STUDY OF SOME PHYSIOLOGICAL AND GENETIC BASES OF THE TOLERANCE TO HEAT STRESS IN JAPANESE QUAIL

BY

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B. Sc. Agric. Sci. (Poulty production), Ain Shams Univ., 1991

Thesis Submitted in partial fulfillment

of

the requirements for the degree of

MASTER OF SEIENCE

in

Agriculture Science

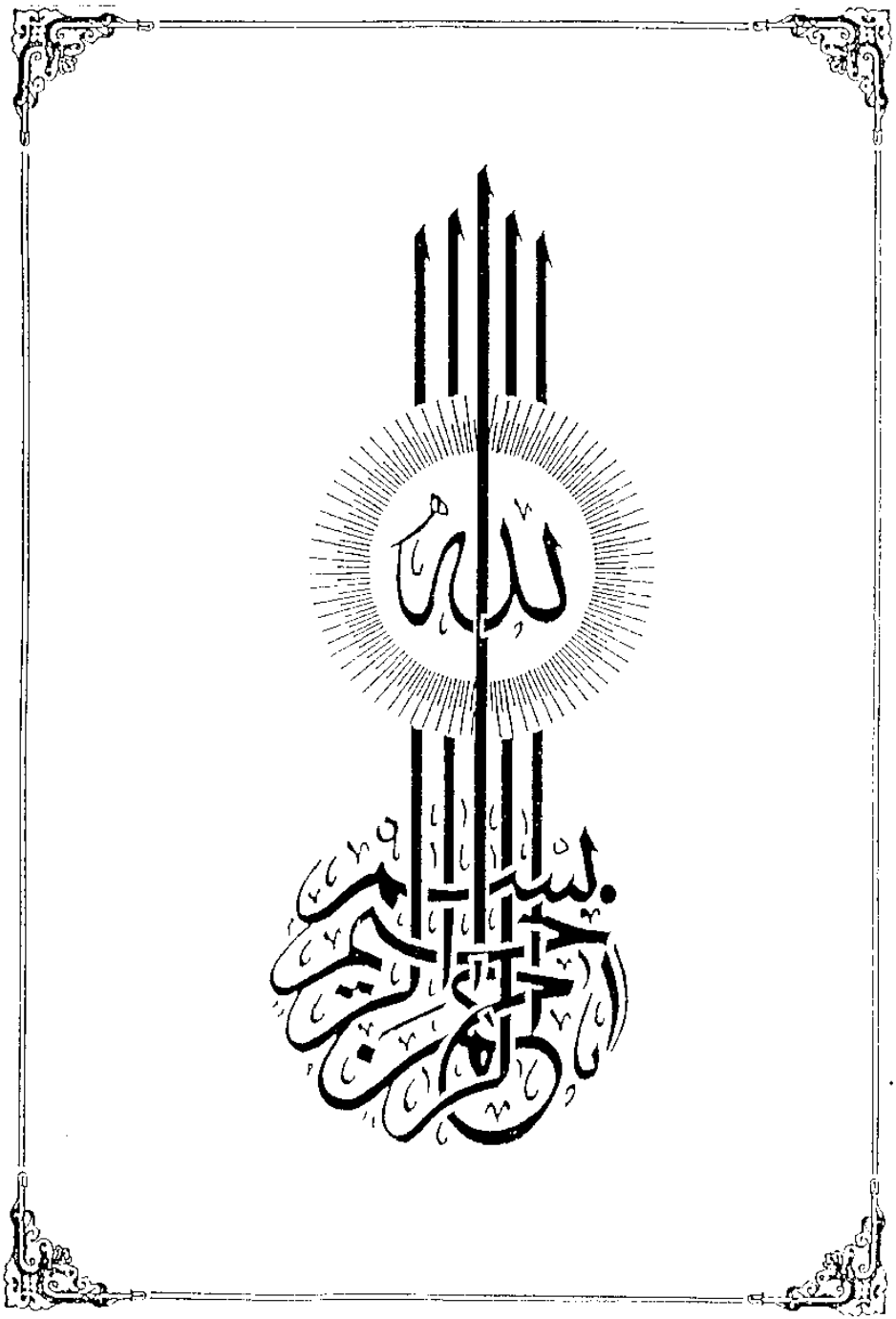
(Poultry Physiology)

Department of Poultry Production

Faculty of Agriculture,

Ain Shams University

1997



APPROVAL SHEET

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CONTENTS

LIST OF FIGURES

LIST OF TABLE

ABSTRACT

Naiera H. M. El- Nabarawy, Study of Some Physiological and Genetic Bases of The Tolerance to Heat Stress in Japanese Quail. Unpublished Master of Science, Dept. of Poultry Production, Fac. of Agric. Univ. of Ain Shams, 1997.

Effects of heat stress and heat shock on body temperature (Tre), respiration rate (R.R.), body weight, mortality, reproductive performance, serum calcium, T_3, T_4 and protein fractions were investigated in Japanese quail chicks and embryos. Chicks were maintained at 32, 38 and 42C air temperature from one-week of age till sexual maturity. Twelve days embryos and chicks at two and four weeks of age were exposed to heat shock (45C). The heat stress had no significant effects on body weight, body temperature, respiration rate and egg number or on egg weight. However, serum calcium, was significantly reduced at 7 wk of age under 38C heat stress. Serum T3 and T4 for heat stressed quail chicks were significantly reduced at 4 wk of age. But at 7 wk of age only T4 was significantly reduced. At zero hour the heat shock SDS protein patterns of embryos did not exhibit specific bands associated with heat shock. In addition, the KD-90 protein was consistently absent in heat-shocked embryos. After three hours from heat shock at (45°C) both the 90 KDa and 70 KDa bands were uniquely expressed in the treated embryos. Moreover, three other proteins; 186 KD, 144 KD and 32 KD were also expressed uniquely in heat-shocked embryos. Heat shock treatment at six hours seemed to trigger hyperactivation in the expression of the 90 KD protein. The SDS electrophoretic pattern of two weeks old quail chicks subjected to heat shock 45°C indicated

an overexpression of 90 KD protein. In addition, P32 KD protein was exhibited due to heat shock.

Agarose protein electrophoregrams for heat shock treatment showed higher intensity and density of pre-albumin and gamma globulin bands than that of control. Electrophoretic patterns of serum protein of heat-stressed chicks revealed higher intensity and density of albumin and globulin fractions than that of the control.

These results suggest that Japanese quail chicks could be considered as heat-acclimated birds. The threshold for prolonged exposure for egg production was in the 38°C range, above which deleterious effects could be inflicted.

Key Words: Heat shock protein, calcium, thyroid hormones, body weight, body temperature, respiration rate, mortality, agarose electrophoresis, SDS-PAGE.