

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 analysed 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:D 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 higher body weight and bone development than a prolonged dark period and dimming, but less efficient feed conversion.

Keywords: light schedule bone development dimming