

Reduction of Stress of Female Broiler Breeders During Growing Period to Maintain the Uniformity Level by Changing Temperature and Stocking density

H.M.W.G.S.L. Kumara and N.M.N. Nambapana
Uva Wellassa University, Badulla, Sri Lanka

Introduction

Although the birds have high genetic potential for faster growth rate, better feed conversion, and increased meat yield in their progeny, if there is no optimum environment conditions for growth, the genetic potential does not appear in the environment. Among the factor for the better performances and health of the poultry birds, temperature and stocking density are the critical factors for stress of the birds in the poultry houses (Rosales, 1994). Chicken, unlike most other animals, do not possess sweat glands to aid in heat loss. The chicken removes excess body heat by radiation from the skin surface through the air to another object, by conduction to cooler objects with which the bird is in contact (Doug Grieve, 1990). Caged birds are more susceptible to heat stress because they are unable to seek a cooler place and there is less conductive heat loss in cages. As the environmental temperature approaches the body temperature of the bird, 41 °C (106 °F), the efficiency of these heat loss mechanisms diminish. At this point the evaporation of water from the respiratory tract becomes the major heat loss mechanism of the birds (Brake, 1987). The term "stress" is commonly used to describe the detrimental effects of a variety of situations on the health and performance of poultry. After extended or repeated periods of stress, birds become fatigued and weak, so they often succumb to starvation and infectious diseases (Rosales, 1994). Since the past, problems in broiler breeders are caused by combinations of whole house temperature and stocking density. Maintaining a uniform flock during the growing period of the broiler breeders may facilitate higher egg production during breeding period. So the broiler breeder farmers have to pay their attention to maintain over 80% uniform flock with increasing uniformity during both growing and breeding period for maximum production. The present study, aims to find better combination of whole house temperature and stocking density of broiler breeders to maintain over 80% uniform flock with increasing uniformity during growing period.

Methodology

This study was carried out at the NEL Farm & Hatchery that has been established under Noorani Estate Limited Naththandiya. Total of four hundred and ninety five *Hubbard F15* broiler breeder hens were used from three weeks of age to eighteen weeks of age in this study. Forty five birds were divided in to nine replicates of five birds each as the control and remaining four hundred and fifty birds were divided in to nine group under temperatures of 27 – 29 °C, 29 – 31 °C and 31 – 33 °C with stocking densities of 1 bird/ 1.8 ft², 1 bird/ 2.0 ft² and 1 bird/ 2.2 ft². After two weeks of successful brooding period, the birds were subjected to above conditions from the beginning of third week up to the end of eighteenth week. The above temperature conditions (27 – 29 °C, 29 – 31 °C and 31 – 33 °C) were maintained by using three grower cages at the grower farm of NEL Farm & hatchery. Each cage was partitioned in to three pens according to the above stocking densities. Cages were numbered as given in Table 1.

Table 1: Conditions of the cages

Cage number	Temperature and Stocking density conditions/Treatments
1	27-29 °C and 1.8ft ²
2	27-29 °C and 2ft ²
3	27-29 °C and 2.2ft ²
4	29-31 °C and 1.8ft ²
5	29-31 °C and 2ft ²
6	29-31 °C and 2.2ft ²
7	31-33 °C and 1.8ft ²
8	31-33 °C and 2ft ²
9	31-33 °C and 2.2ft ²

Broiler starter was given during first two weeks and chick starter was given from third week to end of fourth week. Then grower feed was given from sixth week to eighteen week. Broiler starter was given as ad libitum and then chick starter and grower feed were given from second week to eighteen weeks of age as restricted feeding. After fourth week of age feed restriction was practiced and birds were fed six days for a week (6/1 feeding programme). Body weights of the birds were recorded weekly in each cage during experimental period and uniformity of the each pen was calculated with the help of above weights. BAT 1 Poultry Scale was used to weigh and calculate the collected data. After sixteenth weeks of age, averages from weekly uniformity levels, standard deviation and coefficient of variance for each pen were calculated. Collected data was analyzed by using two-way Analysis of Variance (ANOVA) to analyze the differences between treatment groups using SPSS General Linear Model's procedures.

Results and discussion

Two hypotheses were built relevant to the above study as given below.

H₀ – There is no significant difference between uniformity with temperature and stocking density combination

H₁ – There is a significant difference between uniformity with temperature and stocking density combination

Component	Estimate
Var (VAR00003)	0.000
Var (Error)	0.035

VAR00001 – Dependent variable/Uniformity

VAR00002 (Error) – Stocking Density

VAR00003 – Temperature

Results of the study revealed that there is a significant difference between uniformity with temperature ($P < 0.05$) and stocking density ($P < 0.05$) combination. Therefore the combination of temperature and stocking density affected for highest uniformity level can be selected as the best combination.

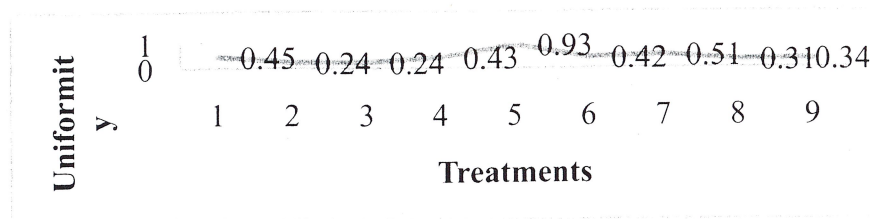


Figure 1. Variation of uniformity in different treatments

According to the Figure 1 treatment no. 5 has given highest uniformity level than the other eight treatments. Therefore it is the better combination of temperature and stocking density for the broiler breeders to gain better performance.

In this graph (Cage under 29-31 °C), fluctuation of the uniformity is very low; it has shown somewhat increasing uniformity level comparatively other cages. According to the graph, uniformity is over 80% with the 29 – 31 °C temperature. Under 2.0 ft² stocking density, fluctuation of uniformity is lowest than the other conditions. Therefore, the best combination to keep these breeder birds is 29 – 31 °C temperature with 2.0 ft² stocking density.

References

- Brake, J.T. 1987. Stress and modern poultry management. Animal Production Highlights. F. Hoffmann-La Roche and Co., Ltd., 4002 Basle, Switzerland.
- Doug Grieve, D.V.M., 1990. Technical Bulletin, A publication of Hy-Line International.
- Rosales, A.G. 1994. Applied Poultry Science, Managing Stress in Broiler Breeders.