

Effects of turning duration during incubation on corticosterone and thyroid hormone levels, gas pressures in air cell, chick quality, and juvenile growth.

ONAGBESAN, Okanlawon Mohammed

Department of Animal Physiology, University of Agriculture, Abeokuta.

Abstract

Two peaks of embryo mortality have been identified during incubation of chicken eggs (the first and the final phases of incubation), and both are linked to egg turning. Turning in the first week enables proper formation of extra-embryonic membrane and in the final week avoids embryo malpositioning. The hatchability of the eggs, however, may depend on physiological parameters (e.g., hormone levels or gas pressures) that turning may influence to ensure proper embryo development and survival. It is not clear how long turning should continue during this second phase to ensure these conditions, but it is general practice to turn eggs until 18 d. This study describes the effects of turning chicken eggs for different durations during the last days of incubation on embryo physiological parameters that may be linked to embryo survival, hatchability, and broiler posthatch performance. Cobb eggs were incubated for 21 d under standard incubation conditions but with varying turning durations. Eggs were turned until 12, 15, or 18 d and left in a horizontal position until transferred to hatcher baskets on the 19th day. Blood samples from embryos were analyzed for corticosterone at d 15, d 18, internal pipping (IP), and hatch. Triiodothyronine (T3) and thyroxine (T4) were measured at IP and at hatch. Partial pressures of CO₂ (pCO₂) and O₂ (PO₂) in the air cell were measured at d 18 and at IP stage. Hatchability of fertile eggs, incubation duration, weights of 1-d-old chicks, chick quality, and their growth potential determined as absolute weight and relative growth (RG) to d 7 were recorded. Corticosterone levels increased in all treatments with embryo age until hatch, but there were no significant differences among treatments. Eggs turned until 18 d had higher pCO₂ and lower PO₂ at IP than those turned for 12 or 15 d. T3 and T4 were higher at IP in eggs turned for 18

d compared with the other two groups in which T3 and T4 were not different. T3/T4 ratio in 1-d-old chicks was also lower in eggs turned until 18 d. Incubation duration, and weights of 1-d-old chicks were similar for all treatments groups. Hatchability and percentage of high quality chicks were lower for eggs turned for 15 d compared to the 2 other groups, which were not different. However, 7-d-old weights and RG decreased with increasing duration of egg turning. We concluded that although turning until 18 d benefited hatchability and chick quality, it depressed potential posthatch performance of the chick to 7 d of age.