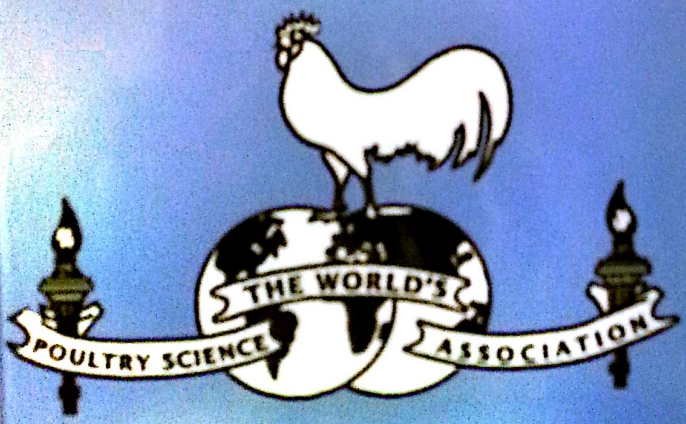
Acclimatization of chickens to high and low temperatures

S. Yalcin, Anne Collin, P.B. Siegel

WORLD'S POULTRY SCIENCE JOURNAL

education
organization
research



Conference on a Cruise

The 5th Mediterranean Poultry Summit Of the WPSA

Oct. 20-25, 2016
Italy - Spain - France

Book of ABSTRACTS

5th Mediterranean Poultry Summit
Of the Mediterranean Poultry Network of the WPSA
Italy – Spain - France

October 20 – 25, 2016

Book of abstracts

Supplement of the
World's Poultry Science Journal

Editors
N. Daghir, H. Khouri and G. Sayegh

Hosted by:
French Branch of the World's Poultry Science Association
Italian Branch of the World's Poultry Science Association
and
Lebanese Branch of the World's Poultry Science Association

Content

PLENARY SESSIONS

ORAL SESSIONS

[K5-02]: Environment / Genetics interaction (ID: 110053)
[Turkey]

Acclimatization to High and Low Temperatures

Servet Yalcin (1), Anne Collin (2) and Paul B. Siegel (3)
(1) Ege University, Faculty of Agriculture, Dept of Animal Sci. Izmir, Turkey; (2) INRA, UR83 Recherches Avicoles, F-37380 Nouzilly, France; (3) Department of Animal and Poultry Sciences, Blacksburg 24061-0306, USA
Corresponding author: yalcinservet@hotmail.com

It is very well known that ambient temperature has a major impact on poultry production. Heat and cold stress can occur at temperatures above and beneath the upper and lower critical temperatures, respectively. In case of heat exposure, growth rate and feed consumption decrease in broilers and it has a highly detrimental effect on egg production and egg shell quality in laying hens. Exposure to low temperatures results in increased feed consumption, but it also results in decreased performance in broilers and laying hens. Thus, both may lead to economic losses and alter animal welfare. Different strategies have been studied in order to reduce the detrimental effects of heat and cold stress. Temperature acclimation during embryogenesis has recently received experimental attention as an effective way. This phenomenon refers to chickens subjected to higher or lower incubation temperatures that may acquire tolerance to higher or lower temperatures during postnatal life, respectively. This hypothesis is based on the facts that: 1. Temperature experienced during embryonic development may influence physiological responses to the environment and 2. It may have positive effects by improving thermotolerance. Previous studies showed that temperature during critical developmental phases that affect gene expression has persistent effects on thermal acclimation of chickens. This critical period is linked to the development and maturation of the hypothalamus-pituitary-thyroid axis and hypothalamus-pituitary-adrenal axis. The mechanisms involved in thermotolerance acquisition include changes in pathways regulating energy metabolism resulting in a change in heat production, modifications in stress markers, changes in anti-oxidant pathways and membrane alterations. The aim of this paper is therefore to review 1. Whether and how temperature experienced during embryogenesis affects temperature tolerance of broilers and laying hens and 2. The physiological mechanisms underlying adaptive temperature response.

Keywords: Broilers, layers, acclimation, temperature