



The Influence of the Incubation Environment on the Hatch Window

PART 2



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Two types of machine incubation environments exist, multi-stage and single stage. In the case of multi-stage, an average temperature is managed during the period that the eggs remain in the machine. That being the case, the temperature inside the machine is going to be cold for the embryos that are starting their embryonic development and warm for the embryos that have more days of development and are ready to be transferred.

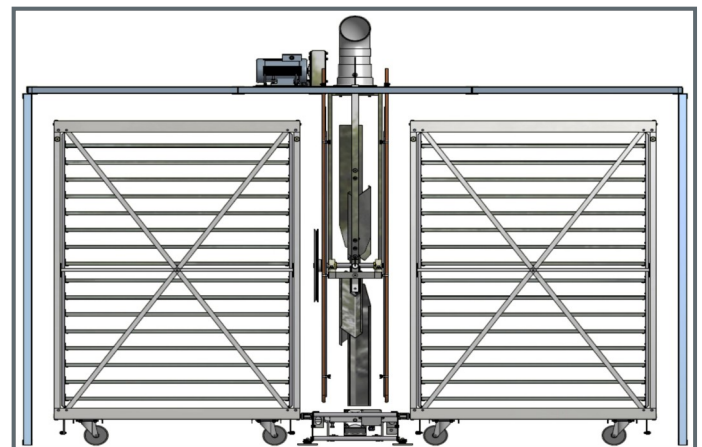
When using multi-stage machines, it's highly important to have a pre-warming room, where the temperature of the egg mass can rise before entering the setter. Otherwise, the machine will require greater use of the heater, which not only consumes more energy, but also creates a warm zone inside the machine. As a result, the hatch window will be wider.

On the other hand, with an adequate pre-warming system where there is good uniformity, the machine's heating will be used less and there will be better uniformity inside the machine, favoring a narrower hatch window.

The single stage machine, "all in, all out", allows the user to develop a stage program and accommodate the machine's environment to the requirements of each phase of embryonic evolution. A more balanced environment is the result of all the embryos having the same age. Added to this, pre-warming is taking place in the same setter, guaranteeing not only a more even environment, but also a simultaneous "awakening" of the embryos that have come from the cool room. At any rate, when heating is used, the



Picture 1: Side view of the heat exchange surface using heat resistance and hot water



Picture 2: Front view of machine with good uniformity in ventilation, provides oxygen, removes heat, humidity and CO₂ from the embryos.

surface of heat transmission is reduced. In the meantime, if the pre-warming process is done with hot water (picture 1) which runs through the coils, the heat exchange surface is greater, generating greater uniformity and a more even “awakening” of the embryos. The help of excellent ventilation in the machine (picture 2) promotes an optimal environment for embryonic development, because on one hand it provides oxygen to the embryos, and on the other hand it removes heat, humidity and CO₂.

The above will result in a narrower hatch window, resulting in the following benefits:

- Improved indicators of chick quality
- Lower percentage of chick waste
- Lower embryonic mortality
- Better navel closing (less predisposition to contamination)
- Greater uniformity so that all the chicks start to eat and drink water at the same time
- More weight gain, better feed conversion rate and therefore more meat production per square meter

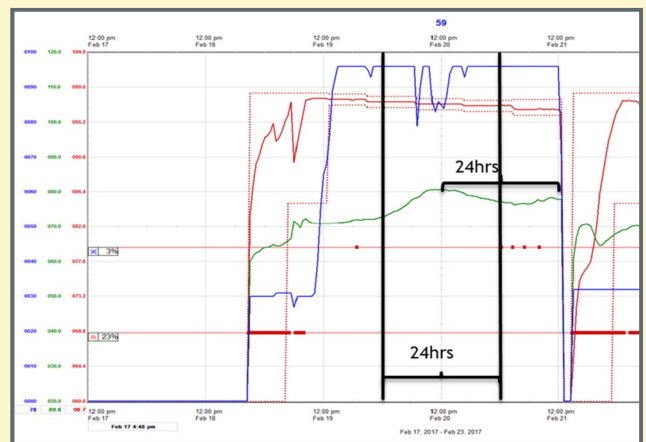
The hatch window is a tool that offers important information for evaluating the incubation process, which can be influenced by many factors. Currently, monitoring systems help obtain data in real time, and in a more practical manner. Correctly applying the earlier procedures to the incubation process helps have the embryos in a more similar state of development. Having and carrying out a good maintenance program influences the environment that the embryo perceives.

Single stage machines that pre-warm the eggs with the heating element plus hot water versus only the heating element, allow for a greater surface for

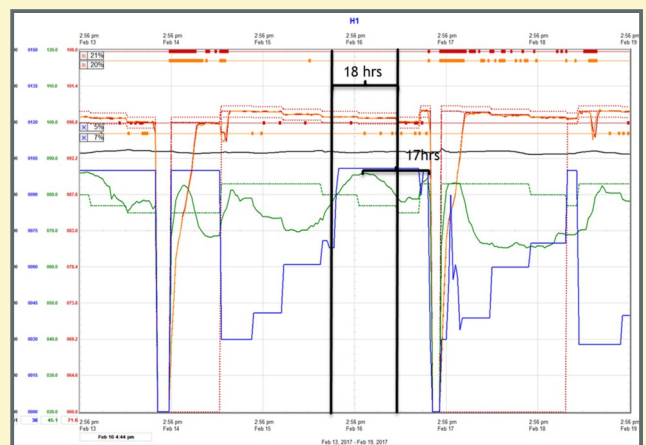
temperature exchange. This generates better consistency in the egg mass, less duration of the pre-warming and improved efficiency in terms of time and energy consumption.

Poor uniformity in the chicks can cause lower growth rate, increased feed conversion rate and mortality. In contrast, adequate uniformity helps exploit the genetic potential of the chicks, contributing to an improvement of productive parameters. The incubation process can help or affect chick handling on the grow-out farms as well as in the processing plants.

The graphs below illustrate the difference of the total duration of the hatch window between machines whose pre-warming has been done only with heating elements (graph A) and pre-warming with heating elements plus hot water (graph B).



Graph A:



Graph B:

