

Abstract

Effect of Light Schedule and Dimming in Early Life on Bone Development in the Broiler Chicken

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Leg problems may partly be prevented by providing a broiler chicken with optimal light schedules for bone development in early life. It can be speculated that continuous light and a sudden switch from light to darkness and vice versa lead to more stress and, therefore, decrease bone development than a prolonged dark period and dimming (a gradual transition, as in nature) in early life.

Newly hatched Ross 308 chickens from a 27 week old broiler breeder flock (n = 500) were exposed to an initial continuous light period of 12 hours. Thereafter, 5 light schedules were applied until 4 days post-hatch: 1. Continuous light (24L); 2. Short dark period without dimming (2L:1D abrupt); 3. Short dark period with dimming (2L:1D dimming); 4. Long dark period without dimming (2L:6D abrupt); 5. Long dark period with dimming (2L:6D dimming). Body weight and feed intake were determined on day 0 and day 4 post-hatch. At day 4 post-hatch, 35 chickens

per treatment were sacrificed to determine femur and tibia characteristics. Data were analyzed using the GLM procedure with individual body weight as a covariable for the bone characteristics.

Most light schedules did not show large or consistent effects on bone development. An exception was 2L:6D dimming compared to 24L. The 2L:6D dimming treatment had significantly lower tibia length (-0.9 mm) and diameter (-0.14 mm), and femur length (-0.53 mm) and diameter (-0.18 mm) than the 24L

treatment (all $P < 0.001$). Body weight at day 4 post-hatch was comparable between 24L and 2L:6D dimming, but feed conversion ratio was highest for 24L (0.81) and lowest for 2L:6D for both abrupt (0.73) and dimming (0.72; $P < 0.001$).

It can be speculated that chickens exposed to a prolonged dark period were less active than chickens exposed to continuous light,

and therefore had lower feed conversion ratio. It is not clear whether decreased bone development as found under a prolonged dark period of 6 hours with dimming results in increased incidence of leg problems in later life. This is currently being investigated. To conclude, continuous light led to larger bones than a prolonged dark period and dimming, but less efficient feed conversion.