

Incubation and hatcheries management

It is a process in which a microscopic germ cell is being transformed into a chick capable of moving, feeding and drinking etc.

types of incubation:-

1-Natural incubation (BROODY HEN)

2-Artificial incubation (INCUBATORS)



The **natural** or **artificial** process necessary for the embryonic development inside the egg resulting in the production of visible chicks coming out of the fertile egg at the end of incubation period.

The Incubation Period: The embryo develops inside the egg for 21 days (the incubation period), until a chick pecks its way out of its eggshell and is hatched.

Length of Incubation Periods

Incubation periods vary for different species of birds. In general, the larger the egg the longer the incubation period. However, there are individual differences.

The incubation period may also vary with the temperature and humidity within the incubator. Average incubation periods for some species are:

Species	Egg size (weight)	Days requires to hatch
Chicken	55-58 gram	21 days
Ducks	80-85 gram	28 days
Turkey	80-85 gram	28 days
pigeon	17-18 gram	18 days
canary	3-4 gram	13-14 days
quail	10-12 gram	16-18 days
Gees	200 gram	28-32days
swan	320 gram	35-40 days
ostrich	1400 gram	42 days

Natural incubation

It is the process of obtaining chicks by keeping fertile eggs under the broody hen (when it is be effected by prolactin hormone).

The factors that effected on the broodiness

1-Tactile stimulation of the hen's breast area by eggs can stimulation broodiness. 2-Warmth. 3-Darkness.

Characteristics of the broody hen

- 1- Clucking
- 2-Loss of appetite
- 3-Decrease of body temperature
- 4-Cessation of eggs production
- 5-Change color of wattles and comb (red to yellow)

6-Ruffled feathers and losing feathers from under hen's wing and legs.

7-Loss of body weight

8-Stays away from the rest of the flock

9-Make disinclined to dark and quite places

There are several advantages to natural incubation

1)The hen does most of the work for you. You don't have to worry about turning the eggs or keeping the temperature stable.

2)A broody hen will usually hatch out a higher percentage of eggs than you will get in an incubator.

3)Once the chicks hatch, she will do much of the work of caring for them.

There are also several problems with natural incubation:

1)With natural incubation is that you cannot tell when a hen will go broody.

2)You can't guarantee that she will be a good mother.

3)You can only fit so many eggs under one hen, so you might not be able to hatch out as many as you want.

4)Sometimes a mother hen will "go wild" when she hatches out chicks, and it will be much harder to tame them.

Artificial incubation

1)Artificial incubation goes back thousands of years when the ancient Chinese and Egyptians operated large hatcheries that were quite successful.

2)The development of the poultry industry over the years is absolutely remarkable and the evolution of artificial incubation.

3)Presently large commercial poultry incubators fit tens of thousands of eggs at a time.

Use of a machine which warms, turns, humidifies bird eggs to incubate and eventually hatch them. An apparatus for maintaining optimal

conditions (temperature, humidity, etc.) for growth and development, and for hatching eggs.

Types of incubators

We can divided the types of incubators as:

1-Size

*Small= 100-500 hen eggs

*Large= 10000-50000 hen eggs

2-Heat source

*Heater

*Pipe hot air

*Pipe hot water

3-Hatchery management

*Manually

*Semi -automatic

*full -automatic

4-Ventilation system

*Still -air incubators:

Which have no fans, so the air is allowed to stratify.

Difficult to maintain proper temperature and humidity.

*Forced -air incubators:

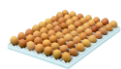
which have a built in fan to circulate the air, moving air incubators operate 3°F cooler than still -air incubators.

Completely atomized Accurate maintenance of temperature and humidity, capacity more than 100,000 eggs.

Parts of incubator

Setter: This is the part where eggs are set for first 18 days. It has multiple trays for setting of eggs. Eggs are set with broader shape up.

Hatcher: Eggs remain in hatcher for last three days. (19-21) days. Eggs lie flat in hatcher.



Advantages of artificial incubation

- 1) With artificial incubation, you can hatch eggs whenever you want, you don't have to wait for a hen to go broody.
- 2) Freed the hen from broodiness.
- 3) Produce eggs a full-time during the year.
- 4) We can hatch out as many eggs as we want, and we have got chicks in the same age and the same time.
- 5) Take advantage of the hens for egg production rather than their use in eggs incubation.
- 6) Can be control of the disease which transmitted from the hens to the hatching chicks.

Disadvantages to artificial incubation

- 1) You have to worry about the temperature, ventilation, and humidity.
- 2) If you do not have an automatic turner, you will have to turn the eggs at least three times a day at evenly spaced intervals.
- 3) Incubators usually hatch out a lower percentage of eggs than broody hens do.

Factors of incubation

Four factors are of major importance in incubating eggs artificially :

1-Temperature 2-Humidity 3-Ventilation 4-Turning

Temperature

Temperature of the incubator (setter) should be 99.5-100 °F .

Low temperature than optimum degree for few hours not effected in hatchability ,temperature of the hatcher should be 99 °F.

Low temperature than optimum degree for few hours make a big problem in hatchability.

*High temperature lead to:

- 1-Early hatching chicks
- 2-Rough navel
- 3-Chick was dehydrated and lost moisture
- 4-Low hatchability

*Low temperature lead to:

1-Late hatching chicks

2-Suffocation of the chick embryos

3-Low hatchability

Humidity

*Eggs lose water during the incubation period, and the rate of loss depends on the relative humidity maintained within the hatching chamber.

*Relative humidity is the percentage of moisture related with the water content in the air.

*Relative humidity in the incubator (setter) may range from 60-65%.

Relative humidity in the hatcher may range from 70-75%.

Role of the humidity in the hatching process

The humidity play as a lubricant, thus it is

1)Prevent chick to stick to the egg shall

2)Facilitated chicks to move out the egg shall

3)Allows free movement of the head

4)Prevent crammed beak in the eggshell

Insufficient humidity causes

*The air cell to be large at the time of hatch

*The contents of the egg be too viscous for the chick to turn

*The membranes to be too tough to break

*The navel to not close properly.

*The dehydrated chick was hatched.

*Chick to stick to the egg shall and be crippled at hatching time

Excess humidity will causes

* Too little water to evaporate from the egg.

*The air cell to be too small for the chick to reach during the hatching process.

*The chick to drown or be too swollen with water to turn in the egg.

*The yolk sac to be too large for the navel to close completely.

*Production of the soft chicks.

Ventilation

*Ventilation is incoming of fresh air and removal of foul gases.

*The chick embryo uses oxygen and produces carbon dioxide.

*The best hatching results are obtained with normal atmospheric air, which usually contains 20-21% oxygen. Decrease 1% of O₂ will cause a decrease in hatchability at 5%.

*Carbon dioxide should be less than 0.5%. Higher levels of CO₂ will cause a decrease in hatchability.

Turning of the egg

*Turning should be done in opposite directions up to 40-45° to each side.

*6-8 times daily are sufficient but in modern incubators trays are turned after every hour.

*Turning of egg avoid sticking of embryo to the egg shell membranes and it provides uniform temperature to all sides of the egg in the incubator.

*Most large artificial incubators mechanically turn the eggs through a 90° arc up to four times each hour.

*Important turning the eggs to avoid adhesive the embryo with egg shell and prevent blood vessels injury.

*Avoid turning the eggs in the first three days and stop turning the eggs for last three days of the incubation cycle.

*The turning must be gently, especially in the first few days of incubation when the blood vessels are being organized.

Setup of hatching machine

1. Clean all equipment thoroughly after each hatch.

2. Using clean water and some disinfectants which are more effective in the presence of organic matter than others.

3. Fumigation is another method of disinfecting and is helpful when the cleaning is poor.

fumigate 100 ft³ of incubator size should be used (17.5) gm of potassium permanganate react with 35 ml of formalin (conc.40%) to liberate formaldehyde gases.

4. Eggs transportation to hatchery needs to storage in especially room with temperature at 17-18°C and humidity 75% up to 7 days.

Services of hatchery

- 1.Vaccination (sprayed or injected) using hand or automatic vaccinators.
- 2.Dubbing(cutting of combs and wattles to prevent damage from fighting)
- 3.Dewing(cutting tips of wing to prevent jumping the fence of flying)
- 4.Debeaking by Debeaker machine(removal of part of the bird's upper or lower beak using electrically heated blades or infrared lasers).
- 5.Detoing
- 6.Sexing
 - *Vent sexing
 - *Color sexing
 - *Feather sexing



