

# Qualities of a fertile egg



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**The qualities of a fertile egg start from the moment we incubate the eggs that will then go on to hatch the chicks that will produce these eggs.**



From the way temperatures in the incubators, to the way we rear the pullets, and how we feed the hens ***plays a major role in ensuring we are successful in producing fertile eggs.*** Let's seed things up a little and talk more about the hen.

**A hen must have proper nutrition in order to produce a fertile eggs.** They need the proper amounts of protein, minerals, lipids, and carbohydrates in order to produce an egg.

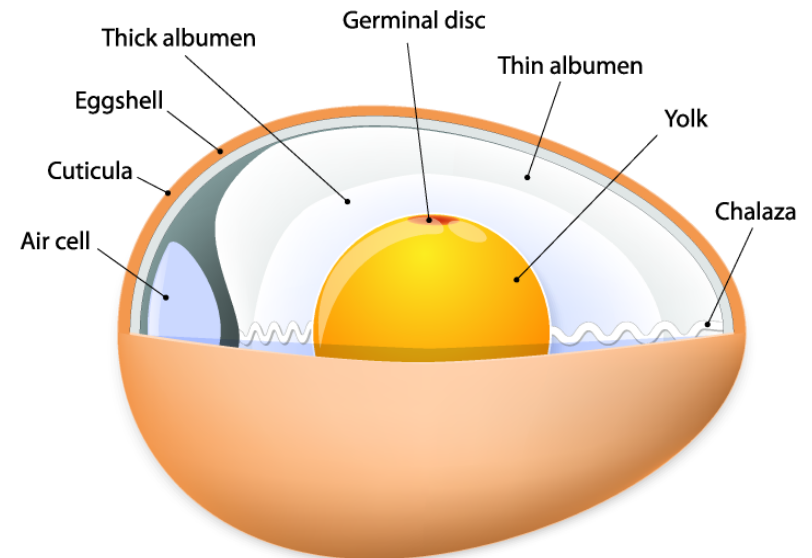
Physiologically a hens first priority is to maintain her health. Then, if she has proper nutrition she can then grow. And finally, if she has enough nutrition to satisfy her physiological needs to maintain her health and grow she can then reproduce and create an egg.

Therefore, **reproduction is a luxury. Without proper nutrition reproducing and producing eggs will be the first things that she will 'give-up'.** A hen puts all the nutrients in to the egg for the developing embryo. The only thing that she does not contribute is the oxygen.

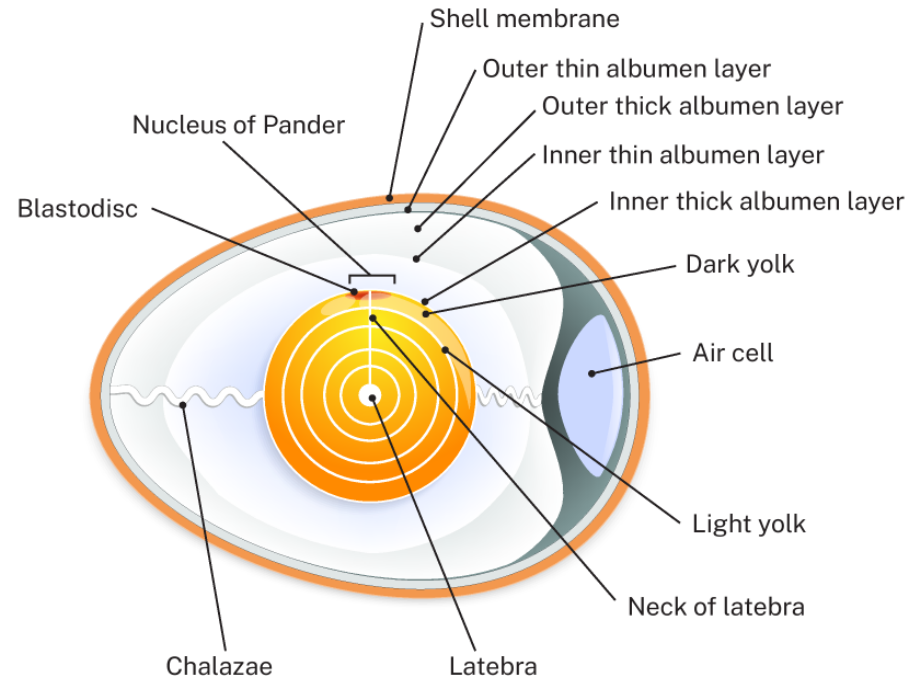
Ensuring that you have good communication with your nutritionist to relay information such as shell quality, yolk and albumin quality, as well as overall hen health is very important to produce fertile eggs.

There are **five key parts** of making an egg:

- ▶ Calcium carbonate crystals
- ▶ Fat
- ▶ Protein
- ▶ Minerals
- ▶ Carbohydrates



That is the general make-up of the egg and all of that comes from a hen and her diet. *The egg is much more complicated than just those five parts.* There is the blastodisc, air cell, chalazae, inner thick albumin, inner thin albumin, outer thick albumin, etc, etc. **Each of these pieces play a critical role in protecting the developing embryo** as well as ensuring proper growth and nutrition.

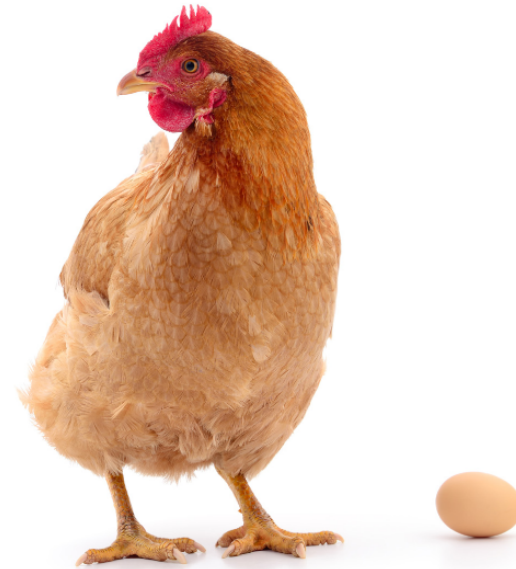


**The blastodisc or germinal disc** is where the genetic material is housed in the egg. It appears as a small white dot on the yolk of the egg. This is where the spermatozoa will fuse in the infundibulum of the hens reproductive tract to create a fertile egg.



A hen makes an egg on average every 24 to 26 hours.

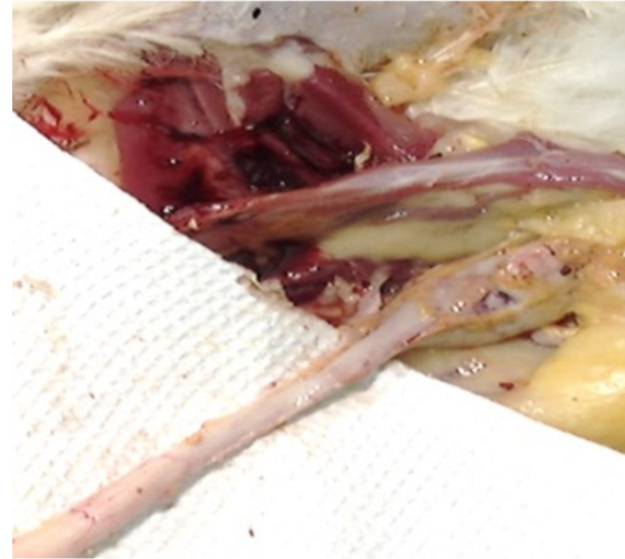
The egg begins its journey of being created at the ovary as a large yellow follicle. It will rupture at the stigma and fall into the infundibulum to become fertilized. **The ovum will only remain in this portion of the reproductive tract for 15-30 minutes.**



After fertilization in the infundibulum the ovum will go onto the **magnum portion of the hens reproductive tract**. This is *the largest part of the hens reproductive system*. It is approximately 13 inches long and **the ovum remains here for 2-3 hours**. It is moved along the reproductive tract through peristaltic motion. This is where the albumin is formed for the egg. The chalaza will also be made here. **This helps in supporting the yolk to keep it from breaking inside the shell.**

The next stop for the ovum is in the **isthmus**. This is where the shell membranes are formed.

**When these membranes separate this creates the air cell for the chick to take its first breath in.** It remains in the isthmus for 1-2 hours. **The shell gland or the uterus is where the ovum remains for the longest period of time** (approx. 20 hrs). This is where the eggshell calcification occurs. **The cuticle is the last thing that is applied.** This acts as a lubricant during lay, acts as an antimicrobial, and reduces moisture and gas loss.

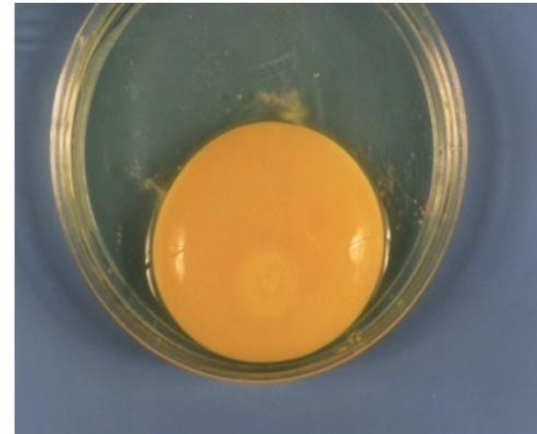


The embryo needs the shell to be properly developed for so they have access to oxygen, the ability to eliminate carbon dioxide, and the ability to eliminate metabolic water. A misshapen egg can have severe impacts on chick quality and development.



**When determining a fertile egg during a breakout analysis the first place you examine is the blastoderm or germinal disc. This is where all the genetic information is house and where cell division will occur to begin growing the embryo.**

If the germinal disc is a solid white dot upon examination it is infertile. If it is a white ring it is fertile and in what is referred to as stage X.



This is known as the *physiological zero*. In order to maintain physiological zero you need to store fertile eggs in a cooler between 18-21 degrees Celsius. Try not to store them longer than a week at a time. **The longer you store the egg the more time the cells have to degrade** and the more difficult it becomes to restart cell division during incubation. It also helps to store them with the small ends down and maintain a humidity in the room of 75%.



- ▶ In order for us to achieve and maintain good fertile eggs we must maintain proper male to female ratios in our breeder facilities.
- ▶ If we do not have successful and complete mating's we will not have fertile eggs.
- ▶ For every 10 females you should have 1 male.
- ▶ You must monitor your feed quality and nutrition as well to maintain good fertility.
- ▶ Egg shell quality and yolk quality is a good indicator of a feed change.
- ▶ Maintain proper cooler temps, egg pick up schedules, and egg packs.
- ▶ One of the final and most important things is investigating embryonic death to ensure that you have fertile or infertile eggs.

# Thank you!

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