



Tropentag, September 19-21, 2012, Göttingen -
Kassel/Witzenhausen

“Resilience of agricultural systems against crises”

Modelling Heat Stress Characteristics on Layers' Performance Traits in Southwestern Nigeria

OLUBUNMI AYOBAMI DUDUYEMI, SAIDU OSENI

Obafemi Awolowo University, Dept. of Animal Science, Nigeria

Abstract

A hot environment is an important stressor affecting poultry production in tropical and sub-tropical regions. Thus, the effect of high ambient temperature and resultant heat stress on the performance of commercial egg-laying stocks, need to be studied.

Data on two strains of layer chickens (Isa Brown and Bovan Nera) were obtained from farm records of Funtuna Farms, Ogere- Remo, in Southwest, Nigeria. Performance traits include age at point of lay, mortality pattern and egg-laying performance. Climatic variables include temperature and relative humidity from which temperature-humidity index (THI) was derived. The THI was grouped into 3 classes: <26, 26–29, and >29 to show the degree of heat stress variation in the chicken houses the birds were exposed to. Effect of threshold of heat stress levels and the associated rate of decline in egg production and mortality were estimated. Egg-laying records of 4,000 pullets on each strain were analysed to quantify the effect of heat stress function in a fixed effect model on performance. Effect of heat stress, genotype, and age of layers on production efficiency, were studied.

Results revealed that egg production was significantly affected by genotype ($p < 0.05$), THI and age of birds ($p < 0.001$). Hen-housed egg production for Isa Brown and Bovan Nera were 4.98 ± 0.21 and 5.20 ± 0.21 per hen per week respectively. There was however, significant effect ($p < 0.001$) of THI on production. The heat stress function developed showed a threshold at $\text{THI} = 27.5$ and the associated rate of decline were 0.35 eggs per unit increase in THI (egg production = $-0.35\text{THI} + 6.3$). Bovan Nera recorded lower rate ($0.32 \text{ eggs THI}^{-1}$) as against Isa Brown ($0.37 \text{ eggs THI}^{-1}$). Further, significant effect ($p < 0.001$) of heat stress was recorded on mortality. Isa Brown recorded higher mortality (24.19 ± 1.25) per month of lay than Bovan Nera (14.46 ± 1.25).

In conclusion, the production performance of the two strains (IB and BN) was influenced by heat stress, genotype and age of bird. There exists variability in heat tolerance among the strains and temperature-humidity index (THI) can be used to account for the effects of heat stress on production performance of commercial layers in humid tropics.

Keywords: Heat stress, layers, performance traits