

4th lecture

HATCHERY MANAGEMENT

Hatching process (Incubator and hatchery period)

There are **FIVE** constituents of hatching process:

1- Temperature. 2- Humidity. 3- Ventilation. 4- Egg turning. 5- Sanitation.

1. HATCHING TEMPERATURE:

Temperature is generated by electric heaters, and the temperature is distributed throughout the incubators and hatcheries by huge fans. The incubators and hatcheries are provided by thermostat which controls the electricity of the incubator to provide constant temperature degree during hatching period up to 37.8 °C in incubator and (37 °C) in hatcher.

Temperature fluctuations for short periods usually do not severely affect hatchability or chick quality **because the temperature inside the egg changes more slowly than the air inside the incubator.**

2. HUMIDITY:

The humidity must be in incubators up to 55-65% and in hatcheries 80%. The source of humidity in incubators and hatcheries is pans filled with water placed in the incubator or hatchery.

The high temperature and the presence of a continuous stream of air caused the evaporation of water in pans quickly, so the humidity is determined by the required capacity of the water surface that exposed to evaporation. The Hatchery needs humidity more than the incubators.

During incubation, water vapor is lost from the egg through the pores of the shell.

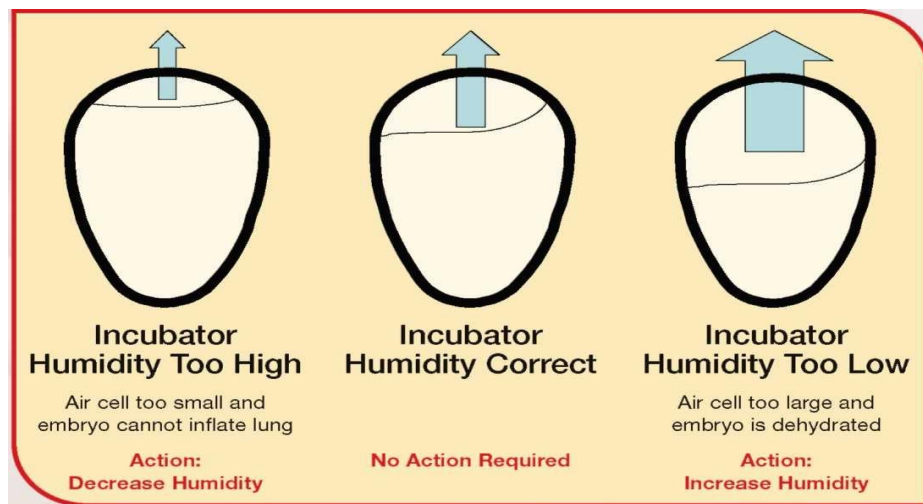
The rate of egg moisture that lost depends on:

- 1- The number and size of the pores (the gas exchange of the shell)
- 2- The humidity in the air around the egg.

For best hatchability, an egg must lose 12% of its weight by 18 days of incubation. So we must be provided external humidity to save the components of the egg.

We can know the loss of humidity or liquid eggs by **Candling** of the air cell of the egg at different ages of the embryos, if the air cell is small; it shows an increase in humidity in the atmosphere of the incubator and must adjust the humidity in order to ensure normal growth of the embryos.

The figure shows different effects of humidity on the egg



Optimum weight loss of eggs during incubation Weight Loss 12%

3- VENTILATION:

Ventilation is important in incubators and hatcheries because of the need of oxygen for respiration (O₂ intake and CO₂ is given off) of developing embryos from egg setting until chick removal from the incubator.

The needed oxygen is small during the first few days compared to the later stages of development. Egg shells contain three to six thousand small holes, called "pores" through which oxygen passes from the air to the developing embryo and through which (CO₂) passes from the embryo to the outside air. The embryo's lungs are not developed during early embryonic development to the point that they can respiration by breathing.

Respiration, therefore, is provided during the first three to five days by the blood vessels (plexus) surrounding the yolk that growing from the embryo. To reach this plexus the gaseous exchange must travel through the egg pores and the albumen (white egg) to

reach the blood vessels, which lies on the surface of the egg yolk. After the 4th or 5th day of development another structure, called the "allantois" grows from the embryo, extends through the albumen, and position itself just underneath the egg shell.

4. EGG TURNING:

Egg turning should be performed in incubators but not needed in hatcheries, Egg turning is the main factor that helps the embryonic development because it prevents adhesion the embryo to the shell, especially in the early days where the embryo is on the upper side of the egg yolk. So if the egg is not turned, the yolk tends to float upward toward the shell because of little specific gravity of the yolk, and pushes the embryo nearer to the shell and that lead to death.

It must turn the eggs at an angle of 90° degree which 45 ° angle move to the downside then moves 45 ° to Top side.

Turning eggs must be in two sides because:

Turning from one side is very harmful to the egg and lead to embryo death as a result of high yolk sac laceration and damage in Chorion, Allantois and chalazae, and explosions in some of the blood vessels.

Normal status of the eggs are the wide up and pointed down, because the wide side contains air sac, which gases exchange through it. When we put the eggs in different position (wide down and pointed up) this will reduce the ventilation, and lead to embryo death.

In the last days of hatching, the embryo had been completed growth and filled most of the inner egg size, therefore, turning is harmful in this case the embryo may expose to shocks or external vibrations, therefore turning will continue during incubation, and when transferred to the hatcheries we must stop turning and leave the embryos for hatching, and this is why hatcheries are not provided with turning device.

5- SANITATION:

1- A sanitation program should be devised to control contamination, and the results should be checked regularly using standard bacteriological monitoring procedures (agar plates and swabs).

2- Sources of contamination other than infected eggs and chick fluff are air, people (both workers and visitors), animals such as rats and mice, wild birds and insects, and equipment such as boxes, trays and buggies.

3- Ensure all workers and visitors wear suitable protective clothing. It is good practice to use different colour uniforms according to location (clean or dirty part of the hatchery) or task. This helps to identify incorrect movement of workers and hence possible cross-contamination.

4- Before using any disinfectant, it is important to remove all organic matter. For example, hatcheries should be washed out completely with water and detergent before disinfection.

5- Obtain product data sheets from the manufacturers and follow their guidelines carefully. Safety aspects are covered by various codes of practices and safety legislation. It is the responsibility of the hatchery manager to familiarize himself with these matters, and ensure that all workers understand and follow them. Specific training of staff in the correct use of disinfectants is important.

TYPES OF SANITATION:

1- Fumigation

2- Spray Application

3- UV Light

4- Egg Washing