

EFFECT OF SOME ENVIRONMENTAL STRESSORS ON REPRODUCTION IN BIRDS

By

YOUSRY MOHAMED AHMED EL-HOMMOSANY

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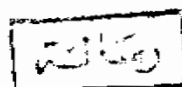
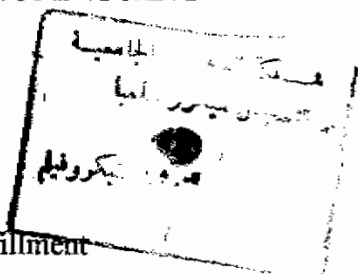
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By

YOUSRY MOHAMED AHMED EL-HOMMOSANY

B. Sc. Agric. (Poultry Production) Ain Shams Univ., 1980.

M. Sc. Agric. (Poultry Physiology) Ain Shams Univ., 1987.

This thesis for Ph D degree has been approved by :

Dr. H. AYOUB

Prof. of Poultry Breeding and Head of Poultry Production Department, Fac. of Agric., Ain Shams University

H. Ayoub

Dr. M. G. KAMAR

Prof. of Poultry Physiology, Animal Production Department, Fac. of Agric., Cairo University

M. G. Kamar

Dr. M. F. ALI

Prof. of Poultry Physiology, Poultry Production Dept., Fac. of Agric., Ain Shams University

M. F. Ali

Date of examination : 4 / 13 / 1995



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YOUSRY MOHAMED AHMED EL-HOMMOSANY

B. Sc. Agric. (Poultry Production) Ain Shams Univ., 1980.

M. Sc. Agric. (Poultry Physiology) Ain Shams Univ., 1987.

Under the supervision of:

Dr. MAIE F. ALI

Prof. of Poultry Physiology, Dept. of Poultry Production,

Fac. of Agric., Ain Shams University

Dr. EL-SAYED A. KOTBY

Prof. of Animal Physiology, Dept. of Animal Production,

Fac. of Agric., Ain Shams University

Dr. JOY MENCH

Associate Prof. of Poultry Physiology, Dept. of Poultry

Science, College of Agric., Maryland University, College

Park, MD, U.S.A

ABSTRACT

Three studies were conducted to determine the effect of population density on reproductive performance and well-being in Japanese quail.

The design for Exp.1; four-wk-old quail (231 males and 231 females) were separately divided into five treatment groups: 1, 2, 3, or 4 birds/cage or 18-birds/pen with floor area of 324,162,108,81 or 324cm²/bird, respectively.

While for Exp.2; eighty four 4-wk-old females were divided into six treatment groups: 2,4, or 8 birds/cage with a floor area of 174 or 348cm²/bird, and for Exp.3; ninety two 8-wk-old females were divided into eight treatment groups:1,2,4 with or 4 without hide per cage with floor area of 225 or 322cm²/bird.

The results indicated that in Exp.1 increasing population density in the cages resulted in significantly ($P<0.01$) decreased body weight at 35 days of age, delayed ($P<0.05$) age at sexual maturity, lowered ($P<0.01$) egg production from maturity to 100 days old, while increasing adrenal gland weight in females, with a decline in male plasma testosterone hormone. Rearing quail in floor pens resulted in significant ($P<0.05$) delay in age at sexual maturity, lowered egg production, lowered body weight at 35 days of age and decreased adrenal weights in both males and females (at 70 and 100 days old, respectively) as compared to caged birds. However, singly caged-birds had greater body weight ($P<0.005$) at 35 days of age, higher egg production ($P<0.001$), increased plasma testosterone level ($P<0.0001$) and lower adrenal weights in both males ($P<0.05$) and females ($P<0.0002$) as compared to multiple cages.

Exp.2: Decreasing floor area resulted in a significantly ($p < .01$) lowered weekly egg production, a higher heterophil to lymphocyte ratio (1.4 vs. 0.6), and a reduction in locomotor activity. The effect of increasing group size was more complex. Age at sexual maturity was greater in the 4(41d) and 8(42d) than in the 2-bird (38d) groups. Group size also affected the frequency of performance of a number of behaviors, although there was an interaction with floor area for some of these behaviors. The duration of stereotyped pacing and cage pecking increased linearly throughout the study. Cage pecking occurred more frequently in the 2-bird (8.9 sec/period/bird) than in the 4-bird (5.6 s) group, while pacing occurred with a significantly greater frequency in the 4-bird groups (63.0 s) than in the other groups (39.8 s). Mortality and weekly body weight did not differ among treatments.

Exp.3: Neither floor area per bird nor group size exerted a significant effect on weekly body weight or egg production. Decreasing floor area per bird resulted in a higher H/L ratio. Although statistically insignificant, 4- bird group with hide had lower H/L ratio than all other treatments except single cage. Increasing floor area per bird and or group size per cage was associated with an increase in locomotor activity. Providing the cage with hide resulted in a significant decrease in the time spent pacing. These results suggested that both group size and floor area per bird are important variables affecting the performance and well-being of female Japanese quail. Rearing Japanese quail on floor pen are not

recommended for best laying performance. We might decrease the stress related to small floor area allowance per bird by providing the cages with a small box.

Key words: quail, stress, floor area, group size, production, body weight, H/L ratio, hormones, behavior, well-being.

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