



ISSN Print: 2664-9926
 ISSN Online: 2664-9934
 NAAS Rating (2026): 4.82
 IJBS 2026; 8(8): 04-05
www.biologyjournal.net
 Received: 04-05-2026
 Accepted: 08-06-2025

Ilaya Bharathi D
 Department of Livestock
 Production and Management,
 Tamil Nadu Veterinary and
 Animal Sciences University,
 VCRI, Salem, Tamil Nadu,
 India

S Durga
 Department of Livestock
 Production and Management,
 Tamil Nadu Veterinary and
 Animal Sciences University,
 VCRI, Salem, Tamil Nadu,
 India

KR Pushpanathan
 Livestock Farm Complex,
 Tamil Nadu Veterinary and
 Animal Sciences University,
 VCRI, Salem, Tamil Nadu,
 India

Corresponding Author:
Ilaya Bharathi D
 Department of Livestock
 Production and Management,
 Tamil Nadu Veterinary and
 Animal Sciences University,
 VCRI, Salem, Tamil Nadu,
 India

Production performance of commercial brown layer under cage-free production system

Ilaya Bharathi D, S Durga and KR Pushpanathan

DOI: <https://www.doi.org/10.33545/26649926.2026.v8.i8a.971>

Abstract

Cage-free systems for laying hens offers better animal welfare, higher-quality eggs, and premium market opportunities, it also poses economic, disease management, and consumer affordability challenges. In the present study, the production performance of birds under cage free system (in EC house) from start of first lay till 70 weeks of age is analysed and compared with standard production as per commercial standard. The overall HHEP till 70 weeks is around 292.35 numbers per hen irrespective of the mortality pattern. The prescribed standard for HHEP by 70 week is 298.5 eggs per hen till 70th week and 308 numbers by 72 weeks. The cumulative mortality percentage during the laying period was at 3.13% which is on par with the commercial standard. Considering the positive impact of cage free system on welfare of the birds and increasing awareness of consumers on products from caged birds, this system offer considerable advantages for the farmers.

Keywords: Cage free system, HDEP, HHEP, mortality

Introduction

Egg production in India is highly mechanised wherein egg production is from layers reared under battery cages. Cage rearing of layers offers various advantages such as cost reduction, space reduction, low labour cost and better disease management etc., are the primary reason for mass production of eggs. The battery-type caging system where a massive number of chickens are piled up draws the consumers' reaction; therefore, facilities with furnished cages, deep litter, free-ranging areas, or cage-free rearing systems have become widespread in layer poultry farming (Blatchford 2018) ^[1]. Currently there has been a shift in the poultry industry from the use of battery cage production systems to the use of cage-free egg production systems globally. Cage-free systems for laying hens can be floor housing systems or aviary systems with multiple tiers. These systems offers better animal welfare, higher-quality eggs, and premium market opportunities, it also poses economic, disease management, and consumer affordability challenges. Consumers tend to believe that eggs produced in cage-free systems are of better quality (Vits *et al.* 2005) ^[6]. Rodriguez-Hernandez *et al.*, 2024 ^[4], reported that the Haugh unit of the eggs of cage-free systems was higher than that of caged systems. In the present study, the production performance of birds under cage free system (in EC house) from start of first lay till 70 weeks of age is analysed and compared with standard production as per commercial standard.

Materials and Methods

The present data was recorded from a flock of 10000 commercial brown shelled egg layers. Day old chicks were procured from commercial supplier and were reared under standard managerial conditions. Standard feeding, lighting and vaccination protocols were adopted stringently without any deviation. Birds were shifted to cage free house (EC House) at 17th week. Commercial layer feed was offered to the birds as per available standards. The egg production was recorded from start of lay on daily basis up to 70 weeks. Mortality numbers was recorded daily to arrive at overall mortality over the laying period. Hen housed egg production (HHEP) and hen day egg production (HDEP) was recorded using the following formula. HHEP = Average daily number of egg production per day or period /No.of hens housed initially X 100 and HDEP = Total no. of egg produced/Total no.of hens available on the day/periodX100. The recorded data was analysed to arrive at meaningful conclusions.

Results and Discussions

Age at sexual maturity (ASM) is considered an important economic trait in layer business. Age at Sexual maturity in layers is the age at 5% of the flock starts egg production. The present flock reached sexual maturity at 19th week (133 days) which is on par with the recommended commercial standards (BV380 guide). In cage free systems, mortality percentage is considered an deterrent in comparison with traditional cage rearing where the birds are confined to cages better disease management practices can be easily adopted. In the present flock the cumulative mortality

percentage during the laying period was at 3.13% which is much below the commercial standard (Table 1).

The weekly production performance as indicated by the egg numbers and HDEP and HHEP are presented in table 1. The overall HHEP till 70 weeks is around 292.35 numbers per hen irrespective of the mortality pattern. The prescribed standard for HHEP by 70 week is 298.5 eggs per hen till 70th week and 308 numbers by 72 weeks. There is no significant difference between the numbers achieved and prescribed.

Table 1: Production performance of commercial brown layer under cage free system upto 70 weeks (n=10000)

Age at first egg - 18 th week (120 days)						
Age at Sexual maturity - 19 th week (133 days)						
Age	Egg number	Cumulative Mortality %	Liveability %	Realised HDEP %	Standard HDEP % *	Realised HHEP %
Till 20 weeks	15042	0.05	99.95	10.75	8.75	10.74
21-25 weeks	267230	0.36	99.64	76.36	73.94	76.35
26-30 weeks	308702	0.58	99.42	88.22	95.00	88.20
31-35 weeks	303640	0.78	99.22	86.77	94.76	86.75
36-40 weeks	303690	1.13	98.87	86.80	93.00	86.77
41-45 weeks	300057	1.48	98.52	85.77	90.66	85.73
46-50 weeks	292552	1.61	98.39	83.62	88.20	83.59
51-55 weeks	290017	1.8	98.20	82.90	85.70	82.86
56-60 weeks	292166	2.16	97.84	83.53	83.20	83.48
61-65 weeks	283976	2.47	97.53	81.19	80.40	81.14
66-70 weeks	266389	3.13	96.87	76.18	77.40	76.11
HHEP/ Bird	292.35					

*BV380 commercial stock management guide by venkateshwara research and breeding farm Pvt. Ltd., Appendix- 3 Pp 32-33

The reduced egg production in cage free systems maybe due to higher ME utilisation towards physical activities instead of egg production (Meng *et al.* 2015). Also, in uncaged housing systems, the likelihood of low energy feed materials found in the litter area played a role in reduced egg production (Philippe *et al.* 2020). Some researchers reported that egg production performance was higher in caged hens than in cage-free systems (Tumova and Ebeid 2003; Voslarova *et al.* 2006). On the contrary, vice versa was also accurate for free-range compared to caged systems (Yildirim and Kaya 2017). HDEP and HHEP during the entire study period does not differ significantly indicating low mortality rates and better management practices.

Conclusions

No significant variations were noted between the standard productions in cages to that of Cage free systems in terms of egg production and liveability. Nevertheless, considering the positive impact of cage free system on welfare of the birds and increasing awareness of consumers on products from caged birds, this system offer considerable advantages for the farmers.

References

- Blatchford RA. Backyard flock production. In: *Advances in Poultry Welfare*. 2018. p. 339-350. DOI:<https://doi.org/10.1016/b978-0-08-100915-4.00016-6>
- Meng F, Chen D, Li X, Li J, Bao J. Effects of large or small furnished cages on performance, welfare and egg quality of laying hens. *Animal Production Science*. 2015;55(6):793-798.
- Philippe F, Mahmoudi Y, Cinq-Mars D, *et al.* Comparison of egg production, quality and composition

in three production systems for laying hens. *Livestock Science*. 2020;232:103917.

- Rodriguez-Hernandez R, Rondon-Barragan IS, Oviedo-Rondon EO. Egg quality, yolk fatty acid profiles from laying hens housed in conventional cage and cage-free production systems in the Andean tropics. *Animals*. 2024;14(1):168.
- Tumova E, Ebeid T. Effect of housing system on performance and egg quality characteristics in laying hens. *Scientia Agriculturae Bohemica*. 2003;34:73-80.
- Vits A, Weitzenburger D, Distl O. Comparison of different housing systems for laying hens in respect to economic, health and welfare parameters with special regard to organized cages (Literature Review). *DTW Deutsche Tierärztliche Wochenschrift*. 2005;112(9):332-342.
- Voslarova E, Hanzalek Z, Vecerek V, Strakova E, Suchy P. Comparison between laying hen performance in the cage system and the deep litter system on a diet free from animal protein. *Acta Veterinaria Brno*. 2006;75:219-225.
- Yildirim H, Kaya S. Egg production and quality traits of layers kept in free range housing system. *Greener Journal of Agricultural Sciences*. 2017;7(2):60-64. DOI:<https://doi.org/10.15580/gjas.2017.2.032217041>