

Effects of managemental system on performance and economy of growing Japanese quails

R BURAGOHAIN¹, G KALITA², K SARMA³ and P HAZARIKA⁴

Central Agricultural University, Selesih, Aizawl, Mizoram 796 014 India

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The Japanese quail (*Coturnix coturnix japonica*) is emerging as a promising poultry to the resource-poor rural farmers of North East India for minimal capital and managemental requirements in rearing. Its eggs and meat serve not only as affordable protein source, but also help in generating valuable income for the farmers. The cost involved in feeding and management plays pivotal role on performance in terms of growth, feed efficiency, carcass yield and nutritional composition, and overall economics of the enterprise. The cost of construction and recurrent expenditure are always higher for cage system, whereas deep litter system of management is comparatively more affordable to the rural farmers. Therefore, in the present study an attempt has been made to elucidate the effects of management system i. e. the cage or deep litter rearing on the performance of Japanese quails.

Japanese quail chicks (80) (2-week-old and in equal sex ratio) were selected randomly from a single stock maintained at the Quail Research Unit of University, and divided into 2 groups with 2 replicates of 20 chicks each. One group was housed in cage (CSM) and another under deep litter system (DLS) under uniform feeding system. The cage was made of wire netting having 3-tiers with facilities for feeding and watering separately. Saw dust was used as litter materials over concrete floor for DLS. Floor space of 3" × 3" per quail was provided for both the systems and commercial broiler starter mash was used for feeding both the groups *ad lib.* up to 7 weeks of age. No vaccination, medication and deworming were done during the experimental period. Daily feed intakes, weekly body weight gain were recorded. At the end of sixth week, 10 birds from each group (5 males and 5 females) were sacrificed for study on carcass characteristics. The proximate composition of the various carcass parts were

analyzed as per AOAC (1990). Calcium was estimated by flame photometer and phosphorus by colorimetric method. Energy content of feed was determined by adiabatic bomb calorimeter following standard procedure. The data were analyzed using t-test (Snedecor and Cochran, 1976).

The broiler starter mash contained 22.78% CP, 2.82% EE, 5.30% CF, and 16.23% total ash, 3.1% calcium, 0.47% phosphorous and 2847 Kcal ME/kg. The per cent nutrient contents of the feed were comparable with the nutrient requirements specified by NRC (1971) and BIS (1992) for Japanese quails during growing period. The feed intake was proportional to the age of the quails, but not significant ($P < 0.05$) between CSM and DLS. Irrespective of management systems, body weight gain was higher in females than that in males. This may be due to greater proportionate yield of liver and alimentary tract in females (Tserveni-Gousi and Yannakopoulos 1986). There is report of higher body weight gain in females than in male under same managemental condition with quail starter ration containing 24.8% CP and 2825 Kcal ME/kg from second to fifth weeks of age (Hassan *et al.* 2003). At fifth week, the body weight gain was highest irrespective of sex and management which was decreased afterwards. This decreasing trend might be due to their early age at sexual maturity (6–7 weeks) as compared to other species of chickens which require a longer growing period prior to maturity. As growth rate reaches the maximum at fifth weeks of age, the sixth week may be regarded as the best period for selling the Japanese quails for table purpose. Growth of male quails was significantly ($P < 0.05$) higher under CSM from fourth week of age; whereas, that of females were significantly higher under cage during second to sixth week of age than those of DLS. The average carcass yields (% live weight) were significantly higher in either males or females under CSM for thigh, drumstick, back and neck than quails under DLS. Higher carcass yields on CSM might probably suggest comparatively better nutrient utilization than on DLS. The dressing percentage was significantly higher ($P < 0.01$)

Present address: ¹Assistant Professor, Department of Animal Nutrition, ²Assistant Professor (Senior Scale), Department of Livestock Production and Management; ³Assistant Professor (Senior Scale), Department of Veterinary Clinical Medicine; ⁴Assistant Professor, Department of Livestock Product Technology.

Table 1. Weekly body weight gain, feed conversion ratio and cost of feed of Japanese quails under 2 management systems

Week	Weekly body weight gain (g)					Sig.
	Management system					
	CSM	DLS	Sig.	CSM	DLS	
	Male			Female		
2nd	10.27±0.45	9.67±0.37	NS	10.93±0.31 ^P	9.67±0.41 ^q	*
3rd	22.73±0.44	22.13±0.60	NS	29.20±0.50 ^P	27.93±0.48 ^q	*
4th	28.20 ±0.93 ^a	24.47 ±0.83 ^b	**	29.60 ±0.66 ^P	25.87 ±0.42 ^q	**
5th	44.33 ±0.56 ^a	41.4 0 ±0.76 ^b	**	49.40 ±1.16 ^P	43.13 ±0.74 ^q	**
6th	40.53±0.61 ^a	33.60±0.75 ^b	**	43.67±0.69 ^P	35.00±0.74 ^q	**
7th	26.93±0.66	25.87±0.54	NS	26.93±0.67	26.47±0.65	NS
Feed conversion ratio [Feed intake (kg)/kg live weight gain] and cost of feed (Rs/kg live weight gain)						
6th	4.02±0.02 ^a (3.92 – 4.24)	4.88±0.01 ^b (4.76 – 4.98)	**	54.22±0.31 ^P (52.86 – 57.31)	65.90±0.20 ^q (64.19 – 67.24)	**
7th	4.88±0.04 (4.53 – 5.03)	4.94±0.01 (4.86 – 5.03)	NS	65.91±0.49 (61.09 – 67.91)	66.68±0.16 (65.61 – 67.84)	NS

Means bearing different superscripts in a row differ significantly ($P < 0.05$) for the same sex and parameter. NS, Nonsignificant ($P > 0.05$); *, significant at 5% level; **, Significant at 1% level. Figures with parenthesis indicate the range.

Table 2. Carcass yield (% live weight) and dressing percentage of Japanese quails at sixth week of age under 2 management systems

	Management system					
	CSM		Sig.	DLS		Sig.
	Male			Female		
Breast	23.92±0.19	23.63±0.14	NS	23.13±0.11 ^P	23.52±0.13 ^q	*
Thigh	9.54±0.09 ^a	9.06±0.05 ^b	**	6.29±0.08 ^P	8.94±0.06 ^q	**
Drumstick	6.63±0.12 ^a	7.09±0.05 ^b	**	6.73±0.14 ^P	7.15±0.05 ^q	*
Back	15.10±0.09 ^a	13.54±0.12 ^b	**	15.17±0.15 ^P	13.60±0.11 ^q	**
Neck	3.49±0.03 ^a	3.10±0.05 ^b	**	3.45±0.08 ^P	3.08±0.06 ^q	**
Wing	5.64±0.06 ^a	5.86±0.06 ^b	*	5.81±0.04	5.83±0.05	NS
Giblet	7.29±0.13	7.16±0.05	NS	7.47±0.11 ^P	7.18±0.05 ^q	*
Dressing%	74.03±0.12 ^a	70.82±0.10 ^b	**	68.74 ^{a**} ±0.08	67.91 ^q ±0.09	**

Means bearing different superscripts in a row differ significantly ($P < 0.05$) for the same sex. NS, Nonsignificant ($P > 0.05$); *, significant at 5% level; **, significant at 1% level.

for either sexes under both CSM and DLS. Feed conversion ratio (FCR) was significantly better under cage rearing. This might be due to significantly high growth rate under cage than DLS for both sexes. Lower body weight on DLS might be due to accessibility for frequent flying movement or tendency to play with the litter materials etc. leading to more body metabolism than those in the cages. At seventh week of age, the FCR was highest and so was the feed cost per kg live weight gain; and however, was statistically insignificant between systems of rearing which might be due to insignificant body weight gain during this period. Nutrient composition at sixth week for various carcass parts (on DM basis) was comparable and statistically nonsignificant

($P > 0.05$). Similar findings were also reported by El-Full (2000) for Japanese quails under similar feeding regime.

SUMMARY

Growth, carcass characteristics and economics of Japanese quails (*Coturnix coturnix japonica*) were studied under cage and deep litter system of management using 80 Japanese quail chicks (2-week-old, either sex). They were divided into 2 groups (cage and deep litter) with 2 replicates. Body weight gain (g/week) was higher in female quails irrespective of management system, but cage rearing resulted significantly higher body weight gain in both sexes than DLS. Feed consumption (g/bird/day) was comparable for both the

managerial practices. Percentage carcass yields were significantly higher for thigh, back and neck under CSM for both sexes. Significantly higher yields of drumstick and wing in males under cage, and breast and wing in females under DLS was observed. Yield of giblet was proportionately higher in female. Dressing percentage was significantly better for both sexes on cage than the DLS. Significantly lower cost involved in feeding for producing 1 kg live weight gain under cage rearing with better feed conversion ratio (FCR). It may be opined that the best marketing age of the quails for meat purpose is at sixth weeks of age and cage system may be superior to deep litter rearing for optimum growth, carcass yields and economy.

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REFERENCES

- AOAC. 1990. *Association of Official Analytical Chemists*. 15th edn. Benjamin Franklin Station, Washington, DC, USA.
- BIS. 1992. *Bureau of Indian Standard of Poultry Feeds*. Manik Bhawan, 9-Bahadur Shah Zafar Marg, New Delhi.
- El-Full E A. 2000. Effects of slaughter age and sex on carcass composition of Japanese quails. *Egyptian Poultry Science Journal* **20** (3): 649–61.
- Hassan S M, Mady M E, Cartwright A L, Sabri A M and Mobarak M S. 2003. Effect of early feed restriction on reproductive performance of Japanese quail (*Coturnix coturnix japonica*). *Poultry Science* **82**: 1163–69.
- NRC 1971. *Nutrient Requirements of Domestic Animals*. National Research Council. National Academy Press, Washington, D.C., USA.
- Tserveni-Gousi A S and Yannakopoulos A L. 1986. Carcass characteristics of Japanese quail at 42 days of age. *Poultry Science* **27** (1): 123–27.
- Snedecor G W and Cochran W G. 1976. *Statistical Methods*. Oxford and IBH Pub. Co. New Delhi.