

Abstract

Effect of Eggshell Temperature throughout Incubation on Broiler Hatchling Leg Bone Development

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Leg problems in broiler chicks may partly be prevented by providing optimal circumstances for skeletal development during incubation. One of the factors demonstrated to affect bone development is eggshell temperature (EST), which provides a reliable reflection of embryo temperature. The present experiment aimed to investigate the effect of EST on development and asymmetry of the femur, tibia, and metatarsus in broiler chicken hatchlings.

Eggs were incubated from day 0 until hatch at 1 of 4 EST: Low (36.9°C), Normal (37.8°C), High (38.6°C), and Very high (39.4°C). At hatch, chick quality was determined in terms of chick length, yolk free body mass, navel score, and organ weights. Tibia, femur, and metatarsus were weighed, their length and width (mediolateral diameter) and depth (craniocaudal diameter) at the middle of the shaft were measured, and their ash content was determined. Relative asymmetry of the leg bones was determined from their relative dimensions. Hatchability, chick quality, and organ development were lower for Very high EST compared to all other treatments. Very high EST resulted in lowest

tibia and metatarsus lengths (- 3.1 to - 8.4%) compared to all other treatments, and lower metatarsus weight (- 9.1%) and femur length (- 4.9%) compared to High EST. Relative asymmetry and ash content did not differ among treatments and no relation between EST and bone parameters was found. To conclude, Very high EST resulted in lower bone development, hatchability, and chick quality. Few differences in bone development and chick quality were found between Low, Normal, and High EST.

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