

## **Early Lay Mortality in Broiler Breeders – Causes, Costs and Solutions**

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The hen house is prepared. Everything appears to be in order - roosters and pullets look good. The feed, water, lighting and ventilation set. The flock should do well. By Week 25, the egg production rapidly increases and the feed amounts increase accordingly. The hen mortality on Week 26 “creeps” over 0.4% - not alarming but it continues to increase daily. By the end of Week 27, the weekly hen mortality doubled and the next week it peaks at 1.6% - the roosters remain unaffected. By Week 32 the hen mortality declines to normal levels as rapidly as it had increased. This scene of early lay hen mortality is not uncommon to find in the industry today.

As a whole, the US poultry industry does a good job managing the development and productivity of today’s yielding broiler breeder but let’s admit we have all had those occasional pullet flocks that were “on target” yet did not perform well in lay. These exceptions can confound us, raising doubt as to what feed and body weight program is best for a given situation. Statements like “managing broiler breeders is more art than science” ring true to us – however raising pullets has become more of a science, deciding how to adjust our rearing programs when things go poorly has become the art!

We’ve all heard these wise words, “Success in the hen house is dependent upon the success in the pullet house”, and we often find the solutions to poor performing breeder flocks are in pullet rearing. Much of our focus is on managing pullet body weight and body weight uniformity but we should also realize that the cumulative nutrition program can have a significant effect on a pullet’s body composition. We now know that pullet feeding programs can develop pullets of similar body weight yet have markedly different body compositions and subsequent reproductive patterns. University studies and field performance observations by primary broiler breeder companies are learning that optimal body conformation at photostimulation may be more important for reproductive success than just obtaining the recommended body weight targets. With these findings, it may be prudent to develop a working knowledge of body conformational growth, to help achieve maximum return from a flock investment. When these pullet body compositions are out-of-balance with the feed-for-production program in the hen house, we often get elevations in hen mortality, particularly at the beginning of the lay cycle. Discussions on optimal pullet body composition prior to photostimulation and feeding programs that

influence it are beyond the scope of this paper, however this paper will focus on causes of early lay mortality that are strongly linked to pullet uniformity body composition and feed for production.

### **Cost of Early Lay Mortality**

Early lay mortality, defined as death losses from Week 25-30, can account for 2-4% of the of the total end-of-flock mortality and can directly impact pullet capitalization costs \$0.15-0.30 per pullet capitalized. Early hen mortality impacts total and hatching egg numbers as well. Work at Cobb learned the mortality during this period can reduce egg numbers 2-12 HE per hen housed – and these are the direct effects. Robinson et. al., reports that large feed allotments (one of the leading influencers of early lay mortality) can influence egg size, hatchability, subsequent broiler chick quality and broiler performance. In sum, early hen mortality can have an influence on your total chick costs by as much as \$0.005 per chick thus costing the US broiler industry millions of dollars per year.

### **Causes of Early Lay Mortality**

What is the cause of this mortality? Is it rooster kill, fat hens, “blow-outs”, internal lay, *E. coli*, SDS, calcium tetany or cholera? There are several possible reasons and many appear similar. So how can one determine the cause?

***Start by getting a good history – oftentimes careful understanding of the problem shortens the time to a solution.*** When a grower calls with concerns about an increase in mortality you should determine:

1. Flock age;
2. Roosters &/or hens dying;
3. Flock average body weight;
4. Body weight of the mortality;
5. Percentage of mortality;
6. Mortality by location:

#### **Scratch Area Only**

- Rooster kill / rooster aggression
- Slats too high / ground too low
- Lameness due to ruptured tendons, fractured femur / pelvis, osteoporosis

#### **Slats and Nest Boxes Only**

- Internal lay / impacted oviduct
- Egg yolk peritonitis “EYP” / *E. Coli* peritonitis / *E. Coli* salpingitis
- “Blow-Outs” / prolapsed cloaca
- Choke / feed impaction
- Calcium Tetany / hypocalcemia
- Sudden Death Syndrome / hypokalemia / hypophosphatemia
- Ketosis / Acetonemia / Fat Hen Syndrome
- Physical injury from nests, feeders, or slats

### **Any Location**

- Fowl cholera
- Thermal stress

*Get a thorough examination of the mortality making particular note of:*

1. Body weight of the mortality;
2. Extent of breast fleshing;
3. Comb & wattles;
4. Footpads & hock joints;
5. Vent area;
6. Bone integrity (humerus, femur, pelvis & keel bones);
7. Both lungs (color & consistency);
8. Heart (size);
9. Liver (color);
10. Ovary & oviduct (color & # of follicles greater than a dime in size)

From 1994 to present over 700 problem flocks in the USA and South America between 25 and 32 weeks of age have been examined. Similarly a colleague has categorized the hen mortality of several breeder flocks in Europe. The mortality ranged between 1-16% during this period and averaged 4.2%. Most (40-60%) of the mortality was categorized as “metabolic“, with few lesions observed. During the early to mid 90’s, much of this mortality was associated with small frame, under fleshed hens now the trend is more associated with heavy, overweight hens. In both cases the leading cause can be associated with poor early development, poor flock body weight uniformity and a too rapid feed-for-production schedule causing rapid late development with metabolic and reproductive consequences in the hen house.

### Calcium Tetany

Cause: Low blood calcium during shell formation – death usually in the morning hours  
Lesions: No lesions but will usually see a fully active ovary and an egg in the oviduct

Treatment: Oyster shell (on feed and in scratch)  
25-Vitamin D<sub>3</sub> (water as per label)

Prevention: Maintain low calcium diet until 1st egg  
25-Vitamin D<sub>3</sub> (feed)

### Osteoporosis

Cause: Poor early frame development, prolonged lay, low dietary calcium / vitamin D<sub>3</sub>  
Lesions: Fractures and trabecular bone loss can occur in hens as early as 28 weeks old

Treatment: No treatment only prevention

Prevention: Maximize frame prior to lighting  
Slow bone loss by elevating dietary calcium and/or 25-Vitamin D<sub>3</sub>

## Sudden Death Syndrome

Cause: Rapid growth of immature, under-fleshed pullets after photostimulation  
Lesions: Greatly enlarged hearts with either a thickened left ventricular wall or right ventricular dilatation (flabby heart)

Treatment: Feed grade potassium sulfate (water @ 2 lbs / gallon stock solution)  
25-Vitamin D<sub>3</sub> (water as per label)  
Prevention: Adequate fleshing prior to photostimulation  
Slow the feed increases in the hen house – evaluate the “feed for production curve”  
Increase the available phosphorus (P<sub>a</sub>) in the hen feed  
25-Vitamin D<sub>3</sub>/ Phytase in the hen feed

## Ketosis / Fat Hen Syndrome

Cause: Heavy, aggressive eating hens at photostimulation given rapid increases in feed  
Lesions: Fatty liver, heart and kidneys; high serum levels of  $\beta$ -hydroxybutyrate (ketones); often these hens have erratic oviposition and defective eggs syndrome (EODES)

Treatment: Feed grade potassium sulfate (water @ 2 lbs / gallon stock solution)  
Vitamin B<sub>12</sub> (water as per label)  
Carnitine (water @ 1 lb / gallon stock solution)  
Prevention: Improve pullet uniformity and evaluate feed distribution  
Slow the feed increases in the hen house – evaluate the “feed for production curve”  
Lower energy values in breeder feed  
Sodium bicarbonate in feed

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