

# Successful Hatching: At The Right Place In The Right Time

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**At the end of the incubation process, the embryo emerges from the eggshell. The embryo needs to move in the right position to make the hatching process successful. However, incubation temperature can negatively influence the position of the embryo and decrease hatchability and chick quality.**

The changes in the position of the embryo that are required for hatching start around day 18 of incubation. The embryo moves with its head to the blunt end of the egg and with its beak under the right wing close to the air cell. The pores in the eggshell are not able to provide the embryo with enough oxygen anymore at the end of the incubation process. As a consequence, CO<sub>2</sub> level increases in the air cell and trigger the embryo to penetrate the air cell with its beak and breath for the first time through its lungs. Around 12 to 24 hours after penetrating the air cell, the embryo punches a hole in the eggshell. The embryo creates a circle at the blunt end of the egg by its beak and rotates in the egg by moving its right wing. This

process takes 8 to 12 hours. The embryo is wet and exhausted after emerging and it takes a few hours before it is dry and active.

High incubation temperatures, that are common in practice due to air velocity and cooling capacity problems, can negatively influence the position of the embryo in the egg. Results of an experiment conducted by HatchTech showed that high eggshell temperatures (38.9°C vs 37.8 °C) after day 7 of incubation increased the number of malpositioned embryos. High eggshell temperatures increased the number of embryos with their head between the legs by 1.5% and with their head over their wing by 2.7%. The reason for this increase in

malpositions is not understood, but might be related to a reduced muscle activity of the embryo as heat stressed bird at hatch are weak as well.

Malpositioned embryos experience difficulties during the hatching process. Embryos with their head between their legs are in a normal position for stages of development prior to the 17th day of incubation. Embryos in this malposition are not able to pip the air cell and have a high chance to die. Embryos with their head over their wing are not able to rotate inside the egg, they can only make a large hole at the side of the shell. Some embryos may survive and manage to emerge, but they need a lot of energy to break the shell. These chicks are often weak and have red beaks or red hocks caused by the struggle to hatch. Embryos with skewed heads or crossed beaks can be seen as well due to the head over wing position. The beak of the embryo is not

protected by the wing in this malposition and pushed to the side of the eggshell, leading to a skewed head or eventually to a crossed beak.

When incubation temperatures are too high, especially at the second half of the incubation process, the number of malpositioned embryos and embryos with a skewed head or crossed beaks increase. As a result, embryo mortality increases as embryos are not able to hatch or chick quality reduces if they manage to hatch. These observations can be helpful to recognize incubation problems, when for example a break out is done.

Hatching is successful if embryos are in the right position at the right moment during the incubation process. Controlling your incubation temperature helps the embryo to get in the right position to successfully hatch and will increase hatchability and chick quality!