Applied Biological Research 14 (2): 198-201, 2012 **Short communication**

INFLUENCE OF REARING SYSTEM ON THE PRODUCTION PERFORMANCE OF COMMERCIAL LAYERS

R. Pourouchottamane*, V. Ramesh Saravana Kumar, V. Venkatsubramanian, M.A. Kataktalware, Aditya Mishra, Showkeen Muzamil and P.K. Pankaj*

Department of Livestock Production and Management, Veterinary College and Research Institute, Namakkal, Tamil Nadu - 637 002 (India);
**National Research Centre on Pig (Indian Council of Agricultural Research), Rani, Guwahati, Assam - 781 113 (India)*
* e-mail: *dr.prabhatkumarpankaj@gmail.com*

(Received 2 January, 2012; accepted 14 May, 2012)

ABSTRACT

A study was conducted by collecting data from 60 commercial layer farms (15 farms in deep litter system, 25 farms in cage system and 20 farms in cages on elevated platform system) to assess the influence of housing system on production performance of commercial layers. The overall hen day egg production (21-72 weeks) was significantly higher in conventional cage system (78.85±0.70) and cages on elevated platform system (80.15±1.19) compared to deep litter system of rearing (72.41± 0.51). The system of rearing had significant influence on feed efficiency for each production period as well as full production period. The values were 1.66 ± 0.02, 1.63 ± 0.02 and 1.86 ± 0.02 in conventional cages, cages on elevated platform and deep litter system of rearing, respectively. The feed consumption was significantly higher in deep litter system in comparison to other two rearing systems. The livability was significantly lower in deep litter system of rearing (85.94 ± 0.36) than conventional cage system (89.32 ± 0.90) and cages on elevated platform system (89.39 ± 1.08).

Keywords: Egg production, feed efficiency, layer, livability, rearing system

INTRODUCTION

Poultry production system in India is undergoing rapid changes from traditional backyard system to highly mechanized intensive system of rearing involving modern managemental techniques. The poultry industry is valued at ₹291 billion with broiler and layer segments contributing ₹156 billion and ₹135 billion, repspectively. Annual production is estimated to be around 2.55 million tonnes broiler and 53 billion eggs, thereby India ranks as 4th largest producer of eggs and 6th largest producer of broiler meat (Bhardwaj, 2010). Poultry farmers in Namakkal region of Tamil Nadu state in India encounter a lot of difficulties like drop in egg production, prevalence of specific disease, heavier mortalities, etc. To overcome such problems, the farmers adopt various new managemental practices. Cages in elevated platform system is one among them in order to minimize the above problems. The elevated cage system or raised platform cage arrangement widens the gap between birds and its droppings, thereby facilitates quick drying of droppings and its easy removal (Prabhakaran, 2003). The elevated system is expected to have less fly menace than conventional cage system (Dogra and Aggarwal, 2010) and ensure superior air quality inside the shed than litter based system (Nimmermark *et al.,* 2009). Moreover, it is expected that the production performance of layers housed in elevated cage

system would be better than traditional cage system or deep litter system owing to better micro-environment. Hence, the present work was designed to study the influence of housing system on production performance of commercial layers.

MATERIALS AND METHODS

During 2001, data from commercial layer farms, maintained in and around Namakkal (Tamil Nadu, India), was collected. A total of 60 farms (15 farms in deep litter system, 25 farms in cage system and 20 farms in cages on elevated platform system) were randomly selected and surveyed personally. All the selected farms were maintaining single commercial hybrid strain of layers (BV-300 from Venkateshwara Hatcheries). The data was collected by using a detailed pre-tested questionnaire. The farmers, staff and laborers working in these farms were interviewed personally. The data was also gathered directly from the pen sheets and records maintained in the farm. The batch-wise egg production data of layers was collected from 21 to 72 weeks of age. Various production parameters like hen day egg production, feed consumption (g day^{-1} $bird^{-1}$), feed efficiency (feed consumed in kg dozen $eggs^{-1}$ produced) and livability at 72 weeks of age were calculated. In order to find any variation in performance of the layers due to system of rearing, the collected data was subjected to least square analysis of Harvey, (1979) and the means were compared by Duncan's multiple range test as modified by Kramer (1957).

RESULTS AND DISCUSSION

Hen day egg production

The overall per cent hen day egg production for full laying period (21 - 72 week age) was significantly ($P<0.01$) higher in conventional cage system (78.85±0.70%) and cages on elevated platform system (80.15±1.19%) as compared to deep litter system of rearing (72.41±0.51%). The higher production may be attributed to minimal stress, better management and hygienic practices prevailed in cages on elevated platform and conventional cage system. This trend of higher production was noted throughout the period, i.e., 21-40, 41-60 and 61-72 weeks of age and the difference was statistically significant. Even though no significant difference was noted between the conventional cage system and cages on elevated platform system, numerically higher hen day egg production was noted in cages on elevated platform system. The present findings are in agreement with those of Suhila *et al.* (2002) who observed a higher egg production under raised platform and conventional cage system than deep litter system. Sivakumar *et al.* (2002) also noted that birds performed better in cages than deep litter.

Feed consumption

During 41-60 week age, feed consumption was significantly higher in deep litter reared birds, while there is no effect of rearing systems in other age groups. The overall feed consumption (g $bird^{-1}$ day^{-1}) during the whole period of laying (21-72 weeks) was significantly higher in deep litter system compared to other two system of rearing. This might be due to higher wastage of feed by scratching and excessive movements of birds. Sekeroglu (2010) also reported that layers in cages consumed less feed compared to those raised in deep litter system.

Feed efficiency

The system of rearing had significant effect on the feed efficiency for each of the production period as well as full production period. The overall feed efficiency (21-72 weeks) was 1.66±0.02, 1.63±0.02 and 1.86±0.02, respectively, in conventional cage, cages on elevated platform system and deep litter system of rearing. The better feed efficiency in cages and cages on elevated platform might probably be due to

Table 1: Production performance of commercial layers as influenced by the systems of rearing

System of rearing	21- 40 weeks	41- 60 weeks	60 - 72 weeks	Overall (21-72 weeks)
Hen day egg production (%)				
Conventional cage system	73.64±1.66^{A}	83.64±0.62^{A}	79.65±0.83^{A}	78.85±0.70^{A}
Cages on elevated platform system	76.31±1.74^{A}	85.09±0.92^{A}	78.84±1.39^{A}	80.15±1.19^{A}
Deep litter system	67.24±0.90^{B}	77.17±0.69^{B}	73.08±0.46^{B}	72.41±0.51^{B}
Feed consumption (g bird^{-1} day^{-1})				
Conventional cage system	105.92±0.89^{x}	111.32±0.62^{X}	110.96±1.02^{x}	109.16±0.63^{x}
Cages on elevated platform system	104.35±1.83^{x}	111.60±1.24^{X}	111.05±1.08^{x}	108.65±1.30^{x}
Deep litter system	107.00±1.31^{x}	117.20±1.20^{Y}	113.40±2.12^{x}	112.40±0.84^{y}
Feed efficiency (feed consumed in kg dozen egg^{-1} produced)				
Conventional cage system	1.74±0.04^{L}	1.60±0.01^{L}	1.68±0.02^{L}	1.66±0.02^{L}
Cages on elevated platform system	1.65±0.03^{L}	1.58±0.02^{L}	1.70±0.02^{L}	1.63±0.02^{L}
Deep litter system	1.96±0.06^{M}	1.83±0.03^{M}	1.89±0.04^{M}	1.86±0.02^{M}
Livability (%)				
Conventional cage system	95.54 ± 0.53^{a}	95.62 ± 0.42^{g}	97.19 ± 0.31^{i}	89.32 ± 0.90^{a}
Cages on elevated platform system	95.35 ± 0.91^{a}	95.96 ± 0.64^{g}	96.50 ± 0.38^{i}	89.39 ± 1.08^{a}
Deep litter system	94.46 ± 0.19^{a}	94.45 ± 0.31^{g}	96.33 ± 0.12^{i}	85.94 ± 0.36^{b}
Reproductive traits	Age at first egg (days)		Age at 50% egg production (days)	
Conventional cage system	128.32 ± 1.34^{h}		160.60 ± 1.76^{h}	
Cages on elevated platform system	127.90 ± 1.02^{h}		160.90 ± 1.90^{h}	
Deep litter system	128.13 ± 1.31^{h}		163.47 ± 1.40^{h}	

*Means bearing different superscripts (capital letters) within the same group in same column vary significantly at $P_{0.01}$ *Means bearing different superscripts (small letters) within the same group in the same column vary significantly $P_{0.05;}$

the less energy loss by movement and less feed wastage. Farooq *et al*. (2002) reported that feed efficiency was better in cages than in deep litter system.

Livability

Rearing system had significant influence on per cent livability for the full production period. The livability was lower in deep litter system of rearing (85.94±0.36) than conventional cage system (89.32±0.90) and cages on elevated platform system (89.39±1.08). The higher incidence of viral diseases and parasitic infection due to litter contact might be the reason for this poor livability. Similar findings were noted by Muthusamy and Viswanathan (1998) wherein mortality was higher in deep litter than cage system of rearing. From the present study, it appears that production performance of commercial layers reared in conventional cage system and cages on elevated platform system were comparable and significantly better than the birds reared under deep litter system of management.

Reproductive traits

System of rearing had no significant effect on age at first egg and age at 50% egg production. This might be due to the fact that all the farms under study are receiving the additional light around 18 weeks of age with more or less uniform lighting schedule and other similar managemental practices. While these results are in agreement with Sekeroglu (2002) and Petek (2004), they stated that the effect of housing system was not significant on sexual maturity age in contrast to Sekeroglu *et al.* (2010) who observed that hens kept in the cage system reached sexual maturity (50% yield age) two days before those in the free range system and 10 days before the birds in the deep litter system.

REFERENCES

Bhardwaj, R. 2010. Indian poultry industry its overview and outlook: The time has come to review our strategy. *Poultry Express,* **1**(6): 4.

Dogra, V. and Aggarwal, A.K. 2010. Association of poultry farms with housefly and morbidity: A comparative study from Raipur Rani, Haryana. *Indian Journal of Community Medicnie,* **35**: 473-477.

Farooq, M., Mian, M.A., Durrani, F.R. and Syed, M. 2002. Feed consumption and efficiency of feed utilization by egg type layers for egg production. *Livestock Research for Rural Development*, **14**: 76-79. **(***http://www.cipav.org.co/lrrd/lrrd14/1/faro141a.htm)*

Harvey, W.R. 1979. *Least Squares Analysis of Data with Unequal Sub-class Numbers.* pp: 54-84. In: USDA Agricultural Research Science and Education Administration, Washington, USA.

Kramer, C.Y. 1957. Extension of multiple range tests of group means with unequal number of replication. *Biometrics,* **12**: 307.

Muthusamy, P. and Viswanathan, K. 1998. Effect of rearing systems on performance of commercial layers. *Indian Journal of Poultry Sciences,* **33**: 264-267.

Nimmermark, S., Lund, V., Gustafsson, G. and Eduard, W. 2009. Ammonia, dust and bacteria in welfare-oriented systems for laying hens. *Annals of Agricultural and Environmental Medicine,* **16**: 103-113.

Petek, M., 2004. The productivity of commercial laying hens housed in battery cage, aviary, perchery and free-range housing systems. pp. 332-332. In: *Proceeding of the 22th World`s Poultry Congress*, June 8-13, 2004, Istanbul, Turkey.

Prabhakaran, R. 2003. *Good Practices in Planning and Management of Integrated Commercial Poultry Production in South Asia*. FAO Animal Production and Health paper. No. 159, Food and Agriculture Organization, Rome, Italy.

Sekeroglu, A. 2002. *The Effects of Free Range System on Egg Productions and Egg Quality of Brown and White Layer Genotypes.* Ph.D. thesis submitted to the Animal Science Department, Institute of Science, Gaziosmanpasa University, Turkey.

Sekeroglu, A., Musa, S., Ergun, D., Zafer, U., Muammer, T., Mustafa, S. and Hussain, O. 2010. Effects of different housing systems on some performance traits and egg qualities of laying hens. *Journal of Animal and Veterinary Advances*. **9**: 1739-1744.

Sivakumar, K., Muralidharan, M.R., Viswanathan, K and Radhakrishnan, K. 2002. Microclimate and production performance of commercial layers under different roof types and rearing systems. *Indian Journal of Poultry Science,* **37**: 258-263.

Suhila, S.G.K., Muralidharan, M.R., Ramesh, V., Arunachalam, S. and Sivakumar, T. 2002. Effect of microclimate and microbial quality in layer house on egg production. *Indian Journal of Animal Science,* **72**: 939-940.