

Why it is beneficial to pre-warm multistage incubator egg sets

Multistage incubators are dependent on the efficient transfer of metabolic heat from the embryos right at the end of incubation to those at the very start of the incubation process.

In a multistage incubator, there is always availability of embryonic heat. Eggs are set and transferred twice on a weekly basis.

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It is important that similar egg numbers and age composition make up each of the egg sets inside the incubator cabinet. Also, that each of these egg sets is evenly distributed within the space available in the incubator cabinet.

The traditional method utilised in many broiler hatcheries to raise the internal temperature of the egg mass prior to setting in multistage incubators, has been to 'acclimatise' these eggs for a period of 8-10 hours in setter trolleys placed in the setter room hallway. This method for accomplishing this goal lacks precise control of ambient conditions and takes place over a long period of time. Thus, it leads to a non-uniform rise in internal egg temperature and a long, protracted hatch window.

Finally, choosing to acclimatise egg sets in setter hall corridors increases the risk of moisture condensation on eggshells. Thus, the risk of exploders in the incubator cabinet increases.

The internal egg temperature distribution of 'acclimatised' egg sets lacks the needed uniformity that allow us to start most of the embryos at a similar internal temperature, once placed inside the setter cabinet to start the incubation process.

True pre-warming

True pre-warming/heating of the egg mass, when carried out under a controlled set of ambient conditions accompanied by forced air ventilation and heat sources is a much better proposition. It allows for the entire egg mass to be placed in idle/empty multistage incubators to reach a quick and uniform increase of internal egg temperature to a range of about 28-30°C, before placing these eggs in a multistage incubator.

It is safe to start pre-heating of multistage egg sets before starting the incubation process, for both block setting and fixed rack units, and is a positive step for achieving uniform hatch windows of normal duration.



'Acclimatising' multistage egg sets in incubator hallways is not the way to go. This process takes too long. The rise of internal egg temperature is not as uniform as required, which results in long hatch windows.

As we all know, pre-heating is routinely done in single stage incubators during the pre-warming step of the incubator's profile. So, our aim in the multistage hatchery should be to achieve a tidy, uniform, rise of internal egg temperature in the great majority of 'reactivated' embryos.

Without the benefit of pre-heating, multistage egg sets do exhibit greater eggshell temperature variation even after several hours of incubation inside the multistage setter cabinet. Further, pre-warming

is also beneficial in reducing early embryo mortality, especially before and during the blood ring stage at three days into the incubation process.

A good rule of thumb is to provide 4,000 watts of heating capacity for each 30,000-32,000 eggs to be pre-warmed during a period of 5-6 hours.

There are several types of pre-heating chambers available in the industry. Some of these cabinets combine both hot water – 80°C – inside copper coil assemblies and,

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Using empty multistage incubators for pre-warming gives good results in terms of quick and uniform internal egg temperature increase.



Farm trolleys can be used to pre-warm eggs inside idle/empty, multistage incubators.





Accurate temperature sensing devices can measure the circulating air temperature.



A room fitted with an overhead fan and heating elements can also be a good option to utilise as a pre-warming chamber.

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electric heat generated by heating elements. All of this allows for a quicker and more energy efficient pre-heating procedure.

Table 1 illustrates a pre-heating schedule that has worked quite well for eggs that have been in storage for 5-7 days at temperatures in a range of 18-20°C. Once the circulating air temperature reaches the desired goal range, 37.8-38°C, the internal egg temperature should be in a range of 28-30°C. We should be able to observe when the multistage setter is loaded with eggs preheated in such a way; one should not be able to detect any measurable temperature drop inside the setter cabinet. The pre-heating chamber or incubator should be closed to the

Egg quantity	Heating (watts)	Capacity	Air movement	Duration
100,000	6,000	(6) Fan motors @ 1,750 RPMs	5.5-6.0 hours	Air temperature in the pre-warm chamber/room @ 100°C or 37.8°F

Table 1. A preheating schedule for eggs stored for 5-7 days at 18-20°C.

outside. There is no need to implement egg turning or to add moisture in the pre-heating chamber/cabinet.

Only two things are required, a heat source and a forced air flow. The easiest way to successfully implement the procedure is to use idle multistage setter capacity as pre-heating cabinets. The difficulty arises when there is no idle setting capacity in the hatchery.

There are several options of pre-heating cabinets available in adjustable, custom made, egg capacities, to suit the specific needs of any hatchery operation.

Remember, the key concept here is: pre-heating of eggs prior to setting must be done in a quick and uniform fashion. Acclimatising of multistage egg sets in setter hall corridors takes too long and the internal egg temperature rise achieved this way is not nearly as uniform as is required for good results.

will achieve a quick and uniform internal temperature increment to about 28-30°C/82-86°F for the entire egg mass.

- Once viable blastoderms/embryos are reactivated and their internal temperature is at the desirable range, the regular incubating multistage setters will not suffer any noticeable disruption in operational setter cabinet temperature, for example, significant drops to about 95.8°F from a normal 99.4-99.5°F, operational temperature set point.

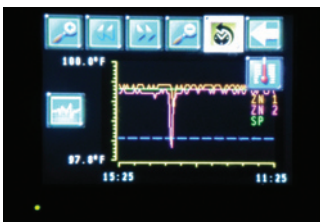
- Main objective: To approximate multistage hatchability and chick quality results to those observed in single stage incubation systems.
- Strategy: Idle multistage setter capacity used to preheat multistage egg sets. Or, used pre-heating cabinets for the same purpose.

- The pre-heating protocol should last 5-6 hours at a temperature of 99.5-100°F inside an empty multistage incubator unit.

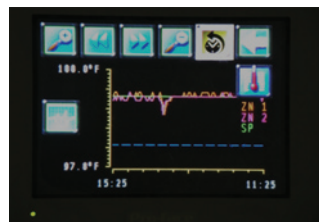
- No egg turning or setter cabinet humidification is required during pre-heating.

- The damper opening on the unit should be set to 'Manual On' with a fixed damper opening set point of 5%.

Temperature drop when 'acclimatising' egg loads inside incubator room hallways.



Temperature drop after proper pre-warming protocol is applied.



Several options available for pre-warming cabinets, custom made to fit almost any egg setting capacity.



Conclusions

- Pre-heating multistage egg sets will get cell division in the great majority of viable embryos re-started quickly and uniformly.
- Pre-heating multistage egg sets

Pre-warming cabinets should be fitted with ample heating capacity to achieve a quick and uniform rise in internal egg temperature prior to setting the eggs in a standard multistage incubator.

