

Lecture 9

EGG FORMATION IN FEMALE REPRODUCTIVE TRACT

Structure and egg composition

The egg is an important product derived from keeping poultry. It is primarily storage of nutrients for the chick embryo. It weighs about 58g in the temperate but lowers in the tropics. When an egg weighs between 60-70g is regarded as being heavy. Egg shell is about 0.33mm thick with over 7500 pores through which micro- organisms may enter the egg to cause spoilage.

The edible portion of egg is enveloped by the inner egg membrane which consist of the yolk and albumen (Albumen is white when cooked and transparent when raw). Yolk is spherical in shape and bright yellow when raw or cooked. Floating on top of the yolk is a white spot known as BLASTODISC (which is the only living portion of the egg capable of developing into chick if the egg is fertilized before it is laid.

The formation of egg has both structural and hormonal influences. The egg is synthesized partly in the ovary and oviduct; although yolk is formed in the ovary the proteins it contains are synthesized in various parts of the body principally in the blood to the ovary.

The yolk is released from the ovary and taken up by the infundibulum. The fertilization of the egg involving the fusion of the sperm with germinal disc or nucleus of the egg occurs in this part of the oviduct before the other components of the egg are added. Fertilisation occurs only as a sequel to mating and the complete formation of the egg is independent of the fertilization process. The egg spends 15 minutes in the infundibulum. It then moves to the magnum where it spends 3hours, and part of the albumen is formed. The membranes are formed in the Isthmus for about 1hr 15minutes. If the Isthmus is abnormal it may distort the egg shape.

The formation of the albumen continues in the uterus or shell gland for 19 – 20 hours, where the shell is also formed and normal egg shape assumed. The shell is formed slowly during the first half of the period spent in the uterus and rapidly during the remaining half. Minerals, mainly calcium and phosphorus utilized for the formation of the shell.

Care and Incubation of Hatching Eggs

1. Selection of Hatching Eggs

- Select eggs from breeders that are
 - (1) Well developed, mature and healthy;
 - (2) Compatible with their mates and produce a high percentage of fertile eggs;

(3) Not disturbed much during the mating season;

(4) Fed a complete breeder diet; and

(5) Not directly related [brother, sister, mother, father, etc.].

- Avoid excessively large or small eggs. Large eggs hatch poorly and small eggs produce small chicks.
- Avoid eggs with cracked or thin shells. These eggs have difficulty retaining moisture needed for proper chick development. Penetration of disease organisms increase in cracked eggs.
- Do not incubate eggs that are excessively misshapen.
- Keep only clean eggs for hatching. Do not wash dirty eggs or wipe eggs clean with a damp cloth. This removes the egg's protective coating and exposes it to entry of disease organisms. The washing and rubbing action also serves to force disease organisms through the pores of the shell.

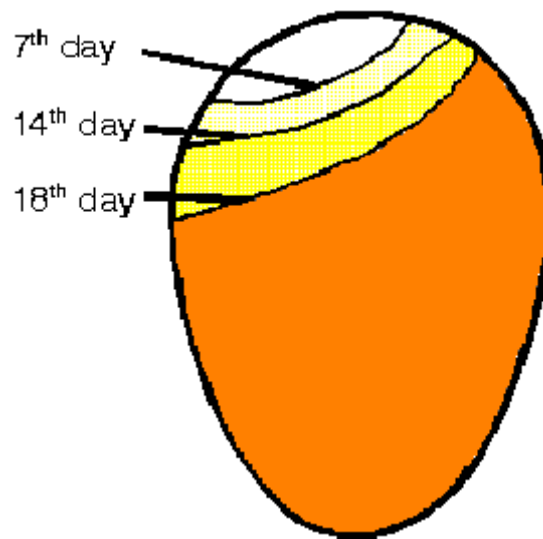
2. Egg Care and Storage

- Collect eggs at least three times daily. When daily high temperatures exceed 85 degrees F. increase egg collection to five times daily. Collect two or three times in the morning and one or two times in the afternoon.
- Slightly soiled eggs can be used for hatching purposes without causing hatching problems, but dirty eggs should not be saved. Do not wash dirty eggs.
- Store eggs in a cool-humid storage area. Ideal storage conditions include a 55 degree F. temperature and 75% relative humidity. Store the eggs with the small end pointed downward.
- Alter egg position periodically if not incubating within 4-6 days. Turn the eggs to a new position once daily until placing in the incubator.
- Hatchability holds reasonably well up to seven days, but declines rapidly afterward. Therefore, do not store eggs more than 7 days before incubating. After 3 weeks of storage, hatchability drops to almost zero. Plan ahead and have a regular hatching schedule to avoid storage problems and reduced hatches.
- Allow cool eggs to warm slowly to room temperature before placing in the incubator. Abrupt warming from 55 degrees to 100 degrees causes moisture condensation on the egg shell that leads to disease and reduced hatches.

3. Incubating Conditions

Poor results are most commonly produced with improper control of temperature and/or humidity.

- Poor results also occur from improper ventilation, egg turning and sanitation of the machines or eggs.
- Maintain a still-air incubator at 102 degrees F. to compensate for the temperature layering within the incubator.
- If the eggs are positioned in a vertical position, elevate the thermometer bulb to a point about ¼- to ½-inch below the top of the egg. The temperature is measured at the level where the embryos develop (at the top of the egg). Do not allow the thermometer's bulb to touch the eggs or incubator. Incorrect readings will result.
- Humidity is carefully controlled to prevent unnecessary loss of egg moisture. The relative humidity in the incubator between setting and three days prior to hatching should remain at 58-60% or 84-86 degree F., wet-bulb. When hatching, the humidity is increased to 65% relative humidity or more.



Size of air cell on 7th, 14th and 18th day of incubation

EGG ABNORMALITY NOT SUITABLE FOR THE HATCHERY

TOO LARGE AND TOO SMALL EGGS- Leads to internal egg deformities

Double Yolk Eggs:

Double Yolk eggs appear when ovulation occurs too rapidly, or when one yolk somehow gets "lost" and is joined by the next yolk. Double yolkers may be by a pullet whose productive cycle is not yet well synchronized. They're occasionally laid by a heavy-breed hen, often as an inherited trait.

No Yolk:

No-yolk eggs are called "dwarf", "wind" [or, more commonly, "fart"] eggs. Such an egg is most often a pullet's first effort, produced before her laying mechanism is fully geared up. In a mature hen, a wind egg is unlikely, but can occur if a bit of reproductive tissue breaks away, stimulating the egg producing glands to treat it like a yolk and wrap it in albumen, membranes and a shell as it travels through the egg tube.

More Than Two Yolks:

Occasionally, an egg contains more than two yolks. Record breaking eggs are likely to be multiple yolk eggs. The Guinness Book of Records lists the world's largest [chicken] egg (with a diameter of 9 inches/22.5 cm) as having five yolks and the heaviest egg (1 pound/0.45 kg) as having a double yolk and a double shell.

No Shell

Every once in a while we get an egg with a membrane, but without a shell. It feels like a water balloon. This is another accident of the hen's reproductive system and is not necessarily an indication of any problem