poultry breeding. Proceedings of 24th British Poultry Breeder's Roundtable
- 7- Gertonson, E.H., L.E. Dawson. and T. H. Coleman. 1974. Composition and acceptability of meat from chukar partridge. Poultry Science. 53 (5):1819-1823
- 8- Halil, A. and C. Özbeyaz. 1999. Hayvan Yetiştiriciliği Temel Bilgileri. 1<sup>st</sup> ed., Kariyer Matbaacilik, Ankara: pp: 0-7
- 9- Hartmann, W. 1992. Evaluation of the potentials of new scientific developments for commercial poultry breeding. World's Poultry Science Journal. 48 (1): 17-27
- 10- Henderson, C. R. 1963. Selection Index and Expected Genetic Advance. In: Hanson, W.D. and Robinson, A.F. (eds.), Statistical Genetics and Plant Breeding. NAS-NRC, Washington: pp:141-163
- 11- Henderson, C.R. 1975. Best linear unbiased estimation and prediction under a selection model. Biometrics. 31 (2): 423-447
- 12- Henderson, C.R.; Champaign, United States 1-January 1973. Sire Evaluation and Genetic Trends. Journal of Animal Science. Illinois University: pp:10-41
- 13- Ismael, L. A. and E. M. Ameen. 2022a. Reproductive, biochemical, and hormonal traits of local quail in response to dietary supplementation of dried garlic powder. Iraqi Journal of Agricultural Sciences. 53 (2):.278-287
- 14- Ismael, L. A. and E. M. Ameen. 2022b. Reproductive, serum biochemical and hormonal traits of local quail in response to dietary supplementation of green tea powder. Iraqi Journal of Agricultural Sciences. 53 (1): 57-66
- 15- Jones, R. 1984. A standard method for the dissection of poultry for carcass analysis. Technical Bulletin. 222:16-20
- 16- Kerr, R. J. 1998. Asymptotic rates of response from forest tree breeding strategies using best linear unbiased prediction. Theoretical and Applied Genetics. 96 (3): 484-493
- 17- Kirikçi, K., C. Tepeli, O. Çetin, A. Yılmaz and A. Günlü. 2017. Growth, fattening performance, slaughter and carcass characteristics of Rock partridges (*A. graeca*) obtained from molting partridge hens. Bulletin of Environment, Pharmacology and Life Sciences. 6 (5): 67-70
- 18- Kokoszynski, D., Z. Bernack, H. Korytkowska, A. Wilkanowska and A. Frieske. 2013. Carcass composition and meat quality of Grey Partridge (*Perdix perdix L.*). Journal of Central European Agriculture. 14 (1): 378-387
- 19- König, S., F. Tsehay, F. Sitzenstock, U. U. Von Borstel, M. Schmutz, R. Preisinger. and H. Simianer 2010. Evaluation of inbreeding in laying hens by applying optimum genetic contribution and gene flow theory. Poultry Science. 89 (4):658-667
- 20- SAS. 2004. Statistical Analysis System, SAS Institute, Inc. Cary., N. C. USA
- 21- Nowaczewski, S., B. Kolanos, S. Krystianiak, H. Kontecka and M. T. Gorecki. 2014. Body weight and some biometrical traits of grey partridges (*Perdix perdix*) at different ages. Annals of Warsaw University of Life Sciences-SGGW. Animal Science. 20 (4): 962-966
- 22- Putra, W.P. and K. Kırıkçı. 2020. The Growth Curve of Body Weight in Mixed-sex Rock Partridges (*Alectoris graeca*) Kept in captivity. Journal of Poultry Research. 18 (1): 19-23
- 23- Rozempolska-Rucinska, I., G. Zieba, and M. Lukaszewicz. 2013. Heritability of individual egg hatching success versus hen hatchability in layers. Poultry Science. 92 (2): 321–324
- 24- Sariyel, V., A. Aygun. and I. Keskin. 2017. Comparison of growth curve models in partridge. Poultry Science. 96 (6): 1635-1640

- 25- Uscebrka, G.; D. Zikic and S. Stojanovi. 12th European Poultry Conference, 2006, Verona, Italy. World's Poultry Science Association. Histochemical Characteristics of Breast and Leg Muscles in Farm Bred Partridges (*Perdix perdix L.*): pp: 1-4
- 26- Večerek, V., V. Šerman, F. Vitula, E. Straková, P. Suchý, N. Mas and Z. Lukac. 2008. Slaughter value of selected breeds of wildfowl. *Krmiva: časopis o hranidbi životinja, Proizvodnji Tehnologiji Krme.* 50 (6):335-344
- 27- Vitula, F., P. Suchý, E. Strakova, K. Karásková, D. Zapletal, and L. Kroupa. 2011. Energy value of meat in selected species of feathered game. *Acta Veterinaria Brno.* 80 (2):197-202
- 28- Wen, Y., H. Liu, K. Liu, H. Coa, H. Mao, X. Dong and Z. Yin. 2020. Analysis of the physical meat quality in partridge (*Alectoris chukar*) and its relationship with intramuscular fat. *Poultry Science.* 99 (2): 1225-1231
- 29- Wfodarczyk, K., D. Kokoszyński, M. Saleh, M. Kotowicz and P.D. Wasilewski. 2021. Effects of sex on carcass composition and physicochemical, textural and rheological properties of meat from grey partridge. *South African Journal of Animal Science.* 51 (5): 647-656
- 30- Yamak, U. S., M. Sarica, M. A. Boz and A. Ucar. 2016. The effect of production system (barn and free-range), slaughtering age and gender on carcass traits and meat quality of partridges (*Alectoris chukar*). *British Poultry Science.* 57 (2): 185-192
- 31- Yilmaz, A. and C. Tepeli. 2009. Breeding performance of a captive Chukar partridge (*Alectoris chukar*) flock. *Journal of Animal and Veterinary Advance.* 8 (8): 1584-1588.