COMPARATIVE STUDY OF PRODUCTION PERFORMANCE AMONG LOCAL QUAILS

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ABSTRACT

This research was carried out to compare the productivity performance of three lines of local quail. The results showed a significant superiority in the daily gain weight (3.76 g/day/quail) and marketing weight (167.2 g/quail) for brown quail over other colors. Also, significant differences were found in the dressing ratio between males (67.8%) and females (65.76%). As for the egg production of quail, it was found a significant superiority of the desert quail over the other colors in the number of eggs produced, the average egg weight (9.73 g/ egg) and the HDEP (78.6 %) with the best feed conversation (2.15 g / g of egg). The results also show that the white-colored quail was average between the other two colors for the characteristics of the productive performance of body weight and egg production. It could be concluding from these results the possibility of directing the different colors of a particular trait and developing it into specialized lines for the production of eggs or meat through the selection process.

Keywords: Egg production, feed conversation, carcass, daily gain, dressing%.

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دراسة مقارنة الأداء الإنتاجي بين خطوط السمان المحلي

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المستخلص

أجريت هذه الدراسة لمقارنة الأداء الإنتاجي لثلاثة ألوان مختلفة من السمان المحلي. أظهرت نتائج الدراسة تفوقاً معنوياً في معدل زيادة الوزن اليومي (3.76 غم/ يوم/ السمان) ووزن التسويق (167.2 غم / طير) للسمان البني اللون على الألوان الأخرى. كما وجدت فروقات معنوية في نسبة التصافي بين الذكور (67.8٪) والإناث (65.76٪). أما بالنسبة لإنتاج بيض السمان فقد وجد تفوقاً معنوياً للسمان الصحراوي على الألوان الأخرى في عدد البيض المنتج ومتوسط وزن البيضة (9.73 غم/ بيضة) والنسبة المئوية لأنتاج البيض اليومي (78.6٪) مع أفضل نسبة التحويل الغذائي (2.15 غم / غم من البيض). كما بينت النتائج أن السمان الأبيض كان متوسطا بين اللونين الآخرين لخصائص الأداء الإنتاجي لوزن الجسم وإنتاج البيض. نستنتج من هذه الدراسة إمكانية توجيه الألوان المختلفة لصفة معينة وتطويرها إلى خطوط متخصصة لإنتاج البيض أو اللحوم من خلال عملية الأنتخاب.

الكلمات المفتاحية: النسبة المئوية لأنتاج البيض،التحويل الغذائي، الذبيحة، الزيادة الوزنية، نسبة التصافي.

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INTRODUCTION

Quail (*Coturnix coturnix*) is one of the poultry species, which has been used in various biological experiments including meat and egg production. Quail is a popular bird model in numerous fields of research because of its small body size, short generation interval (3-4 generations per year), resistance to many common avian diseases, and high egg production it has been considered as an excellent laboratory experimental bird, less feed and easy maintenance (3). The great nutritional value of quail eggs and meat makes them valued (29). Quail eggs are high in nutrients that are beneficial to human health. Quail eggs are consumed by a large number of people, particularly in Asian countries. Despite their small size, quail eggs have three to four times the nutritious value of chicken eggs and are rich in vitamins and minerals. Consumption of quail eggs regularly aids in the prevention of various diseases and strengthens the immune system. Quail eggs have considerably better nutritional benefits than other eggs, and they are rich providers of antioxidants, minerals, and vitamins, as well as providing us with more nourishment than other foods (18). The hen day egg productions traits were significantly influenced by the lines. This was observed in the white line which proved to have remarkably significant values ($P \leq 0.01$) in the hen day than other two lines, where white birds are lighter than desert and brown (1). Nestor and Bacon, (24) figured out that heavy Japanese quail had lower egg production and light quails had higher egg production. They contributed this difference to the fact that small-size quails had higher number of mature ovarian follicles. (14) and (6) also reported the similar findings. Another study that reported by (10) who conducted an experiment on two breeds of Japanese quails Pharaoh (PH) and Manchurian Golden (MG) breeds, they concluded that egg production was very high significantly ($P \leq 0.001$) in both breeds with mean egg production intensity of 75,8% and 80.5% in PH and MG breeds, respectively. (7) indicated that the hen-day egg production was 25.77 in the 3rd month of lay, while number of part-period egg was 62.43±0.23 eggs / hen. In study on local quail (13) show that the egg production, egg weight rate, feed intake, HDP, and egg mass were averaged (84.33 number/week), (11.69 g/egg), (92.48%) and (10.62 g), receptively. The current study aimed to compare the productive performance (for eggs and meat) for three different colors (white, brown and desert) of local quail in order to know the direction of each color to the production of eggs or meat or both characteristics.

MATERIAIS AND METHODS

A total of 238 local quails (*Coturnix coturnix*) of one-day age were involved in this study. The included birds belong to three distinct lines, desert (n=55), white (n=90), and brown, (n=104) lines (Figure 1). All three lines were taken at one day of old from the agricultural college university of Raparin, Rania, Kurdistan. At the poultry research farm administered by the biology department at Soran University, the birds were maintained throughout the course of the study under the exact same set of management circumstances. According to their breed standard, quails were kept in battery cages (21). All of the birds were given the same care and diet when they were young. According to the National Research Council, throughout the raising phase, a conventional meal of 240g crude protein/kg and 12.1 MJ (Mega joules) of ME (Metabolized Energy)/kg was administered via the nipple system, for water providing were used. The quail's nesting box averaged temperature around 20 degrees Celsius. A 16:8 light: dark cycle was implemented, with a total installed lux level of five. To control the spread of disease, we took all the necessary bio-security and hygiene measures on the farm. Cloaca and chest feather color were used to determine sex in the sixth week (4). Each group's body mass and feed intake were recorded independently using an electrical balance with a sensitivity of 0.01 g. (16). The recording of the live body weight was carried out on a weekly basis on animals of both sexes between the ages of three and six weeks, after that, male and females that had been separated were allowed to have their live body weight recorded at the time of sexual maturity (n 223), the blood sample was taken at six-week age as sample for body weight and growth After the animal has been slaughtered, eviscerated, and de-feathered, the carcass

weight and the live weight were recorded., and for egg production purposes the breeding system was in a ratio of three females to one male were kept together in separate cages. To evaluate their productive and reproductive performance, data on egg weight, chick body weight at first day, 2nd, 4th, 5th and 6th week of age, feed consumption, and egg production were recorded during research and at the conclusion of the thirteenth week of their lives, all of the quails were slain. After the animal has been slaughtered, blood sample were taken for egg production purpose. The PROC GLM (General Linear Model) procedure in (28). was used to analyze the data. Fixed effects: Quail lines, sex of quail was fitted in the following model for weight traits:

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

Where: Y ijk = one day weight, 42 day weight, ADG of n quail, carcasses, dressing % of i quail lines (Qi, i=1 Brown, 2 dessert and 3 white); of j sex of quail (Aj , j= 1 male and 2 female), μ = Population mean; Eijk = random error. The analysis of the effect of quail lines on egg traits the following model was used:

$$Y_{ij} = \mu + Q_i + \varepsilon_{ij}$$

Where: Y ij = number of egg, egg weight, HDEP, egg mass, feed conversation of i quail lines (Qi, i=1 Brown, 2 desserts and 3 white); μ = Population mean; Eij = random error. It was assumed that had a normal distribution and was distributed independently, with a mean of zero and a variance. The Duncan's multiplied range was using in (28) software to comparative among the groups mean.

Figure1. The white, brown and desert quails

RESUITS AND DISCUSSION

Body weight: The results in Table (1) show significant differences among quail lines of body weight traits under study. The average weight of quail chicks in the one-day age were (9.94 ± 3.52 g/chicks), (9.45 ± 3.35 g/chicks), and (9.31 ± 3.80 g/chicks) in white, brown, desert quails, respectively. which it is significantly differenced from each other (P≤0.05) superiority of white over desert and brown line is obvious, also in the six-week age, there is a significant difference seen among three lines were arrived (167.2 ± 59.3 g/quail), (166.2 ± 58.2 g/quail) and (156 ± 55.3 g/quail) in brown, desert and white quail respectively, brown have high body weight compare to the desert and white line while white is superior to the desert line. Similar results were found in averaged daily gain (ADG) for brown quails (3.76 ± 0.11 g/ quail/ day) from one day to 42 days (marketing age) of age (Table, 1). These results could be return to different in genetic makeup of three quail lines under study. A group of researcher (22, 25, 30) were generally in agreement with the current results of body weights values, which suggested compared to other lines, the brown line had a relatively high body weight. According to the research, the body weights were greatly affected by the various kinds of color mutants or variations of quails Rahman *et al.* (26). Alternatively, the current research demonstrated an undeniable trend of weight superiority toward the brown line, which could be plainly seen only when sexual maturity had been reached by the subjects. This results

showed that sex, plumage color, and weight could be interact. The brown line's superiority only becomes apparent in females after the sexes were separated in line with our findings, a number of other studies found that the sex of the bird seemed to have an effect on the body weight of the birds (2, 15). The brown line's higher body weight suggests a larger potential for meat-type quail than the other two lines. It's genetically different from the two investigated lines.

Table 1. Mean ± S.E for the effect of quail lines on body weight traits.

		Mean ± S.E Body weight traits (g/ bird)		
Factor	**levels**	**One day**	**42 days**	**ADG**
Breed	**Brown**	**9.45 ± 0.195 ab**	**167.2 ± 5.01 a***	**3.76 ± 0.11 a***
	Desert	**9.31 ± 0.036 b**	**142.2 ± 0.10 c**	**3.18 ± 0.002 c**
	White	**9.94 ± 0.24 a***	**156 ± 3.38 b**	**3.48 ± 0.076 b**

*** its mean there are significant difference at P≤ 0.05**

Carcass traits

No significant differences were observed among quail lines in carcass and dressing percentage at 42 days of age (Table, 2), while significant differences recorded between male and females quail in same age of both carcasses and dressing traits. The performance of quail males was significantly superior to quail females in carcass weight at 42 days of age (99.1 ± 2.57 g/quail vs 92.6 ± 2.01) and the percentage of dressing (67.8 ± 1.3 vs 65.76 ± 1.4 %) at the same age. One of the elements that determines the amount and quality of the carcass in Japanese quail is the strain type Kumari *et al.* (17). furthermore, a number of variations were recorded in the lines that were analyzed with regard to a number of carcass properties. This suggests that these variable lines play an important role in the characteristics in concern to the findings of a more recent research that asserted the clear superiority of white line in a number of productive characteristics, including carcass weight, our findings showed no such result Nasr *et al.* (23). Researchers also found that the brown line was clearly better than the other two lines in terms of how the carcasses were prepared. Higher levels of brown line features of carcass dressing were reported by Lnci *et al.* (20) which is disagree with our result that has no difference between lines. Simultaneously, these results demonstrate an evident advantage for the male line in terms of carcass dressing over females, the superiority of quail males over females. The male line of quail was produces better dressed carcasses in the above-mentioned traits is due to the male hormonal effect that helps in sequestering nitrogen in the body and promoting growth in males compared to females.

Egg traits

The data of the statistical analysis shows in Table (3). The results were revealed significant differences in the characteristics of egg production among the three quail lines, as it recorded a significant superiority of the desert-colored quail in most of the traits under study. The average daily, total number of eggs, the percentage of egg production, the mass of eggs, and the efficiency rate of food conversion of the desserts quail were 2.35 ± 0.06, 82.5 ± 2.06, 9.73 ± 0.27, 78.6± 1.96, 7.7 ± 0.37 and 2.15 ± 0.12, respectively. The superiority of the desert color quail in egg performance over other colors could be due to the genetic differences that exist among those colors in relation to the egg production of these birds. The current research shows that there is a significant role for color variation in both the number of eggs and their weight features. This discovery was made in accordance with a series of obtained data that found large differences in egg weight among many lines of quail.

Table 2. Mean ± S.E for the effect of quail lines and sex on carcass traits

Factor	levels	Mean ± S.E Carcass weight traits (g/ bird)		
		Live Weight	Carcass weight	Dressing %
Breed	B	142.66 ± 5.15 a	95.45 ± 2.93 a	67.172 ± 0.86 a
	D	141.0 ± 7.74 a	95.66 ± 4.96 a	67.95 ± 0.95 a
	W	146.11 ± 3.34 a	96.89 ± 2.55 a	66.258 ± 0.60 a
Sex	Female	141.1 ± 3.58 a	92.6 ± 2.01b	65.76 ± 1.3 b
	Male	146.5 ± 4.0 a	99.1 ± 2.57 a*	67.8 ± 1.3 a*

Different letter in same column means there are significant. * it means significant at (P ≤ 0.05).

This finding was in agreement with the findings of Ahmed and Al-Barzinji. (1) and Ashok *etal.* (5). The fact that various lines of quails produce eggs in ways that are noticeably distinct from one another was found in other studies, which provided further support for the validity of this result (22, 26). Additional support for this result comes from other studies that revealed substantial differences in egg output across quail strains Yılmaz and Çağlayan (30), was indicated that the white line's eggs weighed substantially less than those of the other groups, although no big variation were identified between these lines and the other lines investigated Similarly Ashok *et al.* (5). The brown line has displayed high egg weight values, whereas the black lines have demonstrated substantial advantage in terms of egg quantity. Conversely Faruque *et al.* (9) were discovered that the egg weight of the white line has substantially higher percentage values than those of the other lines. In addition, Farghly *et al* (8) disproved the concept that there was any connection between the color of the feathers and the qualities of the eggs. No significant differences recorded between white and brown quail for egg production traits (Table,3).These consequences are in agreement with those found by Hocking *et al.* (11) and Leeson *et al.* (19). They were unable to identify a significant difference ($p > 0.05$) in the number of eggs produced by the various chicken strains. In a similar way, there was no statistically significant difference in the quantity of eggs produced by local, Hussain et al. (12) and imported Japanese quail stocks.

CONCLUSION

From the results achieved in the present study, could be conclude that desert quail significantly outperforms in the productive performance of egg traits, and this result reflects its genetic abilities to produce eggs, as it could be bred and directed in this direction through selective breeding. The results also showed the superiority of brown quail in live weight and direct it to meat production by following scientific methods of poultry breeding.

Table 3. Mean ± S.E for the effect of quail lines on egg traits

Factor	level	Mean ± S.E Egg production/day/family	Total egg production/ family	Egg weight g/egg	HDEP %	Egg mass	Feed Conversation
Breed	Brown	2.07 ± 0.09 b	72.6 ± 3.26 b	9.7 ± 0.22 a	69.1 ± 3.1 b	6.7 ± 0.35 a	2.65 ± 0.16 a
	Desert	2.35 ± 0.06 a*	82.5 ± 2.06 a*	9.73 ± 0.27a	78.6± 1.96 a*	7.7 ± 0.37 a	2.15 ± 0.12 a
	White	2.16 ±0.07 ab	75.85 ± 2.43 ab	9.62 ± 0.22a	72.3 ± 2.3 ab	7 .1± 0.30 a	2.53 ± 0.17 a

Different letter in same column means there are significant. * it means significant at (P ≤ 0.05).

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