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Comparative of egg production performances between three lines of Japanese quail female.

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ABSTRACT

This study was conducted in the poultry field of the Animal Production Department, College of Agriculture - University of Kirkuk, during the period from (3/7/2021 to 6/7/2021). 300 female Japanese quails (white = 100, brown = 100, gray = 100) were used in the experiment. They were raised in breeding cages until the age of 30 days, after which they were transferred to production cages until the age of 120 days to evaluate the production performance between three lines of female Japanese quail represented by age at sexual maturity, cumulative egg production, egg production period, average egg weight, egg mass, daily egg production (HD%), feed consumption, feed conversion ratio, in addition to the economic conversion ratio. The results showed a significant ($P \leq 0.05$) superiority of brown line females over gray line females in the trait of cumulative egg production and egg production based on HD%. In contrast, white line females significantly outperformed brown and gray line females in the trait of average egg weight and egg mass. In contrast, a significant improvement was observed for white line females compared to brown and gray line females in the trait of feed conversion ratio and ESR. No significant difference was observed in the traits of age at sexual maturity, egg production period and feed consumption between white, brown and gray line females.

***Keywords*:** Female quail, egg production, feed consumption, feed conversion ratio.

INTRODUCTION

Japanese quails, are the smallest type of quail cultivated for their meat and eggs. Several factors explain the usefulness of this significant bird; it offers a more affordable option than hens. As an agricultural species that produce particular meat valued for its distinct flavor and high nutritional content, these birds have reached a remarkable economic relevance [1]. Farmers should be encouraged to cultivate Japanese quails for a variety of reasons. Because quails require less upkeep, poor people worldwide are drawn to rearing quails for profit because the initial outlay is smaller [2]. Compared to commercial broiler farming, they have a remarkably minimal risk [3]. Additionally, these birds are the most appropriate and productive poultry, which may encourage farmers to continue producing them due to their early adolescence, short generation gap (3–4 generations per year), and reduced feed requirements [4]. Additionally, a number of other qualities make these birds useful in scientific studies. For example, their high egg production makes them perfect for scientific investigation [5, 6, 7]. Estimating genetic parameters for improving the traits is crucial before starting a breeding program [8, 9]. The plumage color, dependent on several candidate genes, is also impacted by a selection program and is strongly correlated with quantitative features that require further investigation [10].

However, it has been noted that the majority of farmers faced difficulties in obtaining high-quality commercial quail chicks [11]. According to reports, the color of the plumage has a substantial correlation with the qualities of eggs, body weight, and abdominal fat [12, 13]. Furthermore, insufficient information is available to evaluate their use in commercial production regarding growth performance and color changes in the plumage. A direct comparative analysis of various quail lines could be used to implement the intended improvement plan [14]. Recent genotyping investigations have focused on the plumage color phenotype, which is noteworthy since it is the primary reactive manifestation of the complex genetic makeup of Japanese quails [15].

On the other hand, many research has been done on Japanese quail plumage color mutations. This is a result of the restricted quantity of stock in various nations. The goal of the current study is to evaluate the productive traits for egg production among three lines of Japanese quail females.

Materials and methods:

The current experiment was conducted in the poultry field of the Animal Production Department at the College of

Agriculture - University of Kirkuk, from (7/3/2021 – 7/6/2021). 300 female Japanese quail birds were used in the experiment (white= 100, brown= 100, gray= 100), the birds were sexed at 30 days old. They were raised from the age of one day to 120 days to study the productive traits of eggs concerning age of sexual maturity, cumulative egg production, egg production period, mean of egg weight, egg mass, hen day production, feed intake, feed conversion ratio, and ESR according to [16].

The birds were fed on ration that contained 24% crude protein, and 2906 Kcal/Kg Metabolism energy, while the production diet contained 20% crude protein, and 2900 Kcal/Kg Metabolism energy according to [16], while water was given openly. Data on egg production and weight were recorded from the day of sexual maturity until the end of the experiment. General Linear Model within the statistical program SPSS [17] was used to study the effect of lines on the productive traits. Duncan Multiple Range Test [18] was conducted to diagnose the significance differences between the means of the lines.

Result and discussion:

Table 1 shows the effect of three lines of Japanese quail on sexual maturity, cumulative egg production, and egg production period. There were no significant differences in sexual maturity among the three breeds. The same applies to egg production period. As for the cumulative egg production period, the brown line female outperformed the gray line female. Our result agreed with [19] who found significant difference in the cumulative egg production between three lines of Japanese quail. Furthermore, [19] found in his study that there was no significant difference in age of sexual maturity among the Japanese quail lines.

Table 2 shows the effect of three lines of Japanese quail on the average egg weight, egg mass, in addition to egg production based on H.D %. significant differences were found for egg weight, in which the white line female outperformed the brown and gray line female. The same applies to the egg mass, which exceeds the white line. As for the traits of egg production based on H.D %. The brown line female outperformed the gray line female, our results agreed with [9], who found by using three lines of Japanese quail there is a significant difference among these lines in egg weight, also [20] found by using different lines of chicken that the egg weight linked by the feather color. He found significant differences in egg weight by using three genetic lines of Kurdish local chicken. These differing may linked to the egg component that differ among the lines [13]. Moreover, [20] found in his study significant differences among the genetic lines of Japanese quail in the HD%.

Table 3 shows the effec

t of three lines of Japanese quail female on the feed consumption ratio, feed conversion ratio, and ESR. There were no significant differences in the amount of feed consumed. While the grey line outperformed the brown and white lines in food conversion ratio. The same applies to the ESR trait, in which the grey line outperformed the rest of the lines. Our result agreed with [20] who found a significant difference in the FCR between three lines of Japanese quail, also observed non-significant differences in the feed intake among the genetic lin

Table 1: The effect of three lines of Japanese quail female on the age of sexual maturity, cumulative egg production, and egg production period

Traits	Line 1		Line 2		Line 3		Sig.
	Mean ± S.E.	CV	Mean ± S.E.	CV	Mean ± S.E.	CV	
ASM	51.68±0.34 a	8.46	51.58±0.44 a	10.12	51.57±0.45 a	10.24	N.S
CEP	53.03±1.00 ab	24.36	54.12±1.11 a	24.20	50.77±1.09 b	24.89	*
EPP	68.32±0.34 a	6.40	68.42±0.44 a	7.63	68.43±0.45 a	7.72	N.S.

Line 1= White, Line 2= Brown, Line 3= Gray, ASM= age of sexual maturity, CEP= cumulative of egg production, EPP= egg production period, CV= Coefficient of variation, NS= Non-significant, means with different superscripts in each row differ significantly (P≤0.05).

Table 2: The effect of three lines of Japanese quail female on the mean of egg weight, egg mass, and hen day production

Traits	Line 1		Line 2		Line 3		Sig.
	Mean ± S.E.	CV	Mean ± S.E.	CV	Mean ± S.E.	CV	
MFEW (g)	10.24±0.05 a	6.61	7.91±0.07 b	10.01	7.66±0.08 c	11.84	*
EM (g)	544±10.90 a	25.97	431±10.22 b	27.98	392±10.58 c	31.34	*
HD (%)	77.49±1.39 ab	23.27	78.88±1.47 a	21.92	73.81±1.39 b	21.95	*

Line 1= White, Line 2= Brown, Line 3= Gray, MFEW= mean of first egg weight, EM= egg mass, HD= hen day production, CV= Coefficient of variation, NS= Non-significant, means with different superscripts in each row differ

significantly (P≤0.05).

Table 3: The effect of three lines of Japanese quail female on the feed intake, feed conversion ratio, and economic conversion ration

Traits	Line 1		Line 2		Line 3		Sig.
	Mean ± S.E.	C.V.	Mean ± S.E.	C.V.	Mean ± S.E.	C.V.	
FI (g)	1366±6.75 a	6.40	1368±8.85 a	7.63	1369±9.09 a	7.72	N.S.
FCR (g/g)	2.73±0.07 c	34.31	3.47±0.10 b	34.81	3.83±0.10 a	30.96	*
ESR	2045±54.11 c	34.30	2603±76.85 b	34.81	2871±76.50 a	30.96	*

Line 1= White, Line 2= Brown, Line 3= Gray, FI= feed intake, FCR= feed conversion ratio, ESR= economic conversion ratio, CV= Coefficient of variation, NS= Non-significant, means with different superscripts in each row differ significantly (P≤0.05).

Conclusion:

In conclusion, the three lines of Japanese quail female are differing significantly in the egg weight and the cumulative egg production, egg mass, H.D.%, FCR, and ESR. This is due to the genetic makeup of the lines were used.

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مقارنة الأداء الإنتاجي بين ثلاث خطوط من اناث السمان الياباني.

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الخلاصة

أجريت هذه الدراسة في حقل الدواجن التابع لقسم الإنتاج الحيواني بكلية الزراعة – جامعة كركوك للفترة من (2021/3/7 ولغاية 2021/6/7) واستخدم في التجربة 300 أنثى من طيور السمان الياباني (الأبيض = 100، البني = 100، الرمادي = 100) وتم تربيتها في اقفاص تربية حتى عمر 30 يوما، بعدها نقلت الى اقفاص الإنتاج حتى عمر 120 يوم لتقييم الأداء الإنتاجي بين ثلاث خطوط من اناث السمان الياباني المتمثلة بالعمر عند النضج الجنسي، الإنتاج التراكمي للبيض، فترة إنتاج البيض، متوسط وزن البيضة، كتلة البيضة، إنتاج البيض اليومي (HD%)استهلاك العلف، معامل التحويل الغذائي، إضافة الى نسبة التحويل الاقتصادي. أظهرت النتائج تفوق معنوية (P≤0.05)لإناث الخط البني على اناث الخط الرمادي في صفة انتاج البيض التراكمي وإنتاج البيض على أساس HD %، بينما تفوقت اناث الخط الأبيض معنوياً على اناث الخط البني والرمادي في صفة متوسط وزن البيض وكتلة البيض، في حين لوحظ تحسن معنوي لإناث الخط الأبيض مقارنة مع اناث الخط البني والرمادي في صفة معامل التحويل الغذائي وESR ولم يلاحظ أي فرق معنوي في صفات العمر عند النضج الجنسي وفترة انتاج البيض واستهلاك العلف بين اناث الخط الأبيض والبني والرمادي

الكلمات المفتاحية: دوال خصوبة التربة، الزراعة المستمرة، التغير المناخي ، الري المفرط، الزراعة المحمية.