

# Effect of Eggshell Temperature and a Hole in the Air Cell on the Perinatal Development and Physiology of Layer Hatchlings

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**To investigate the effect of incubation conditions on layer hatchlings, an experiment was performed in which layer eggs were incubated at a normal (37.8°C) or high (38.9°C) eggshell temperature (EST) and a hole was punctured in the air cell of half of the eggs in both EST treatments from d 14 of incubation onward. Chick development, plasma metabolites, and hepatic glycogen were measured at 12 h after emergence from the eggshell.**

Embryo mortality was not affected by the EST or hole treatment. At the high EST, yolk-free body mass (YFBM) was 0.7 g lower and residual yolk weight was 0.7 g higher than at the normal EST. This may be related to the shorter incubation duration at the high EST. Relative heart, lung, stomach, liver, spleen, and intestinal weights were lower in the high EST than in the normal EST group. YFBM did not differ between eggs with or without a hole, but residual yolk weight was slightly

lower in eggs with a hole (0.3 g). Relative lung weights were higher in eggs with than without a hole, whereas no effect on other organs was found. Plasma glucose, lactate, and uric acid concentrations did not differ between the EST or hole treatments. Hepatic glycogen was lower in the high EST (7.3 mg) than in the normal EST group (11.2 mg) at 12 h after emergence from the eggshell, and this effect may be related to the shorter hatching process at the high EST.

Hepatic glycogen levels were lower in eggs with a hole (8.6 mg) compared with eggs without a hole (10.0 mg), and this may be related to the longer period between external pipping and hatching in eggs with a hole.

In conclusion, the EST and hole treatment did not interact, and neither treatments affected embryonic survival. High EST negatively

affected hatchling development and seemed to change the carbohydrate metabolism in layer embryos. The effect of a hole in the air cell was limited.

*Full text: 2010 Poultry Science 89:1716-1723.*

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