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Effect of plumage colour and breeding system on the reproductive traits of brown and black quail

ABSTRACT

This study was conducted in the farm of the Department of Animal Production, college of Agriculture –Tikrit University for the duration of 19/11/2021 to 23/12/2021. The aim this to study the effect of colour plumage and breeding system on the traits reproductive of Japanese quail Use in this experiment 180 A quail bird of age 21 Days were divided into two groups according to the colour of plumage 90 brown bird and 90 Black birds, each group divided that was raised in two breeding systems (batteries and floor). each breeding systems Contain 45 bird and is divided into three replicates, each replicate contains 15 the bird, and the sex ratio was used 2:1. The results showed no significant effect of plumage color and breeding system on the hatchability from total eggs, hatchability from fertilized eggs, fertility rate, embryonic mortality, superiority of brown quails over blacks in the weight of the first egg, while black quails outperformed brown ones in weight at maturity sexual.

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INTRODUCTION

The Japanese quail is the smallest type of poultry that is breeding for egg production and meat is considered an economic alternative to chicken. The quail bird is used as a guide in high-cost experiments due to the short period of its generation, especially in the study of breeding and improving domestic birds (Al-Tikriti, 2010). also characterized by early maturity The first egg 42-35 days and the shorter period of the generation as it gives 3-4 (generations per year) (Vali, 2008) and its resistance to diseases and diseases associated with high egg production. (Scholtzet et al, 2009). The quail bird is characterized by its production of eggs (280 egg/year) and hatching period (18-16) days and weight at maturity for female (150-140) grams and males 140-100 grams (Tarhyel et al, 2012, 2012). The average weight of the egg 10 gram (Lukanovet et al, 2019). There are differences between breeds of quail in reproductive traits. explained Al-Rubaie (2021) show The

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superiority of the colour plumage brown quail over the quail in the percentage of embryonic mortality. Although the quail bird has resistance to environmental conditions, this does not mean that it is not affected by them. Therefore, it can be bred in the floor breeding system and cages, with the same requirements as chickens in terms of nutrition, temperature, humidity and lighting. There is a possibility to link the reproductive traits of the quail bird to the breeding system as he indicated (Roshdy et al,2010) to the improvement of the reproductive traits of the quail that was bred in the floor breeding system comparison with the quail that was bred in the battery breeding system. While Arumugam et al (2015) It was found that there is no effect of the type of breeding on the traits of fertility and hatchability. Therefore, this study was show the effect of quail's plumage colour, the breeding system and the interaction between them on reproductive traits.

MATERIAL AND METHODS

This study is in Quail Hall of farm Poultry, animal production department - College of Agriculture-Tikrit University for a period from 19/11/2021 to 23/12/2021 . The herd was obtained from the Agricultural Research Department belonging to the Ministry of Agriculture .Use in the study 180 birds age 21 days After her naturalization The flock was divided into two groups depending on the color of the birds' Plumage (black and brown), each group included 90 birds, each group divided into two parts according to Breeding system (batteries and floor) Each group included three replicates, and each replicate contained 15 birds a The ratio is adopted Nationality 2:1 That is, one male for every two females. It was The main objective of this study is to know the effect of the breeding system and genotype on adjectives Genital and the quality of the eggs for a bird Quail Water and fodder were provided freely for a period of time the study, In the study, a diet containing protein was used 20.11% and a representative energy of 2860 kilocalories / kg feed (N.R.C,1994) .

Studied Traits

Weight of the first egg (grams)

Using a sensitive electronic scale, the weight of the egg laid down was recorded

Sexual maturity age (day)

The age at the time of laying the first egg considered the age of sexual maturity of the birds.

Weight at sexual maturity (gm)

scale to two decimal places Record the weight of the females when laying the first egg using a sensitive electronic.

The Rate hatch From total eggs, hatchability percentage from fertilized eggs, fertility percentage and embryonic mortality were calculated according to what was mentioned in it. Diyab (1988).

The Rate Centennial hatch

The number of hatched chicks

$$\text{The percentage of hatching from the total eggs} = \frac{\text{The number of hatched chicks}}{\text{The total number of eggs in the incubator}} \times 100$$

The number of hatched chicks

$$\text{The percentage of hatching from fertilized} = \frac{\text{The number of hatched chicks}}{\text{The number of fertilized eggs}} \times 100$$

The number of fertilized eggs

Fertility percentage

The number of hatched eggs + the number of dead embryos

$$\text{Fertility percentage} = \frac{\text{The number of hatched eggs + the number of dead embryos}}{\text{The total number of eggs in the incubator}} \times 100$$

The total number of eggs in the incubator

Embryos mortality percentage

Calculated after the end of the hatching process by calculating the number of eggs in which there are dead embryos.

$$\text{Embryos mortality percentage} = \frac{\text{Mortality embryos number}}{\text{number of eggs enriched}} \times 100$$

The weight of the first egg, the age at sexual maturity, and the weight at sexual maturity. Diyab (1988).

STATISTICAL ANALYSIS

Has been analyzed Data for the experiment Workers Experience factorial The same two factors are (the effect of the breeding system and the effect of genotype), as well as the overlap between them and the effect of plumage colour job Statistical program SAS(2010) and the averages of the coefficients were compared with the Duncan multiple rang test (Duncan ,1955). Equation of the mathematical model of the global experience with two factorsshe:

$$Y_{ijk} = \mu + a_i + b_j + (ab)_{ij} + e_{ijk}$$

Y_{ijk} = value of any observation in the breeding system and plumage colour.

μ = general average.

a_i = the effect of the breeding system (batteries, Floor).

b_j = effect of plumage colour (brown and the black).

$(ab)_{ij}$ = the effect of the interaction between breeding system and plumage colour.

e_{ijk} = effect of experimental error which is distributed.naturally.with zero mean power and variance.capacity S^2e .

RESULTS AND DISCUSSION

Weight of the first egg

The results of Table (1) showed that there were significant differences ($p \leq 0.05$) for the effect of the plumage colour on the trait of the weight of the first egg, as it was noticed that the brown plumage colour were superior compared to the black plumage colour and their values were (9.93 and 9.08) grams respectively.

The results also indicated that there were no significant differences for the effect of the breeding system in the trait of the weight of the first egg between cage-bred and floor-bred birds and their values were (9.44 and 9.58) grams respectively.

The same table also shows that there were no significant differences in the effect of the interaction between the colour of plumage and the breeding system in the trait of the weight of the first egg for each of the brown-plumage birds bred in batteries and floor, and the black-plumage birds bred with batteries and the floor, and their values were (10.14, 9.72, 8.74 and 9.43) grams respectively.

Age at sexual maturity

The results of Table (1) showed that there were no significant differences ($p > 0.05$) for the effect of plumage colour on age at sexual maturity, and its values were (38.16 and 38.66) days for each of the birds brown and black respectively. The reason may be that the characteristic of age at sexual maturity is genetically and phenotypically positive and highly significant with the characteristic of egg weight rate (Dakhil ,2020) . The reason may be due to the possibility of male fathers reaching sexual maturity at a close time, as the father inherits her genetic code located on the sex chromosome to his female daughters to a greater degree than the mother (Al-kaisi and Al-Tikriti,2022).

Weight at sexual maturity

The results of Table (1) showed that there were significant differences ($p \leq 0.05$) for the effect of plumage colour on body weight at sexual maturity, as black plumage colour birds outperformed brown plumage colour and their values reached (202.48 and 193.72) grams respectively. The results also showed that there were significant differences for the effect of the breeding system, as the floor-bred birds outperformed the caged-bred birds in of body weight at sexual maturity, and their values reached (203.50 and 192.70) grams respectively. The results of the same table indicated that there were significant differences in the effect of the interaction between

the colour of plumage and the breeding system, as black plumage colour birds with floor breeding were superior to black plumage colour with battery breeding, as well as brown plumage colour with floor breeding and battery in body weight at sexual maturity, and its values reached (201.83, 194.12, 196.16 and 191.28) grams respectively.

Table No. (1): shows the effect of plumage color, breeding system and the interaction between them on the trait of the weight of the first egg (gram), age at sexual maturity (day) and weight at sexual maturity (gram) (Mean $\pm$ Standard error)

Traits				
plumage colour		Weight of the First Egg (gram)	Age at Sexual Maturity(day)	Weight at Sexual Maturity(gram)
Brown		0.08 a $\pm$ 9.93	0.70 a $\pm$ 38.16	2.78 b $\pm$ 193.72
Black		0.10 b $\pm$ 9.08	0.88 a $\pm$ 38.66	1.51a $\pm$ 202.48
Breeding system				
Batteries		0.57 a $\pm$ 9.44	0.15 b $\pm$ 37.66	1.16 b $\pm$ 192.7
Floor		0.18 a $\pm$ 9.58	0.20 a $\pm$ 39.16	1.60 a $\pm$ 203.5
Interaction between plumage colour and breeding system				
Brown	Batteries	0.14 a $\pm$ 10.14	1.20 a $\pm$ 37.33	1.27 c $\pm$ 191.28
	Floor	0.32 a $\pm$ 9.72	0.57 a $\pm$ 39.00	1.93 b $\pm$ 196.16
Black	Batteries	1.06 a $\pm$ 8.74	1.73 a $\pm$ 38.00	2.83 b $\pm$ 194.12
	Floor	0.20 a $\pm$ 9.43	0.66 a $\pm$ 39.33	2.08 a $\pm$ 210.83

Different lowercase letters within the same column indicate significant differences ($p \leq 0.05$) between plumage colour, breeding system, and the interaction between them.

Hatch percentage of total eggs

The data in Table (2) indicate that there were no significant differences ($p > 0.05$) for the effect of plumage color on Hatch percentage of total eggs between brown and black plumage colour and their values were (69.11 and 68.00) % respectively.

The percentage of hatching from fertilized egg

Table (2) shows that there were no significant differences ($p > 0.05$) for the effect of plumage colour on The percentage of hatching from fertilized eggs between brown and black.

Fertility percentage

The results of Table (2) showed that there were no significant differences ($p > 0.05$) for the effect of plumage colour on the fertility percentage between brown and black plumage and their values were (87.25 and 90.66)% respectively.

The results also showed that there were no significant differences for the effect of the type of breeding with batteries and floor on the fertility percentage and its values were (88.66 and 89.25)% respectively.

The same table also showed that there were no significant differences for the effect of the interaction between the colour of plumage and the breeding system in the fertility percentage between the colour of brown plumage bred with batteries and floor and the colour of black plumage bred with batteries and floor and their values were (89.33, 85.16, 88.00 and 93.33)% respectively.

Embryos mortality percentage

The results of Table (2) indicated that there were no significant differences ($p > 0.05$) for the effect of plumage color on the embryos mortality percentage between brown and black plumage and their values were (21.80 , 25.30)% respectively.

The data of the same table showed that there were no significant differences for the effect of the breeding system with batteries and floor on the embryos mortality percentage and its values were (23.40 , 23.70)% respectively.

The same table also indicates that there were no significant differences for the effect of the interaction between the colour of feathers and the breeding system in the embryos mortality

percentage between the colour of brown plumage bred with batteries and floor and the colour of black plumage bred with batteries and floor and their values were (16.30 , 27.30, 30.40 , 20.10)% respectively.

Table No. (2): shows the effect of plumage color, type of breeding and the interaction between them on the trait of the hatching percentage of total eggs (%), hatching percentage of fertilized eggs (%), fertility percentage (%) and the embryos mortality percentage (%) (Mean $\pm$ Standard error)

Traits					
plumage colour		The total number of eggs in the incubator	The percentage of hatching (%)	Fertility percentage (%)	Embryos mortality percentage (%)
Brown		69.11 $\pm$ 3.69 a	78.2 $\pm$ 3.22 a	87.25 $\pm$ 2.61 a	21.80 $\pm$ 2.27 a
Black		68.0 $\pm$ 5.65 a	74.7 $\pm$ 4.74 a	90.66 $\pm$ 4.21 a	25.30 $\pm$ 4.34 a
Breeding system					
Batteries		68.00 $\pm$ 4.38 a	76.6 $\pm$ 4.05 a	88.66 $\pm$ 3.92 a	23.40 $\pm$ 3.78 a
Floor		69.11 $\pm$ 5.14 a	76.30 $\pm$ 2.78a	89.25 $\pm$ 3.21 a	23.70 $\pm$ 3.42 a
Interaction between plumage colour and breeding system					
Brown	Batteries	74.66 $\pm$ 1.33 a	83.70 $\pm$ 3.57 a	89.33 $\pm$ 2.66 a	16.30 $\pm$ 3.52 a
	Floor	63.55 $\pm$ 5.97 a	72.70 $\pm$ 2.90 a	85.16 $\pm$ 4.76 a	27.30 $\pm$ 1.21 a
Black	Batteries	61.33 $\pm$ 7.05 a	69.60 $\pm$ 4.38 a	88.00 $\pm$ 8.32 a	30.40 $\pm$ 4.80 a
	Floor	74.66 $\pm$ 8.11 a	79.90 $\pm$ 8.17a	93.33 $\pm$ 3.52 a	20.10 $\pm$ 4.42 a

- Different letters with in the same column indicate significant differences at the level of ($P \leq 0.05$).

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تأثير لون الريش ونظام التربية في الصفات التناسلية لطائر السمان البني والأسود

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الخلاصة

أجريت هذه الدراسة في حقل قسم الإنتاج الحيواني كلية الزراعة – جامعة تكريت للمدة من 19 / 11 / 2021 ولغاية 23 / 12 / 2021. وهدفت هذه الدراسة الدراسة تأثير لون الريش ونظام التربية على الصفات التناسلية لطائر السمان الياباني. استخدم في هذه التجربة 180 طائر السمان بعمر 21 يوم تم تقسيمه إلى مجموعتين حسب لون الريش 90 طائر بني و 90 طائر أسود ، كل مجموعة مقسمة على نظامين تربية (بطارية وارضية). كل نظام تربية يحتوي على 45 طائر مقسم الى ثلاث مكررات كل مكرر يحتوي على 15 طائر ونسبة الجنس استخدمت 2: 1. بينت نتائج التجربة عدم وجود تأثير معنوي للون الريش ونظام التربية في نسبة الفقس من البيض الكلي ونسبة الفقس من البيض المخصب ونسبة الخصوبة ونسبة الهلاكات الجنينية وتوقع طائر السمان البني على الاسود في وزن اول بيضة في حين تفوقت طيور السمان سوداء اللون على البنية في الوزن عند النضج الجنسي.

الكلمات المفتاحية:

سمان ، لون الريش ، نظام التربية ، صفات تناسلية