Faculty of Agriculture

REPRODUCTIVE PERFORMANCE AND SOME PHYSIOLOGICAL PARAMETERS OF JAPANESE QUAIL FEMALES VARYING IN EGGSHELL COLOR AND PATTERN USING IMAGE ANALYSIS

By

Shaaban Saad Ahmed Saad El-Nesr

B.Sc. Agriculture Sciences (Animal and Poultry Production) Faculty of Agriculture, Suez Canal University, 2003

M.Sc. Agricultural Sciences (Poultry Nutrition) Faculty of Agriculture, Suez Canal University, 2009

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ABSTRACT

This study was conducted to investigate the reproductive performance, some physiological parameters, eggshell ultrastructure, egg weight loss% and hatching traits of Japanese quail females varying in eggshell color and pattern using image analysis. A total number of 225 five weeks-old Japanese quails (150♀ + 75♂) were used. Females were classified into four groups according to their eggshell color and pattern, 1st group [Light eggs (none or rarely of very small spots)], 2nd group [dotted eggs (small and much spots)], 3rd [spotted eggs (large and many spots)] and 4th group [dark eggs (very large and few spots)]. A total of 2900 eggs were selected from the four groups of eggshell color and pattern to perform two consecutive hatches of eggs collected for 12 days consecutive each. Eggs of the first hatch were stored for 11 days at room temperature (ranged from 21-25°C and relative humidity 50-60 %) and the eggs of the second hatch were stored for 11 days in a refrigerated room (17°C and 70 % relative humidity). **The results of the present study are as follows:** Light eggshell color group had higher clutch number, pause number, pause length, values of red, green and blue of eggshell, hue, lightness, and egg weight loss % at different periods of storage and embryonic mortality % (mid and late) and worst eggshell ultrastructure. Light eggshell color group had lower clutch length, egg production%, egg mass from 57-84 days, antibody titer against sheep red blood cells (SRBCs), saturation of eggshell, hatchability %, hatchability/fertile eggs % (H/F %), chick weight and chick weight % than other groups. The dark eggs group had the highest values of plasma triglycerides, hatchability% and H/F %, and it had the lowest values of clutch number, pause number, values of red, green, blue, hue and lightness, egg weight loss % at different periods of storage and early embryonic mortality %. Spotted and dark eggshell groups had the highest values of shell% and shell thickness. Hue of quail eggshell positively correlated with each of clutch number, pause number, pause length, shape index, egg weight loss % and embryonic mortality (mid and late) but it negatively correlated with each of clutch length, egg production, egg mass, Haugh unit, shell %, shell thickness, plasma cholesterol and calcium, hatchability % and H/F%. Saturation of eggshell color positively

correlated with clutch length, malondialdehyde, antibody titer against SRBCs and late embryonic mortality % and negatively with each of clutch number, pause number, pause length, Haugh unit, shell %, plasma globulin, total antioxidant, packed cell volume, hemoglobin and H/F %. Lightness of eggshell color correlated positively with each of clutch number, pause number, egg weight loss %, fertility % and early embryonic mortality but it negatively correlated with each of clutch length, yolk index, Haugh unit, shell%, malondialdehyde and H/F %. Egg weight loss% increased with increasing time and temperature of pre-incubation storage. Negative correlations were found between time of storage and each of hatchability %, fertility% and H/F%, however, it was positively with embryonic mortality.

It can be concluded that, selection should be focus on females producing spotted and dark eggshell which had better reproductive performance, eggshell ultrastructure and hatchability% compared to females with light eggshell color using image analysis.

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