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Study on the performance of Japanese quail in cage system of rearing in hot and humid tropical conditions

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Abstract

The study was conducted on 900 Japanese quail chicks to study the performance in hot and humid conditions of Puducherry. Japanese quail chicks were reared in a cage system from day-old to marketing age (5 weeks) at a livestock farm complex, RIVER. During the first two weeks, the chicks are fed with a starter ration followed by a grower ration. Body weight, weight gain, Feed intake, FCR, Survivability, and cost of quail production were studied during the experimental period. Body weight obtained at five weeks of age was 220g with the maximum weight gain of 57g/bird during the third week of age. An FCR of 2.46 was recorded and overall mortality was 2.33%. High feed costs and poor marketing are the most significant problems of quail farming. It was observed that quail farming can be considered an enterprise as it is profitable.

Keywords: Japanese quail, cage system, starter ration, body weight, FCR

Introduction

Japanese quails were first domesticated in Japan in 1959, a member of the Phasianidae family. Twenty species of quails exist along with 70 domestic breeds/strains, including laboratory and commercial lines. Due to the large size compared to other species of quails, Japanese quail became popular and reared for meat and egg production. The Japanese quail have an advantage over other poultry since these have unique characteristics such as fast growth, early sexual maturity, shorter generation interval, low feed requirement, sturdy, adaptability to varied climatic conditions, resistance to common poultry diseases, and less space requirement (karousa *et al.*, 2015) [5]. The Japanese quail has high egg production-250 eggs. Quail eggs are more nutritious than other poultry eggs. Quail meat contains high protein (23%) low fat (2%) and low cholesterol (Hamm *et al.*, 1982) [3]. Owing to the various advantages of Japanese quail, there is an increased trend in rearing Japanese Quail by small farmers with limited resources. There are more Quail farmers in Tamil Nadu, Andhra Pradesh, and Karnataka, and recently there is an increased awareness among farmers about Quail farming in Puducherry. Puducherry is located on the east coast at an altitude of 3m (10ft) above sea level and surrounded by Tamil Nadu state. The climate of Pudherry is hot and humid with temperature rises upto 40 °C during summer and humidity varying from 60 to 80%. Therefore, the proposed study was conducted at the Poultry Unit of Livestock Farm Complex (LFC), RIVER, Puducherry to assess the growth performance of Japanese quail in a cage system of rearing.

Materials and Methods

Management

Housing: The experiment was conducted in the Japanese quail cages in the quail shed. The shed and the cages were cleaned, washed, and disinfected. Disinfected the cages with Kohrsolin TH (Glutaraldehyde and 1, 6- Dihydroxy – 2, 5- Diohexane). Feeders and Drinkers were washed and disinfected. A total of 900 day-old chicks were procured from a private hatchery in Puducherry and are reared in cages from day-old to 5 weeks.

Floor space: Chicks were housed in multi-tier colony cages on a wire floor, with a dimension of 90 cm width and 180 cm length. Each bird was given a floor space of about 162 sq. cm/bird. Feed and water were given ad-libitum and standard management practices were followed throughout the experimental period.

Brooding: The chicks were raised in cages with a brooding facility for the first Three weeks under constant brooding temperature. The brooding floor was covered with paper material that

could absorb moisture and droppings, which were changed every day. During the brooding period, 24-hour lighting was ensured. Incandescent bulbs (200 watts) were used to provide brooding temperature. During the first week temperature of 35 degrees Celsius was maintained and later every week 2.5 degrees was reduced. (Coutts *et al.*, 1991) [2]. Feed was provided through semi-automatic circular feeders. Fresh drinking water was provided through semi-automatic drinkers. Pebbles are added to the drinkers to avoid drowning chicks in accordance with suggestions (Oluwatomi 2010) [6].

Feeding: The birds were fed formulated commercial feed. The Starter feed fed to the birds from day old to 2 weeks of age contained 20% crude protein, 2800 Kcal/Kg metabolizable energy, 0.5% salt, 1.0% Calcium, and 0.70% Phosphorous, while the grower feed fed from 3 to 5 weeks of age contained 16.0% crude protein, 2500 Kcal/Kg metabolizable energy, 0.5% salt, 1.0% Calcium, and 0.65% Phosphorous.

Parameters studied: Body weight (BW), body weight gain, feed intake, Feed Conversion Ratio (FCR), and mortality rate were recorded at weekly intervals.

- a. **Body weight:** Individual body weight was recorded at weekly intervals from hatch weight to five weeks of age using a digital scale of 1 g accuracy.
- b. **Body weight gain:** Body weight gain was calculated as the difference between the final and initial weight during each of the weighing periods using a weighing scale.
- c. **Feed consumption:** Weekly Feed consumption was calculated as the difference between the amount of feed supplied to the birds and the amount of feed that remained at the end of each week.
- d. **Feed Conversion Ratio (FCR):** The feed conversion ratio was calculated as the ratio of feed consumption to the average body weight.

Mortality rate: The mortality was recorded daily and percentage mortality was calculated up to five weeks on a weekly basis

Results and Discussion

Body weight: The results of the weekly body weight of the quail are presented in Table 1. Body weight is the direct reflection of growth and it influences the production and also reproductive performance of birds. The average day-old chick weight was 7 g and the body weight progressively increased. The average body was 32 g, 34 g, 57 g, 50 g, and 43 g from the first week to five weeks of age, respectively. The study showed that body weight gain was higher in the third week (57 g). The results of the present study were in agreement with Razee *et al.*, 2016, and Soomro *et al.*, 2019 [7, 10] in a study of the performance of Japanese quail on cage system rearing.

Table 1: Body weight of quails at different ages in the cage system

Age	Body weight (g)	Body weight gain (g)
Day old	7	7
1 st week	39	32
2 nd week	73	34
3 rd week	130	57
4 th week	180	50
5 th week	223	43

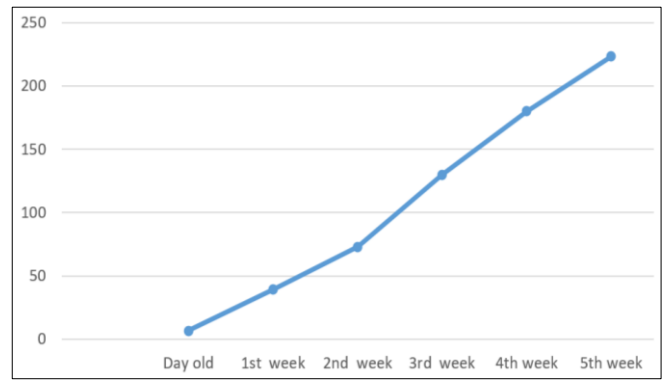


Fig 1: Body weight (g)

Feed consumption

The feed intake of quails in the cages gradually increased with age as seen in Table 2. The average feed intake per quail/day recorded was 9.04 g, 21.9 g, 42.05 g, 65.38 g, and 77.61 g. from the first to five weeks of age, respectively. The total feed intake per bird up to five weeks of age was 516.08 g. A similar feed consumption pattern was reported by Rajput *et al.*, 2016 and Seker *et al.*, 2009 [8, 11] in a study on the effect of various forms of feed on the growth performance of Japanese quail. However, Jogeswar *et al.*, 2022 [4] showed that the total feed intake per bird at five weeks of age in the cage system was 558.84 g higher. The weekly FCR varied from 1.62 in the first week to 2.46 in the fifth week. The weekly FCR values showed fluctuations during the rearing period.

Table 2: Feed intake of quail at different ages in the cage system

Week	Consumption gms/bird/day	Cumulative Consumption gms/bird/week	FCR
1 st week	9.04	63.33	1.62
2 nd week	21.9	153.3	2.1
3 rd week	42.05	294.4	2.26
4 th week	65.38	457.7	2.54
5 th week	77.61	543.3	2.46

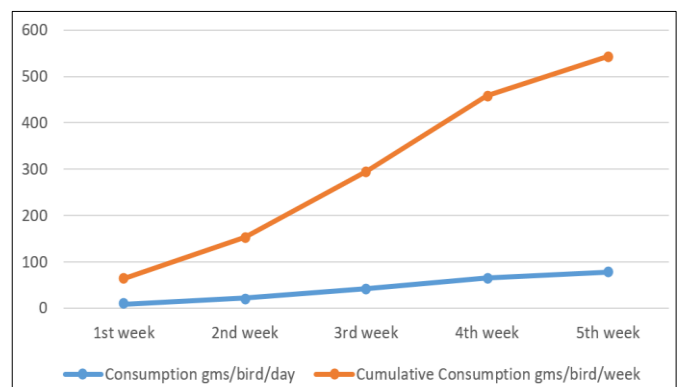


Fig 2: Feed consumed

Survivability

The survivability of quails is shown in Table 3. The overall mortality observed was less (2.33%) and no major incidence of disease was noted. The overall survivability percentage was higher at the fourth(0.11) and fifth(0.11) weeks. A mortality of 1.11% was observed during the first week due to the clustering of chicks. The statement is in agreement with Redoy *et al.*, 2017 [9] who reported cool winds and insufficient lead to the clustering of young ones.

Table 3: Mortality of quails at different ages in the cage system

Week	Number of dead birds	Percentage(%) of dead birds
1 st week	10	1.11
2 nd week	6	0.67
3 rd week	3	0.33
4 th week	1	0.11
5 th week	1	0.11
Total	21	2.33

Cost of production of Japanese quail

The cost and return estimate for quail bird production is reflected in Table 4. The cost of production was calculated based on chick cost, feed cost, and miscellaneous costs. The result indicated that the cost of production of 900 quail birds was Rs.30,000/- The total revenue realized from the sales was Rs.35,819/-. The gross margin obtained was Rs.5,819/-. Overall there was a profit of Rs. 6.46/-per bird.

Table 4: Production of Japanese quail based on the cost of feed and chicks

Particulars	Quantity	Cost(Rs)	Total(Rs)
Day old chick	900	9/bird	8100
Starter ration	160kilograms (kg)	44/kg	7040
Layer starter	329 kilograms(kg)	38.2/kg	12,567.8
Mislliniious cost	-----	2541	2292.3
Cost of production	900	33.33/ bird	29,999
Birds sold (live)	559	39/ bird	21,801
Birds sold (Dressed)	320	43.8/bird	14,016
Profit per bird at 5 weeks of age	900	6.463/bird	5816

Constraints and prospects of quail farming

The constraints and prospects of quail production observed were those common to poultry farming. In this study, the poor market and high cost of feed were the most significant major problems. Unlike domestic poultry, quail cages must be cleaned daily to remove the pungent odor they emit (Saif 2009) ^[12]. Quail raising offers many advantages when compared to other poultry. Quails have been reported to be affected by common poultry diseases, but are fairly resistant Bakoji *et al.*, 2013 ^[1]. The incidence of any diseases was not observed because of good and efficient management practices on the farm.

Conclusion

This study reviewed the rearing of quail chicks and their management in the livestock farm complex. Quail rearing can be a secondary occupation as it requires low space, and low time commitment which can be practiced by people of all backgrounds. The main challenge was a marketing of birds due to inadequate publicity and sale outlet. Japanese quail has an enormous potential as an alternative to chickens by providing gainful employment, income, and nutritional value.

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