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Economics of chick production in pure bred Japanese quail breeders under cage and deep litter systems of rearing

R ARUMUGAM, R PRABAKARAN and T SIVAKUMAR

Department of Livestock Production and Management
Madras Veterinary College
Tamil Nadu Veterinary and Animal Sciences University, Chennai 600007 TN, India
Email for correspondence: aarivet@gmail.com

ABSTRACT

A study was conducted to assess the comparative economics of chick production in pure bred Japanese quail breeders under deep litter and cage systems of management. Per cent hen day chick production was significantly higher from cage rearing of Japanese quail parents than deep litter rearing (34.07 ± 2.05 vs 31.05 2.55). Age effect was found to be significant on per cent hen day chick production. The highest number of 45.27 ± 1.16 chicks per 100 parents was obtained during 17-20 weeks and the lowest of 17.87 ± 3.49 during 9-12 weeks. Feed cost (Rs) required to produce 100 day old Japanese quail chicks was found to be significantly lower for deep litter reared breeders compared to cage reared breeders (176.08 ± 6.84 *vs* 208.11 ± 10.46) and the cost was the cheapest during 17-20 weeks (154.18 ± 2.21) and the highest (229.49 ± 12.32) during 29-32 weeks and such influence of age was highly significant.

Keywords: Japanese quail breeders; hen day chick production; feed cost; rearing system

INTRODUCTION

The Japanese quail, *Coturnix coturnix japonica* due to its easy maintenance, early sexual maturity, shorter generation interval and high rate of egg production has become a pilot animal in the field of research. In meat lines of Japanese quail the productivity and quality of the eggs is important for economical breeding and also for propagation of the flocks. Japanese quail constitutes the third largest avian species in number next only to chicken and ducks used for commercial poultry production (Agarwal 1995). Since there is considerable shortage of meat and egg there exists a scope for increasing the per capita consumption by rearing Japanese quail. A study under field conditions was designed to evaluate the effect of cage and deep litter systems of rearing on the economics of Japanese quail chick production.

MATERIAL and METHODS

The study was conducted in a private commercial Japanese quail breeder farm in Coimbatore district of Tamil Nadu. A total of 1584 adult pure bred grand parent breeders (under selection for high four week body weight) of meat type Japanese quail birds (1152 females and 432 males) were selected at the age of four weeks and randomly divided into two treatment groups of equal number. Birds under each treatment were further allotted randomly into 4 replicate groups in equal number with a breeding ratio of eight females to three males and were reared upto 32 weeks of age under cage or deep litter system. A floor space of 225 cm^2 per bird was provided under deep litter system and under cage system 11 birds (3 males and 8 females) were housed in a breeder cage unit of 2025 cm^2 each offering a floor space of 184 cm^2 per bird. All the birds were fed with the same quail breeder ration (187.90 g crude protein, 10.83 MJ metabolizable energy and 28.20 g calcium per kg of feed) ad libitum and had free access to wholesome water throughout the experimental period. A total of 15 hours of light (photoperiod) was provided daily from 7-32 weeks of age.

The hatching eggs from the breeder stock were collected four times daily during the experimental period and the eggs collected during three days in each 28 days period of the experimental period were subjected for hatchability studies (Abdul Mujeer 1992). Soon after collection the eggs were fumigated for 20 minutes at 2X concentration according to the permanganomatrix methods of North and Bell (1990). Applying the data on per cent hen day egg production and hatchability on total eggs set per cent hen day chick production at different ages was worked out under both deep litter and cage systems of management. Feed cost for producing 100 chicks under both the systems of management was worked out separately taking into consideration the feed consumption, market rates of breeder ration, per cent hen day egg production and per cent hatchability on total eggs set. The data were grouped and subjected to analysis of variance. All the percentage values in the experiment were transformed to their arc sine roots before subjecting them to statistical analysis (Snedecor and Cochran 1989).

RESULTS and DISCUSSION

Per cent hen day chick production

Per cent hen day chick production was significantly ($P \leq 0.01$) higher from cage rearing of Japanese quail parents (Table 1) than deep litter rearing (34.07 ± 2.05 vs 31.05 ± 2.55). The highest number of 45.27 ± 1.16 chicks per 100 parents was obtained during 17-20 weeks and the lowest of 17.87 ± 3.49 during 9-12 weeks. Age effect was found to be significant. The influence of housing system effect was however not apparent during 21-24 and 25-28 weeks of age and breeders under

Table 1. Per cent hen day chick production in pure bred Japanese quail breeders under deep litter and cage systems

Age in weeks	Deep litter	Cage	Overall mean** (age)
9-12	10.10 ± 1.66	25.64 ± 0.68	17.87^{c} ± 3.49
13-16	30.00 ± 2.06	39.84 ± 0.48	34.92^{b} ± 2.40
17-20	42.86 ± 0.45	47.69 ±0.81	45.27^{a} ± 1.16
21-24	35.75 ± 1.05	34.69 ± 2.78	35.22^{b} ± 1.35
25-28	32.19 ± 2.58	30.19 ± 4.08	31.19^{b} ±2.21
29-32	35.40 ± 3.06	26.35 ± 2.33	30.88^{b} ± 2.66
Overall mean* (system)	31.05^{B} ±2.55	34.07^{A} ± 2.05	

*Means bearing different superscripts differ significantly ($P \leq 0.01$)

**Means bearing at least one common superscript do not differ significantly ($P \geq 0.01$)

Table 2. Feed cost (Rs) for 100 chicks in pure bred Japanese quail breeders under deep litter and cage system

Age in weeks	Deep litter	Cage	Overall mean** (age)
13-16	215.16 ± 6.21	179.47± 2.67	197.31^{b} ± 5.98
17-20	147.76 ± 1.75	160.60 ± 1.83	154.18^{a} ± 2.21
21-24	157.16 ± 2.65	208.88 ± 5.46	183.02^{b} ± 6.84
25-28	173.58 ± 6.10	219.34 ± 10.03	196.46^{b} ± 9.42
29-32	186.73 ± 6.13	272.25 ± 10.65	229.49^{c} ± 12.32
*Overall mean (system)	176.08^{A} ± 6.84	208.11^{B} ± 10.46	

*Means bearing different superscripts differ significantly ($P \leq 0.01$)

**Means bearing at least one common superscript do not differ significantly ($P \geq 0.01$)

deep litter rearing outperformed cage reared birds during the later age of 29-32 weeks. Attainment of early maturity and high rate of egg production under cage rearing would have ensured such superiority over deep litter rearing. Chidananda et al (1986) also agreed that although fertility was higher among the litter reared bird the cage rearing resulted in more number of chicks. Age effect was significant and the efficiency of chick production was the highest between 17-20 weeks compared to all other ages.

Feed cost (Rs) for 100 chicks

Feed cost (Rs) required to produce 100 day old Japanese quail chicks for deep litter rearing was found (Table 2) to be significantly lower compared to cage rearing of breeders (176.08 ± 6.84 vs 208.11 ± 10.46), the cost was the cheapest during 17-20 weeks (154.18 ± 2.21) and the highest (229.49 ± 12.32) during 29-32 weeks and such influence of age on the parameter was highly significant. Feed cost (Rs) for 100 chicks for deep litter rearing was higher during 13-16 weeks and lower during 21-24, 25-28 and 29-32 weeks of age compared to cage rearing. Deep litter system of rearing was found efficient in ensuring lower production costs (Rs176.08 vs 208.11). Age effect was found to be significant with the cost of production of chicks remaining the lowest during 17-20 weeks of age and it became increasingly costlier as the age advanced.

Higher levels of rate of lay and hatchability at this age contributed to the lowest cost. The breeder farm owners have to hence decide which is the most optimal age to cull the breeders depending on the effect of age on cost of production of chicks.

CONCLUSION

Cage system of housing resulted in significantly higher per cent hen day chick production (34.07 ± 2.05 vs 31.05 ± 2.55) and the age effect was also significant with the peak chick production noticed during 17-20 weeks of age that gradually declined as age advanced. Feed cost (Rs) to produce 100 chicks remained significantly lower under deep litter rearing for pure line Japanese quail breeders over cage rearing (176.08 ± 6.84 vs 208.11 ± 10.46). Age also significantly influenced the feed cost as the same increased as age advanced.

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