

Heating eggs before storage

Hatcheries do not have to accept a decrease in hatchability when storing eggs for a longer than optimal period of time. Under specific storage conditions, hatchability can be maintained or even increased.

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It is a common phenomenon in hatcheries that hatchability decreases with storage time, and much research has been undertaken on this point. The environment inside an egg changes with prolonged storage time, and is influenced by outside conditions as temperature and humidity. Eggs from some breeds can be stored for longer periods without any adverse effect on hatchability, probably due to a better interior egg or albumen quality. However, the decrease of hatchability with storage time is often taken for granted. Not many hatcheries are aware that they can prevent hatchability decreases – not in the hatchery, but at the place where eggs are laid: the breeder farm!

Heat treatment

A vital embryo in an optimal environment has the best possible chance to hatch a healthy chick. Canadian research by Dr Fasenko and co-workers in 2001 showed that turkey embryos need to be at a certain minimal stage of development at the moment of laying to be able to survive the storage period. Eggs from some breeds may be in a less advanced stage of development, and may benefit from a temporary heating treatment before the storage period. The heating treatment would bring the embryos into a further stage of development, which increases the chances for embryo survival and hatchability. It remained unclear how this treatment would affect embryo survival in long stored broiler breeder hatching eggs, and if this technique would work in practice. Therefore, a trial was conducted where broiler breeder hatching eggs were warmed one day after laying to incubation temperature for short periods of time, stored for 1 and 2 weeks and incubated thereafter. This technique was also applied in practice, where layer hatching eggs were warmed in incubators within 1-5 days after laying and stored for 7 to 24 days respectively.

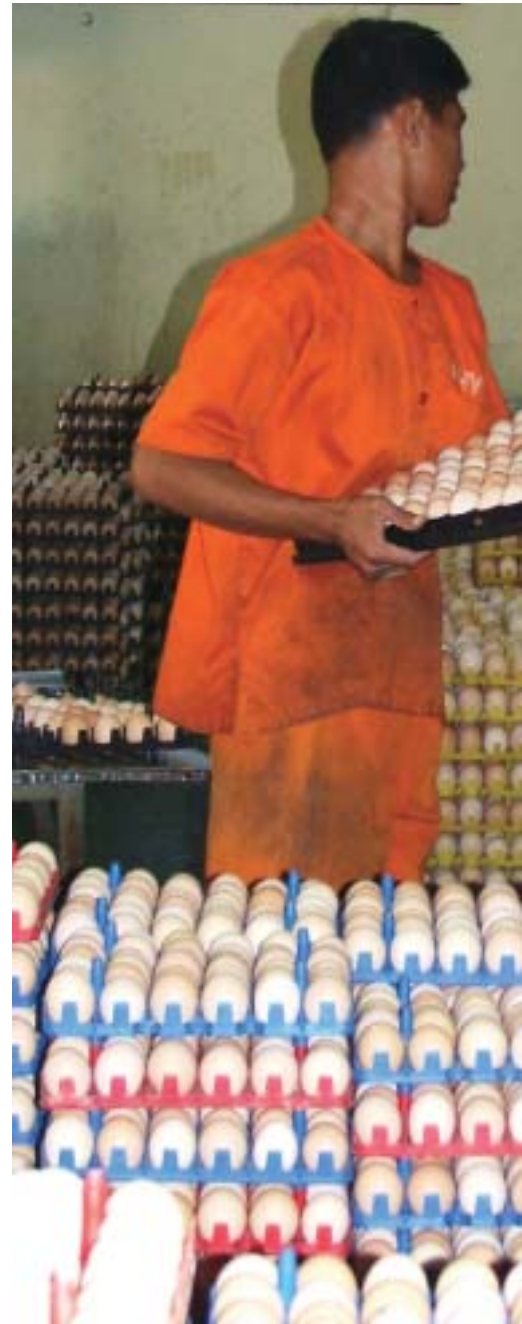
Small scale trial

From a 48-week-old Ross 508 flock, a total of 2,400 first grade hatching eggs were collected and transported to the hatching facilities at 'Het Spelderholt'. Eggs were placed in hatching trays (experimental unit was a half loaded hatching tray

containing 75 eggs) and stored at 18°C for one night. The next morning 1,800 eggs were placed in the setter room at 24°C for two hours, and placed in a pre-warmed setter running at 37.8°C and 55% relative humidity. The control group of 600 eggs remained in the storage room. Eggs were incubated for a period of 3, 6 or 9 hours, then removed from the incubator into the setter room. After two hours, the eggs were placed in the storage room again. Eggs were stored for 1 or 2 weeks, and then incubated to determine true fertility, embryonic mortality and hatchability. Hatchability of first grade chicks, as percentage of true fertile eggs in the different treatments is shown in *Figure 1*. After one week of storage, hatchability was highest in eggs that were warmed for three hours compared to the control group. Eggs warmed for nine hours had similar hatchability as in the control group. After two weeks of storage, the average hatchability decreased, but decreased least in eggs that were warmed for three or six hours. Again, eggs warmed for nine hours still showed decreased hatchability. This would suggest that embryo development in these eggs was pushed beyond the optimal stage of embryo development for storage. Warming hatching eggs at incubation temperature for 3-6 hrs before storage increased hatchability in eggs stored for two weeks, and positive effects of this technique can already be observed in eggs stored for only one week.

How about the real world

In different layer hatcheries, the technique of warming eggs before storage was applied for eggs that were stored for 7-24 days. Eggs were collected at the breeder farm, transported to the hatchery and placed in the storage room. In more than 50 trials, eggs were warmed within 2-5 days of storage at incubator temperature for 3-6 hrs and then returned to the storage room. The control eggs remained in the storage room. Eggs were used from different flocks, at different ages. The results are summarised in *Figure 2*. An increase in hatchability of 50% in warmed eggs that were stored for 21 days means for example that hatchability increased from 20% to 30% saleable female chicks.



Hatchability in eggs stored for two weeks increased 10%, meaning that hatchability in the control group was 35.0%, and in the experimental group 38.5% saleable female chicks. On average, the warming treatment increased hatchability most significantly in flocks of 50 weeks and older. Also, it appeared that the warming technique was most effective when eggs were warmed quickly to incubation temperature at the start of incubation: a firm 'wake-up call' was required for good results. The technique therefore worked best

increases hatchability



Figure 1 - Hatchability of first grade chicks as a percentage of true fertile broiler breeder hatching eggs

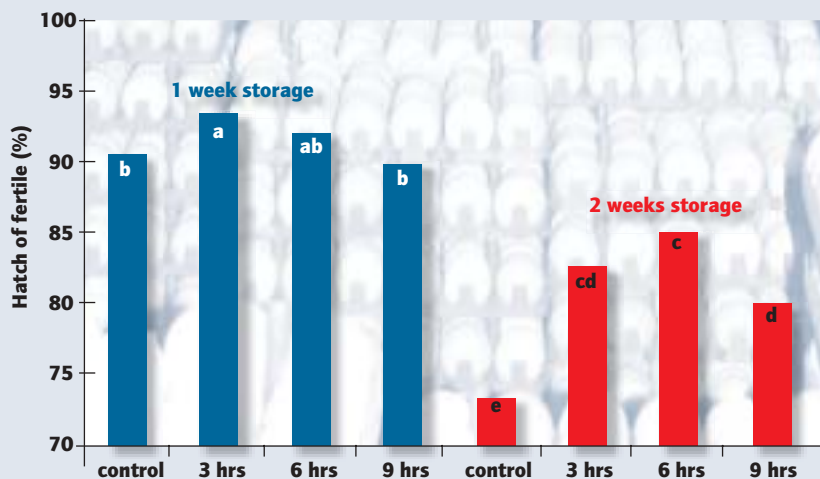
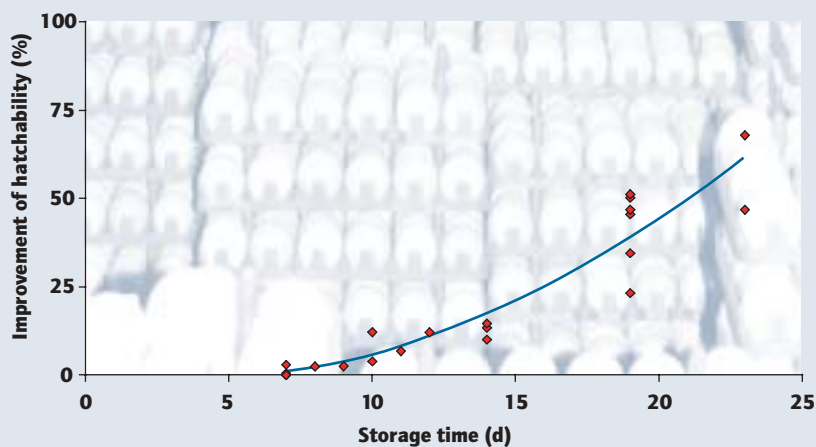


Figure 2 - Increase in hatchability of heat treated layer hatching eggs as a percentage of the control group



in single stage incubators, and less in some multi-stage incubators that were not able to warm up the eggs quickly enough.

What next?

The technique of warming hatching eggs before storage proved to be a very powerful tool to preserve embryo vitality, especially in eggs that need to be stored for longer times. However, in a commercial hatchery, sufficient storage capacity is often not available, and logistics and

planning are often so unpredictable that storage time is not known in advance. It would be better to install an incubator at the breeder farm, to immediately warm all hatching eggs collected during a day. Positive effects of the warming technique were observed for eggs that were warmed up the first day after collection, but also for eggs that were warmed up a few days later. For an average broiler breeder farm, an increase in hatchability of only 1% would quickly

recover the investment cost for an incubator. A large hatchery could also build a pre-storage heating room where all hatching eggs are warmed before storage when they arrive at the hatchery. The revenue for an integrated company will be even higher, because every technique that increases hatchability, also increases first week survival at the farm and further productivity. ■