HatchTech
INCUBATION TECHNOLOGY

Technical Information

Chick Quality in Layer Hatchlings affected by Temperature?

Dr. Roos Molenaar M.Sc.

Incubation conditions have a major impact on chick quality and temperature is the most crucial factor during incubation. Not the incubator temperature, but the temperature that the embryo experiences is important throughout incubation. Because embryo temperature is difficult to measure without killing the embryo, eggshell temperature is used in practice as an indicator for embryo temperature. Different studies have shown that the highest hatchability and best chick quality is obtained with an eggshell temperature of 37.8°C.

In practice, high eggshell temperatures (>38.9°C) are often observed in the second half of incubation because of suboptimal incubator design, insufficient cooling capacity, or high temperature setpoints. High eggshell temperatures are known to impair chick quality in broiler hatchlings. However, the effect of high eggshell temperatures on chick quality in layer hatchlings are less intensively studied. The research department of HatchTech, therefore, performed a trial to evaluate if high eggshell temperatures impair chick quality in layer hatchlings.

First-grade hatching eggs from a commercial Dekalb White parent flock with an age of 40 weeks were used. Eggs were incubated at a normal (37.8°C) or high (38.9°C) eggshell temperature from day 14 of incubation. Hatchling quality was measured 12 hours after emergence from the eggshell. Results showed that chick quality was impaired at a high eggshell temperature and this was expressed by a lower yolk-free body mass and larger residual yolk. The yolk-free body mass (YFBM) is the body weight of the chicken minus the residual yolk weight and expresses the true development of the hatchling. The

YFBM of layer hatchlings incubated at the high eggshell temperature was 37.7 g and 0.7 g lower compared with layer hatchlings incubated at a normal eggshell temperature (37.0 g). This finding is comparable with results in broiler hatchlings.

Navel condition of the layer hatchlings was also evaluated with a score of 1 to 3 (Picture 1), where 1 was a closed and clean navel area, 2 a black button up to 2 mm or black string, or 3 a black button exceeding 2 mm or open navel area. Navel condition did not differ between the two eggshell temperature treatments in the layer hatchlings and was on average lower than in broiler hatchlings (Table 1). These results differed with a broiler study performed by the research department of HatchTech, where a high eggshell temperature resulted in a poorer navel condition (Table 1). The reason that navel condition was not affected by a high eggshell temperature in layer hatchlings is unclear. Our results confirmed practical experiences that layer hatchlings have a poorer navel condition compared with broiler hatchlings.

In conclusion, high eggshell temperatures negatively affect chick quality in layer hatchlings and should be prevented at any time. The incubation temperature needs to be adjusted throughout incubation to obtain the optimal eggshell temperature of 37.8°C in layer embryos.

Breed	Average navel condition
Layer hatchling	
Normal eggshell temperature	2.0[a]
High eggshell temperature	1.9[a]
Broiler hatchling	
Normal eggshell temperature	1.4[b]
High eggshell temperature	1.6[a]

[a,b] *Means followed by a different superscript within a breed are significant different (P<0.05).*

Table 1: *Navel condition of layer and broiler hatchling incubated at a normal and high eggshell temperature.*

Pictures: *Navel condition of* 1 *(closed and clean navel),* 2 *(black button up to 2 mm or black string) or* 3 *(black button exceeding 2 mm or open navel area).*

19_314_HAT137