Performance evaluation of Japanese Quail (*Coturnix coturnix japonica*) strains in Ernakulam, Kerala

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Abstract

This study was conducted to evaluate the performance of Japanese quail (*Coturnix coturnix japonica*) strains in the homesteads of Ernakulam district, Kerala. *Nandanam III* quails released by Tamilnadu Veterinary and Animal Sciences University is a meat purpose bird and the *MLQ 2* quails released by Manuel Hatchery, Kalady, Kerala is meant for egg purpose. The quails were compared with local Japanese quails available in the local markets. The average egg production of 257 per bird by *MLQ 2* was significantly higher than that of Japanese quail kept as control (231 eggs/bird). The mean body weight of *Nandanam III* birds (189 g/bird) was significantly higher than that of local *Japanese quail* whereas the FCR was lower when stocked at density of 0.16 sq ft per bird. Farmer and consumer preference for Nandanam III quail meat was higher. The cost of production per bird was less than the control yet the profit earned in rearing of both varieties did not show much difference. This can be improved by proper pricing of quails for meat which will in turn increase demand of good meat strains of quail like Nandanam III.

Keywords: Quail, Body weight, Nandanam III, economics, profit

Introduction

Among several types of quails available in the world, two species are widespread in India; the black-breasted jungle or rain quail (*Coturnix coromandelica*) that is found in jungles and the brown-coloured Japanese quail (*Coturnix coturnix japonica*) that is bred for meat and eggs. The former is a protected bird, whereas the latter is exempted from Wild life protection act (Ashok & Prabakaran, 2012; Arya *et al*, 2018). Japanese quail is the one domesticated by several research programs over a long period and is not an indigenous bird. It can be used for rearing in farms and marketed (Edwin S.C., 2020). Japanese quail was first introduced in India from California during 1974 by Central Avian Research Institute, Izatnagar (U.P.) (Arya *et al*, 2018). Japanese quails are reared commercially for both meat and eggs (Kennedy et al 2019). The advantages of raising quails are low feed requirement, short age at sexual maturity (around 6 weeks), high egg production, ease of handling, disease resistance and requirement of less floor space.

The quail farming is one of the popular poultry farming systems in Kerala particularly in areas where space availability is a constraint. The quails are predominantly reared in Kerala for eggs and the spent birds or excess males are the ones used for meat purpose. However there are improved breeds developed specifically for meat and egg purposes. The *Nandanam III* quails released by Tamilnadu Veterinary and Animal Sciences University is a meat purpose bird (Devaki *et al*., 2019) and the *MLQ 2* quails released by Manuel Hatchery, Kalady is meant for egg purpose (https://manuelhatchery.com/en/mlq2.html). Nandanam quail can reach a weight of 221 g in 4 weeks (Expected yield is 247g) (Pandian *et al*, 2017). However these birds are found not popular in Ernakulam district, Kerala. Hence a study was conducted to evaluate the performance of Japanese quail strains *MLQ 2* and *Nandanam III* in the homesteads of Ernakulam, Kerala.

Materials and Methods

The performance evaluation of Japanese quail *MLQ 2* strain was undertaken in the fields of five farmers selected from Kumbalanghi village, Palluruthy block, Ernakulam having hot and humid climatic conditions (Latitude 9.8725461 and Longitude 76.2855534). Three weeks old *MLQ 2* quail chicks procured from Manuel Hatchery, Kalady were distributed to all the selected farmers in batches of 50. Locally available Japanese quails were also supplied to them in batches of 50 as control. All the farmers were trained to give feed and water at the rate of 25-30 g per adult split into 2-3 times a day to avoid wastage. The birds were raised under ideal management conditions. Commercial grower feed having 22 per cent crude protein and 2950 kcal/kg metabolizable energy was provided during growing phase and layer feed having 19 per cent crude protein and 2850 kcal/kg metabolizable energy was administered during laying phase. The data on egg yield, body weight, egg weight and age at first egg for a period of 52 weeks were recorded and analyzed using unpaired t test and significance was considered at $P<0.05$.

The performance evaluation of *Nandanam III* strain was undertaken in the fields of five farmers selected from Edavanakkad (Latitude 10.11475 and Longitude 76.21169) and Karumaloor (Latitude 10.1303833 and Longitude 76.2930051) villages in Vypeen and Alangad blocks of Ernakulam district having hot and humid climatic conditions. Day-old chicks procured from Poultry Research Station of Tamilnadu Veterinary and Animal Sciences University, Madhavaram, Chennai were distributed to all the selected farmers in batches of 200. Locally available Japanese quails were also supplied to them in batches of 200 as control. They were stocked in an area so as to give finally 0.16 sq.ft per bird space to the growing birds. The farmers were trained on scientific rearing practices including brooding, concentrate feeding and providing nutritional supplements. Feed and water were given adlib. Commercial broiler starter having 24 per cent crude protein and 2900 kcal/kg metabolizable energy was administered during 0-2 weeks and subsequently finisher feed having 22 per cent crude protein and 2950 kcal/kg metabolizable energy was administered. The data on mortality, body weight, feed intake and FCR were recorded for a period of 5 weeks and analyzed using unpaired t test. The feedback of farmers and consumers on these strains were also collected and presented.

Results and Discussion

Japanese quail MLQ 2 for eggs

The average egg production of *MLQ 2* was significantly ($P<0.05$) higher than that of local Japanese quail kept as control (Table 1). Ashok and Reddy (2010) in a previous study also reported significant difference in egg production between different strains of Japanese quails. The average body weight of Japanese quail *MLQ 2* was not significantly ($P>0.05$) higher than that of Local Japanese quail when checked at 6 weeks of age. The egg yield of Japanese quail *MLQ 2* is higher than that of local Japanese quail though there is not much difference in the body

weight between both. Bagh *et al.* (2016) observed that lighter body weight quails produced higher eggs than heavier varieties. In this study, the body weights of both the quails did not differ significantly but the egg production was higher in MLQ 2. The average egg weight when checked at 13 weeks was also not significantly different (P > 0.05). Higher egg weight was obtained as age of quail increased as reported by Rodrigue *et al.* (2021). He reported that at 7 weeks, the different strains had egg weights in the range of 9.03g to 9.26 g which increased to 12.77g to 13.12 g at 18 weeks of age.

Japanese quail Nandanam III for meat

The mean body weight of *Nandanam III* birds was significantly (P< 0.05) higher than that of *Local Japanese quail* (Table 2) when stocked at density of 0.16 sq ft per bird. This result is in conformity with the findings of Pandian *et al.* (2017) who earlier reported higher body weights in Nandanam birds when stocked at density of 0.17 sq ft per bird. However higher weight gain does not contribute to higher income of the farmer as the birds are priced per number in local market. Hence Nandanam III birds would be advantageous only if the pricing is based on weight.

The average feed consumption and FCR of *Nandanam III* was lower than local Japanese quails (Table 3). The mortality of both the quail strains was in the range of 5-6 per cent. Devaki *et al*. (2019) previously reported mortality of *Nandanam III* as 2-5 per cent

Farmer's preference

The data on farmer's preference is presented in Table 4. Farmers perceived that Nandanam quail III gave higher body weight gain in shorter period as compared to local Japanese quail used for eggs. The disease incidence reported by the farmers was also very less. But for increasing the profit of farmers with the higher body weight gained, the pricing has to be based on weight rather than per bird basis as was followed in the markets during the period of study.

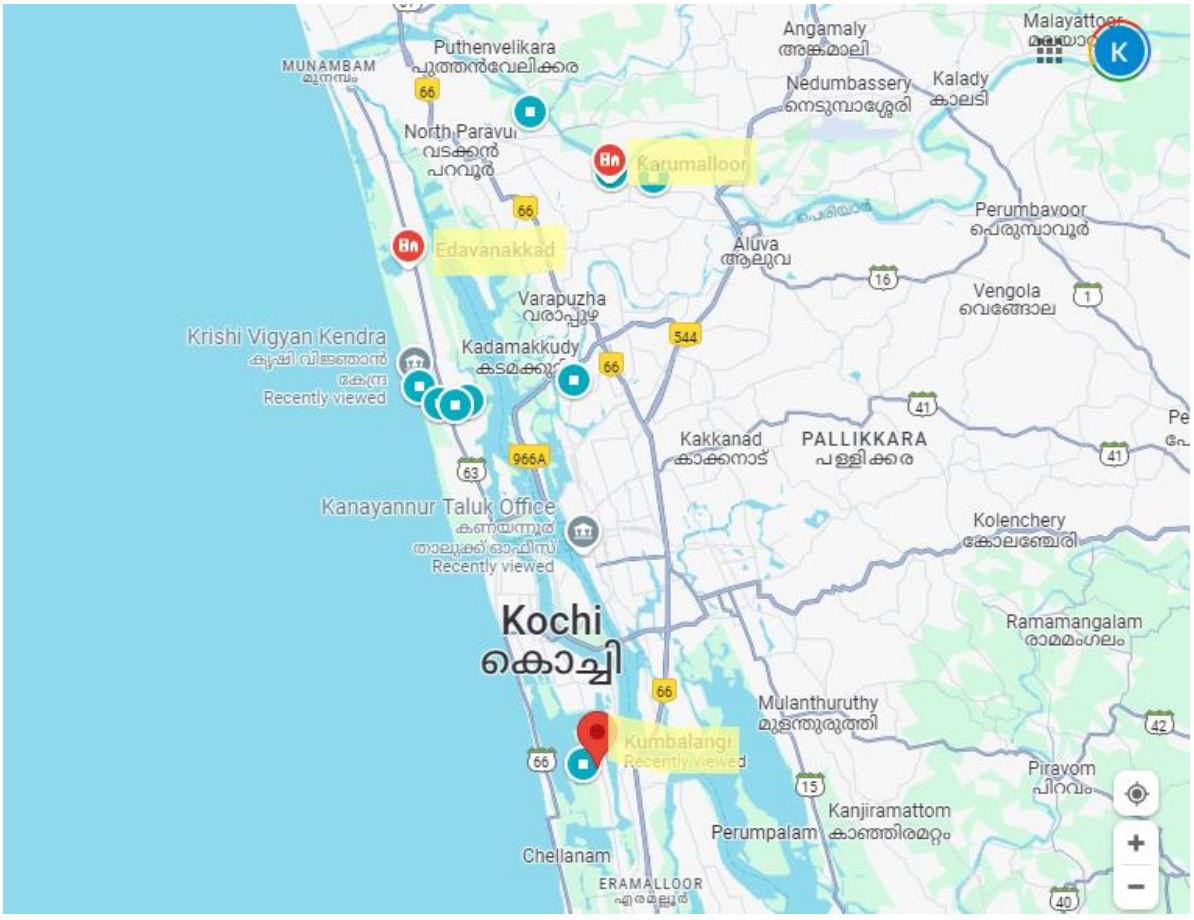

Fig 1 Map of study area in Ernakulam district

Table 1. Performance of quail strains reared for egg purpose

Parameter	Japanese quail *MLQ 2*	Local Japanese quail
Average egg yield, numbers	257.6 ± 6.03	231.2 ± 4.28
Adult body weight, g	144.0 ± 7.30	132.0 ± 4.48
Egg weight at 8 weeks, g	8.56 ± 0.30	8.46 ± 0.35
Egg weight at 13 weeks, g	12.5 ± 0.59	11.3 ± 0.45
Age at first egg, in days	43	49

Table 2. Body weight gain of quail strains reared for meat purpose

Age, days	Body weight, g	
	Nandanam III quail	Local Japanese quail
1	010.46 ± 0.12	009.3 ± 0.13
7	025.72 ± 2.15	020.1 ± 0.49
14-18	069.79 ± 5.97	058.1 ± 0.83
21-25	161.56 ± 8.92	132.1 ± 3.01
28-35	189.76 ± 7.82	170.0 ± 1.78

Table 3. Performance of quail strains reared for meat purpose (5 weeks)

Parameters	*Nandanam III quail*	*Local Japanese quail*
Average feed intake per bird, g	345.0	431.0
Average body weight, g	189.8	170.0
FCR	1.8	2.5
Mortality, %	5.4	6.0

Table 4. Farmer's perception on Nandanam quail III

Sl. No	**Perception (**N= 15)	**Frequency**	**Percent**
1	Cost effectiveness	13	86.66
2	Lower disease incidence	14	93.33
3	Yield	15	100.00
4	Net income	13	86.66

Table 5. Consumer's perception on Nandanam quail III

Sl. no	**Perception** N= 25	**Frequency**	**Percent**
1	Cost effectiveness	23	92.00
2	Preference over spent/male quails	24	96.00
3	Taste and overall acceptability	25	100.00

Table 6. Cost economics

Sl No.		Cost per bird, Rs	
I.	*Quail rearing for eggs*		
		Japanese quail MLQ 2	Local Japanese quail
a)	Capital and operational cost	397.00	397.00
b)	Gross revenue	642.50	577.50
c)	Net profit (b-a)	245.50	180.50
d)	BC ratio	1.62	1.45
e)	Cost of production per egg	1.40	1.56
II.	*Quail rearing for meat*		
		Nandanam III quail	Local Japanese quail
a)	Total capital and operational cost	19.23	21.70
b)	Gross revenue	30.00	30.00
c)	Net profit (b-a)	10.77	8.30
d)	BC ratio	1.56	1.38
e)	Farmer's share in price paid by consumer	63 %	72%

Nandanam Quail

Japanese Quail MLQ2

Consumer's preference

Consumers testified that the taste and overall acceptability was higher as compared to spent local Japanese quails or male quails used for meat (Table 5). They also opined that Nandanam III quails had more meat and was tender when compared to the spent quails or male quails available for meat in the market. Vignesh *et al.* (2019) also found that consumer preference for quail meat was higher. Hence proper pricing and availability of good meat varieties like Nanadanam III quail may increase the demand for quail meat.

Economics

The cost economics in rearing of Japanese quail MLQ 2 and local Japanese quails for eggs and Nandanam quail III for meat are presented in Table 6. The cost of production per egg in case of Japanese quail MLQ 2 was Rs.1.40 whereas for local Japanese quail found in local market was Rs.1.56. The retail price for quail egg in market was Rs.2.50. The net profit per bird was also higher in case of Japanese quail MLQ 2 birds.

In case of Nandanam III quails reared for meat, the cost of production per bird was Rs.19.23 while the market rate per quail for meat was Rs. 30. The cost of production of Japanese quail male chicks for meat was Rs.21.70 per bird. The profit earned by the farmer per bird was Rs.10.77 whereas it was Rs.8.30 for local Japanese quails. The profit margin earned for quail meat can be increased only when the prices are fixed on weight basis rather than per bird basis as was prevalent in the local market. This pricing will attract more farmers towards rearing of quail varieties like Nandanam III for meat. So, the farmer's share in the price borne by consumers is around 63 per cent which is similar to that as observed by Sathiya *et al.* (2017) where they found producer's share in consumer's price as 64.1 per cent.

Conclusion

When reared by farmers in the homesteads of Ernakulam district, Kerala, the egg purpose Japanese quail *MLQ 2* yielded 257.6 ± 6.03 eggs each having average weight 12.5 ± 0.59 g during a period of 52 weeks and the meat purpose quail *Nandanam III* gained a body weight of 189.8 ± 7.82 g during 5 weeks. The cost of production of one egg is Rs. 1.40 while the market rate of quail egg is Rs.2.50. The cost of production per bird for meat is Rs.19.23 while the market rate per quail for meat is Rs. 30.

The farmers perceived that Nandanam quail III gave higher body weight gain in shorter period as compared to local Japanese quail used for eggs. The consumers confirmed that the taste and overall acceptability was higher as compared to spent local Japanese quails or male quails used for meat. However, higher weight gain does not contribute to higher income of the farmer as the meat purpose birds are priced at per bird rate in local market. Hence Nandanam III birds would be advantageous only if the pricing is based on weight.

Conflict of Interest

There is no conflict of interest.

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