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Comparison of preference of layers for laying eggs in Mud Pots Vs Nest Boxes

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Abstract

An experiment was conducted to know the preference of egg laying in mud pot vs nest box. Six hundred birds were reared under deep litter system. Three treatment groups namely T₁- Nest Box (NB), T₂ - Mud pots (MP) and T₃- combination of Nest Box and mud pot(NB+ MP) and each group consisting of 200 birds, provided 1:5 ratio nest box and reared separately in each groups. The results revealed that the highest average hen day egg production was showed in Nest Box (T₁) group (170.15) as against the lower average hen day egg production in T₂ (163.69). The average daily egg production between the T₂ and T₃ groups didn't show much variation. There was a significant difference observed among the groups. Birds using Nest Box (T₁) showed higher percentage of laying eggs in the designated Nest Box (96.57%) as against the lowest percentage of egg laid in Mud Pot design (T₂) (61.90%). When observe the result of (T₃) group, showed the higher percentage of laying eggs in Nest Box (76.63%) as against in Mud Pot (18.22). Birds in the group of Mud Pot (T₂) showed higher percentage of floor egg (38.09%) as against to the Nest Box (3.43%) (T₁) and combination of Nest Box (5.14%) (T₃). However, there was a significant difference in the percentage of floor egg was observed in the group of Mud Pot (T₂) compared to the group T₂ and T₃. It was concluded that, the more number of egg production and less number of floor egg production may be due to provision of standard nest box during the rearing and more floor egg may be due to the non- availability of nest boxes.

Keywords: Mud pot, nest box, deep litter, egg production, floor egg, egg laying

Introduction

Rearing poultry under deep litter system is getting more popular now a days. Because of the Animal Welfare majority of the Poultry farmers are adopting the cage free rearing of layer birds for egg production. As an intension of Animal Welfare birds are also rearing in the enriched cages by providing all necessary facility in the cage system. While studying the animal behavior, the poultry birds exhibit various kind of behavior. The bird expresses its natural behavior like Nesting, Egg Laying, Perching, Scratching, Fighting, Mud Bathing, Pecking and other behavior. Among these behaviors, the egg laying behavior is the major subject to discuss during rearing of egg type chicken. Rearing cage free bird facilitates the nesting behavior of hens and this is an important economic trait also. Normally the layer bird will prefer to lay the egg in Nest Boxes and darker portion of the poultry shed. When birds lay egg outside the Nest Boxes then the eggs are more prone to the bacterial contamination through the contact of fecal material and litter material.

The nesting behavior of layer is a complex and depends on the genetic, behavioral, hormonal and environmental factors. During early stage of egg laying, birds will lay preferably on floor than the Nest Box provided. As age advances and after keen examination of the Nest Boxes the floor egg laying will also be reduced. Hy-Line International has been selecting the birds against floor eggs for more than a decade. The genetic determination of this trait and an estimate of its heritability in commercial lines has been established (Settar *et al.*, 2017) [13].

Nesting behavior is comprised of two phases: the searching phase and the sitting phase. During the searching phase, a hen inspects possible laying locations, often visually inspecting potential sites. When nest sites are inadequate or unavailable, the searching phase often manifests over an extended period of time (Wood-Gush, 1972) [17], Hens may sit for up to 25 min, (Freire *et al.*, 1998) [6]. Nests should be designed to allow hens to perform pre-lay behaviors and oviposition in a desirable location with minimal competition to avoid frustration, stress, and possibly retained eggs (Duncan and Kite, 1989) [5].

Crowding in the nests may increase the risk of heat stress and smothering, aggression between hens (Hunniford *et al.*, 2014)^[9], or scratches, wounds, and feather loss from birds climbing on top of each other (Appleby *et al.*, 1988)^[2]. Insufficient space for simultaneous use of the nest by all hens may prevent hens from performing pre-lay behavior and oviposition in a preferred location (Appleby *et al.*, 1988)^[2] and this can result in litter or non-nest laid eggs by individuals unable to access the nest. This current experiment aimed to build to investigate the preference of egg lying in different kinds of nests provided in the poultry shed under the deep litter system of rearing. The main objective of this experiment was to study the preferences of layers for laying eggs in mud posts vs Nest Boxes under deep litter system of rearing.

2. Materials and Method

This experiment was conducted at the Veterinary College Gadag, Department of Livestock Farm Complex, at Poultry Unit. A total of 600 Hy-Line birds were used to conduct this experiment. The birds were reared in the three treatments; T₁ – Nest Box (NB), T₂ - Mud Pots (MP) and T₃- combination of Nest Box and Mud Pot (NB+ MP), each group consisting of 200 birds and reared separately in each groups. The experimental design was showed in table no. 01. These birds were reared under standard housing system under Deep Litter System by providing ad libitum water, standard lighting schedule and fed as per the breeder specification according to the age during the experimental period. The Nest Boxes were provided in each group at the ratio of 1:5 as per the number of birds in the individual groups. During the data collection the birds were in the age group of 25 to 35 weeks. The data was collected on daily basis and eggs were collected once in an hour interval from all groups and recorded the data. To test for significant differences in the behavior of layers ANOVA calculation was used.

Table 1: Description of the Experimental Design

Treatment	Type of Nest Box	Number of birds	No. of Nest Boxes
T ₁	Nest Box (NB)	200	40
T ₂	Mud pots (MP)	200	40
T ₃	combination of Nest Box and Mud Pot(NB+ MP)	200	NB- 20 MP- 20

3. Results and Discussion

The results of Preference of Layer birds for Laying Eggs in Mud Pots Vs Nest Boxes were showed in table no. 2. Among the various groups the highest average hen day egg production was showed in Nest Box (T₁) group (170.15) as against the lower average hen day egg production in T₂ (163.69). The average daily egg production between the T₂ and T₃ groups didn't show much variation. There was a significant difference observed among the groups. However, the Nest Box (T₁) recorded the higher egg production compared to Mud Pot (T₂) and combination of Nest Boxes (T₃). The T₂ and T₃ group was non-significantly comparable with the T₁. These results are in agreement with the findings of Sonkamble *et al.*, that the hen day and hen housed egg production (HHEP) were 79.33 and 76.00% in cage housing

and 76.32 and 73.47% in deep litter housing, respectively. The findings of others also concluded that, the types of housing system affected the performance of laying hens and reported that egg production was higher in cage systems than in barn and free range systems (Voslarova *et al.*, 2006; Huneau-Salaun *et al.*, 2011; Dikmen *et al.*, 2016)^[16, 7, 4]. However, the egg production from conventional cage layers is higher than in alternative systems such as aviary, floor management or free-range system (Leyendecker *et al.*, 2001)^[11]. European countries studies indicates that egg production in furnished cages is comparable to that in conventional cages. Pohle and Cheng were reported that layers maintained in furnished cages laid more eggs at 40 weeks compared to conventionally caged birds ($p \leq 0.05$) because of considerable improvements in welfare levels.

In contrary to the findings of this result, many researchers have found that egg production of hens reared in different housing systems were found to be similar (Neijat *et al.*, 2011; Ahammed *et al.*, 2014)^[1, 12].

Birds using Nest Box (T₁) showed higher percentage of laying eggs in the designated Nest Box (96.57%) as against the lowest percentage of egg laid in Mud Pot design (T₂) (61.90%). When observe the result of (T₃) group, showed the higher percentage of laying eggs in Nest Box (76.63%) as against in Mud Pot (18.22). However there was a significant difference was observed in (T₁) group compared to the T₂ and T₃ groups. The findings of these results are agreement with the findings of Appleby *et al.*, that more eggs were laid in traditional nests (70% in pen 1, 66% in pen 2) and metal roll away were the next preferred type. These preferences of nest box were confirmed by analysis of records from individual Nest Boxes, and by observations of hens marked with wing tags.

Birds in the group of Mud Pot (T₂) showed higher percentage of floor egg (38.09%) as against to the Nest Box (3.43%) (T₁) and combination of Nest Box (5.14%) (T₃). However, there was a significant difference in the percentage of floor egg was observed in the group of Mud Pot (T₂) compared to the group T₂ and T₃. The found results are in agreement with the findings of Appleby *et al.*, 1986^[2], that Laying behaviour of birds was influenced by flock mates, first few hens are come into lay could leads to high or low levels of floor egg, however it differ between the strains. Floor laying is heritable and selection is effective measure. Islam (1995)^[10] findings showed that choice of nest for laying was influenced by nesting materials in breeding hens. He also showed marked effect of litter type on floor laying. Eggs laid on the floor, instead of nest boxes, are major economic problems in breeding flocks housed on deep litter. The findings of these results are in agreement with the findings of Villanueva *et al.*, that preference of pre-lay behaviors of hens laying outside the nest and tracking of eggs laid by individual hens. Along with these findings Hunniford *et al.* (2014)^[9] found that, in the beginning eggs were laid in the scratch and later were laid in the nest. In Hunniford and Widowski (2016)^[8] studies reveals that the modification which was made to the scratch area significantly impacted egg laying location. On average, hens laid 10% more eggs in the scratch area with a partition than without partition.

Table 2: Results of egg laying pattern

Particulars	T1 (Nest Box)	T2 (Mud pots)	T3 (Combined systems)	P-Value
Number of hens	200	200	200	
Proportion of Nest Box/mud pots: layers	1:5	1:5	1:5	
Hen day egg production	170.15 ^a ± 1.27	163.69 ^b ± 1.58	164.7 ^b ± 1.93	0.012
Percentage laid in designated position	96.57	61.90	76.63 --Nest Box 18.22 --Mud pot	
Percentage floor eggs	3.43	38.09	5.14	

4. Conclusion

It was concluded that, the more number of egg production and less number of floor egg production may be due to provision of standard nest box during the rearing and more floor egg may be due to the non-availability of nest boxes. In mud pot type nest box more floor eggs were observed that might be due to the birds staying longer duration in mud pot because of more dark area and more comfort. This study showed that deep litter system could provide a good managerial system than battery cages system in open-sided houses. Therefore it is important to select an appropriate nest box system for layer in order to prevent floor eggs. The findings from this study suggest that layer should be placed with more nest space per hen to ensure eggs are laid in nests.

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