

EFFECT OF PULLET STOCKING ON LAYING PERFORMANCE

BOZKURT, Z.¹ – BAYRAM, İ.² – GÜCÜYENER, Ö.¹ - LENGER, Ö.F.³

¹ Afyon Kocatepe University, Veterinary Faculty, Department of Animal Husbandry, 03200 Afyonkarahisar, TURKEY

² Afyon Kocatepe University, Veterinary Faculty, Department of Animal Feeding, 03200, Afyonkarahisar, TURKEY

³ Afyon Kocatepe University, Veterinary Faculty, Department of Genetics and Molecular Biology, 03200

Corresponding author:

Assoc. Prof. Dr. Zehra BOZKURT

Afyon Kocatepe University, Veterinary Faculty, Department of Animal Husbandry,
03200 Afyonkarahisar, TURKEY

Tel: 00 90 228 13 11
00 90 228 13 12
++ 90 532 468 19 79

Email: Zhra.bozkurt@gmail.com
akinci@aku.edu.tr

Abstract

A total of 1296 hens 16 weeks old used raised in a three-tier growing cage system with the top, middle and bottom tiers each housing a different population density (211.8, 274.5 and 370.6 cm²/per bird). The effect of being raised in a high density atmosphere seemed to have a positive effect on light and medium genotype hens, whereas the heavy genotype hens were negatively effected; hens of genotypes known for having lively and active dispositions were negatively effected on the top and bottom tier cage levels. These results show that when genotype and cage position are taken into account while determining the numbers of raising pullet in multi-tier cages, cage originated stress can be minimized and hens welfare can be maintained and thus hens can be encourage to achieve a higher laying performance.

Key Words: Genotype; Pullet-stocking density; Pullet-stocking position; Performance; Welfare

1. Introduction

Multi-storey caged-systems are formed by a number of cages having microenvironments different from each other. How cage-related stresses affect productivity and welfare of birds have been exclusively investigated (Carey, 1987; Carey et al., 1995; Carmichael et al., 1999; Patterson and Siegel, 1998), however studies into the effect of microenvironment of cages are scarce. Effects of interactions between the position of cages on the batteries and genotype and sheltered frequency of birds on the welfare and products parameters may provide highly crucial ideas for the possible modification of multi-storey cage systems (Hemsworth and Barnett, 1989; Jones, Craigh et al., 1986; Nazlıgül et al., 1995).

The main objective of this study was to evaluate the production responses of four genotypes of leghorns reared under different cage density and cage position.

2. Materials and Methods

This research was carried out in the Poultry Department of Afyon Feed Factory, Afyon, Turkey. Day old chicks acquired from four different egg-type genotypes from 40-55 week old breeders in the same hatchery, placed on three different levels (top, middle and bottom levels) each with different densities of 35, 27 and 20 birds to a cage with a cage area of 211.8, 274.5 and 370.6 cm² per bird in a mechanically ventilated growing henhouse.

Birds were fed diets, which contained 20, 17 and 14 % CP and 2800, 2750 and 2750 kcal ME /kg, respectively stage and standard husbandry conditions were maintained allowing a 13- h photoperiod (Light intensity were 2.5, 2.2 and 1.9 watt/m² in top, middle and bottom cages respectively), and feed and water were available ad libitum during the growing period.

A total of 1296 hens at 16 weeks of age, were transferred from the growing house into the environmentally controlled laying henhouse of a 4-tier cage system.

From 18 to 21 wk, 21 to 44 wk and 45 to 72 wk periods considered prelayer, layer 1 and layer 2 diets, which contained 15.0, 17.5 and 16.5 % CP and 2750, 2750 and 2750 kcal ME/kg, respectively.

3. Results

Genotype has been found to have an important effect on sexual maturity age.

During the growing period the cage density did not affect to the sexual maturity of the birds. However important G x D interaction revealed that while increased cage density during growing period. The position of the rearing cage in the battery did not have an important impact on the sexual maturity of the hens

Genotype has an important effect of egg weight ($P < 0.01$) and during laying phase hens from brown egg genotypes laid heavier eggs than hens from white egg genotypes. The position of the cage where hens raised had a non-significant effect on egg weight.

Hens originating from brown egg genotypes fed more and benefited less from the feed than hens originating from white egg genotypes. While the inhabited cage area increased as the hens were growing, they consumed more feed, did not utilize well and produced less total egg mass.

The 3 tier battery growing cage position showed a linear increase in daily feed consumption and total egg mass production in descent from top tier downwards, however, the feed utilization showed no change.

4. Discussion and Conclusion

During the laying phase the size of both hens reared in cage densities of 20/cage and those reared in densities of 35/cage was less than the size of hens reared in a cage density of 27/cage. During the growing period the birds may be hindered by the density in the most populated cages from getting to the feeder, as a result the lowest average live weight was observed in this group at the age of 16 weeks Carey (1987).

The study revealed that hens reared in crowded cages had a higher laying performance compared to hens reared in cages with more cage area. This result is in conflict with the expectation that cage related stress and density related social stress would be more in densely populated cages and less in cages sparsely populated (Blokhuys, 1994; Baxter, 1994; O'Keefe et al., 1988). The reason for this is that immediately before laying is stimulated the high flock uniformity is high in high density cages and low in sparsely populated cages

Comparison of the laying performance of hens raised in three tier cage batteries revealed that the best performance were obtained from those raised on the top tier. Although cage level has no major impact on sexual maturity age, the hens on the top tier might have reached sexual maturity a bit earlier because of exposure to more light (Morris, 1967). The hens reared on the bottom level of the cages were heavier and consumed more feed and hen-day egg production (2-4%) and egg mass production was lower than of those reared positioned differently.

High egg mass production in hens raised in densities of 35 birds/cage was observed in all cage positions. However, highest egg mass production was determined in groups of 20 birds/cage densities on top and in groups of 27 birds/cage densities on the middle level. In the rearing henhouse regardless of cage density, the hens reared on the bottom level had a low hen-day egg production. The live weight differences between white genotype hens reared in top and bottom level cages was much more striking, genotypes responded differently to position impact.

The higher (body weight, feed intake and feed conversion rate, mortality and egg production) and lower (egg weight and eggmass) R^2 values shows how the variation explained by this model.

These results showed that by taking genotype and cage position into account in determining the number of hens to be reared in multi-tier cages, cage related stress could be minimized and thus both the welfare and laying performance of these hens would be increased.

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