



Growth and Reproductive Performance of Crossbred Japanese Quails Raised in a Humid Tropics

By

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Abstract

This study was carried out to determine the growth and reproductive performance of crossbred Japanese quail in a humid tropical environment. A total of three hundred and sixty (360) day old chicks comprising of ninety (90) crossbreds for each genotype were used for the study. Each genotype was replicated three (3) times with 30 birds per replicate. The mating ratio was 1:3. Data on growth and reproductive performance were taken for each genotype. The data obtained were subjected to analysis of variance in a randomized complete block design and significant means were separated using Duncan new multiple range test. The results indicate that final body weight ranged from (111.70-118.15) across the genotypes at the growing phase. PWxCB progeny outperformed other strains in final body weight and feed efficiency (169.40_g and 12.49) respectively in the laying phase. Age at first egg was statistically the same 42 days among PwxCB, CB x PW and CBxCB. The highest number of eggs laid was recorded on the PWx CB strain (211.65). It can be concluded that PW x CB progenies performed best in most of the parameters measured and therefore should be selected for better meat and egg production in the humid tropical environment.

Key words: Crossbred, Humid, Growth traits, Reproductive, Strains,

INTRODUCTION

In meat producing animals and birds, growth is the most important trait for evaluating different livestock species. Quail rearing for egg and meat production has become an economically important activity in Nigeria and it is increasingly being developed due to increasing interest in the products for food and medicine. As a suitable alternative to chicken, its improvement will help to provide a suitable animal protein to Nigerians particularly among rural populace. Improvement of poultry birds by genetic principles is one of the vital ways in developing the poultry industry.

Growth parameters such as body weight and body weight gain are affected by genetic and non-genetic factors and the phenomenon of growth is usually determined by observing differences in body weight recorded at different ages or body weight gain obtained during different growth periods (Chambers, 1993). Mizutani (2003) reported that adult male quail. Weighs about 100-130 grams. Male also have local glands (a bulbous structure located at the upper edge of the

vent which secretes a white foamy material). This unique material is used to ascertain the reproductive fitness of the males. The adult females are slightly heavier when compared to the males weighing 120-160grams (Ortlieb, 2013). Information on growth and reproductive performance of crossbred Japanese quails found in Nigeria is comparatively scanty hence, the need for the study.

Materials and Methods

Study on crossbred Japanese quails was undertaken to determine growth and reproductive performance of among four strains of the birds in a humid tropical environment in Nigeria. The breeding stocks used for the study were obtained from Teaching and Research Farm, Michael Okpara University of Agriculture, Abia State. The base population consisted of 48 adult Japanese quails comprising of 18 female Cinnamon Brown and 6 male Cinnamon Brown (CB) and 18 female Panda White and 6 male Panda white (PW). The mating schemes were:

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CB x CB pure line

PW x PW.....pure line

CB x PW . . . main cross

PW x CB . . . Reciprocal cross

The mating ratio was 1:3

After mating and hatching, a total of 360 pedi-gree-day old Japanese quail chicks from the four (4) crosses were used for the study, that is ninety (90) chicks per strain and were replicated 3 times, that is 30 chicks per replicate.

Data collection

The following parameters were measured:

Initial body weight: the weight of the birds at the beginning of the experiment in (grams). This was done using single pan electronic balance.

Final body weight: the weight of the birds at the end of the experiment. This was done using triple beam balance (kg).

Feed intake/bird/day (g):

Quantity of feed given – leftover

No of birds x days of experiment

Daily weight gain/bird (g):

Final live weight – initial weight

No of birds x days of experiment

Feed conversion ratio:

Quantity of feed consumed

Weight gained

Egg weight at first egg: this was determined with the aid of weighing scale in grams.

The experimental design was randomized complete block design (RCBD) and data collected were subjected to Analysis of variance (ANOVA) using (SAS, 2004) package and separation of mean was done using Duncan New Multiple Range Test (Duncan, 1955).

$Y_{ijk} = \mu + S_i + B_j + e_{ijk}$

Y_{ijk} = Individual Observation

μ = Population mean

S_i = Effect of genotype ($i = 1 \dots 4$)

B_j = Block effect (hatch)

e_{ijk} = Experimental error (identically, independently, normally distributed with zero mean and constant variance ($iind, 0, \sigma^2$))

Results and Discussion

The mean growth performance during growing phase of four strains of Japanese quails is presented in table 1.

Table 2: Growth performance characteristics of four strains of Japanese quail from week 1-6

Parameters	PW x PW	PW x CB	CB x PW	CB x CB	SEM
Initial size weight (g/bird)	7.92	8.08	8.02	8.01	0.03
Final body weight (g/bird)	112.37 ^b	111.70 ^b	119.15 ^a	116.56 ^a	0.92
Daily weight gain (g/bird)	3.73 ^b	3.70 ^b	3.93 ^a	3.88 ^a	0.03
Feed conversion ratio	3.64 ^b	3.70 ^b	3.46 ^d	3.62 ^c	0.03

^{abcd} Mean within the rows with different superscripts are significantly different ($P < 0.05$): SEM- standard Error of the mean PW x PW = Panda white x Panda white, PW x CB = Panda white x Cinnamon Brown, CB x PW = Cinnamon Brown x Panda white, CB x CB = Cinnamon Brown x Cinnamon Brown.

At this growing phase all the parameters measured were significantly different ($P < 0.05$) except the initial weight which was not significant ($P > 0.05$). CB x PW progeny had the least feed conversion ratio of (3.46) followed by CB x CB progeny

(3.62). The results obtained for feed conversion ratio were better than 4.03 reported by Ray *et al.* (2014). Improved feed conversion ratio may lead to lower maintenance costs and lower fat deposition with higher growth rate. CB x PW progeny also had the highest value for final weight and daily weight gain (118.56 and 3.93) followed by CB x CB progeny (116.56 and 3.88).

The mean growth performance during the laying phase of four strains of Japanese quails is presented in Table 2.

Table 2: Growth Performance Characteristics during laying phase of four strains of Japanese quail from week 7-14.

Parameters	PW x PW	PW x CB	CB x PW	CB x CB	SEM
Initial size weight (g/bird)	124.02 ^d	136.63 ^a	134.25 ^b	126.42 ^c	1.59
Final body weight (g/bird)	154.77 ^c	169.40 ^a	164.77 ^b	162.70 ^b	1.62
Daily weight gain (g/bird)	1.46 ^{bc}	1.56 ^b	1.45 ^c	1.73 ^s	0.04
Daily feed intake (g/bird)	24.87 ^a	19.49 ^c	21.65 ^b	25.11 ^a	0.71
Feed efficiency	17.03 ^a	12.49 ^d	14.93 ^b	14.51 ^c	0.49

^{abcd} Mean within the rows with different superscripts are significantly different ($P < 0.05$); SEM- standard Error of the mean PW x PW = Panda white x Panda white, PW x CB = Panda white x Cinnamon Brown, CB x PW = Cinnamon Brown x Panda white, CB x CB = Cinnamon Brown x Cinnamon Brown.

At the laying phase, all the parameters measured were significantly different ($P < 0.05$) among the four genotypes. PW x CB progeny had the least feed efficiency (12.49) followed by CB x CB progeny (14.51). This implies that PW x CB progeny used lesser feed to produce higher number of eggs. PW x CB progeny also recorded the highest value for final body weight (169.40g) followed by CB x PW progeny

(164.77) g. The value for final bodyweight obtained in this study is slightly higher than (120-160) g reported by (Ortlieb, 2013). The daily feed intake obtained among the four genotypes in this study (19.49-25.11) was low compared to 29.84g reported by (Ijaiya *et al.*, 2012). The lower feed intake in this study could be attributed to the fact that the feed given to these birds were able to meet up with their dietary energy requirement. PW x CB strain could be selected for better growth performance during the laying phase for enhanced breeding program for both egg and meat production.

The mean reproductive performance of four strains of Japanese quails are presented in Table 3

Table 3: Reproductive Performance of four strains of Japanese quail.

Parameters	PW x PW	PW x CB	CB x PW	CB x CB	SEM
Age at first egg (day)	56.00 ^a	42.00 ^b	42.00 ^b	42.00 ^b	1.83
Body weight at first egg (g)	150.00 ^a	139.10 ^b	137.50 ^b	127.03 ^c	2.46
Egg weight at first egg (g)	7.96	8.28	8.11	7.84	0.08
Number of eggs laid (6-14) weeks	145.00 ^b	211.65 ^a	175.00 ^{ab}	146.65 ^b	1.97

^{abcd} Mean within the rows with different superscripts are significantly different ($P < 0.05$); SEM- standard Error of the mean PW x PW = Panda white x Panda white, PW x CB = Panda white x Cinnamon Brown, CB x PW = Cinnamon Brown x Panda white, CB x CB = Cinnamon Brown x Cinnamon Brown.

Age at first egg, weight at first egg and number of eggs laid were significantly different ($P < 0.05$) across the strains. The age at first egg for PW x CB, CB x PW and CB x CB progenies were statistically similar and at 42 days, while PW x PW progeny was 56 days. The 42 days reported in this present study was better than 45.82 ± 0.22 days reported by Sezer *et al.* (2006), 61.22 and 50.94 days reported by El-full (2001) and (El-Deen *et al.*, 2008). Age at first egg can be highly variable because it is affected by feeding and management practices. Early age at first egg can be advantageous because of selection for it leads to reduced generation interval, but for commercial egg production, it can lead to the production of many small eggs which may not find a ready market. However, if early age at first egg is accompanied by a corresponding increase in body weight then the egg size will also increase. The highest body weight at lay was found in PW x PW progeny (150.00), this may be attributable to its lateness to lay compared to the other genotypes. PW x CB progeny performed best since it has an early age at first egg accompanied by a corresponding increase in bodyweight which leads to increase in egg size population. It also, recorded the highest egg weight at first egg (8.28) g this was little below the range of 8.99-9.72 reported by El-full (2001) and highest number of egg laid (211.65). Therefore, PW x CB progeny can be recommended to local and commercial farmers for better egg production.

Conclusion

PW x CB progeny strain outperformed the other strains in feed efficiency and final body weight during laying phase. The age at first egg was statistically similar among PW x CB, CB x PW and CB x CB progenies. It can be concluded PW x CB progeny revealed an early age at first egg accompanied by a corresponding increase in body weight which leads to increase in egg size and egg number. Therefore, PW x CB progeny can be recommended to local and commercial farmers for better egg and meat production.

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