

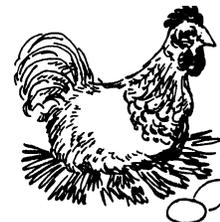


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## COMMERCIAL EGG TIP

### IMPORTANT NUTRITIONAL DISEASES THAT AFFECT LAYING HENS

We frequently discuss pathogenic diseases that can infect and quickly spread through a flock of hens, however, there are also nutritional and metabolic disorders that may not be infectious but if they are not identified and treated their symptoms will be seen quickly spreading through a flock. This month's commercial layer tip will focus on three common nutritional or metabolic disorders that can affect laying hens.

**Rickets** is caused by a deficiency or imbalance of circulating calcium, vitamin D3 or phosphorous. The disease occurs when there is an imbalance of these nutrients or if the diet is deficient in any of them. Some medications and mold toxins may also cause rickets. The condition results in soft bones, where they will often become bowed thereby restricting the birds' ability to stand and walk.

Rickets can be prevented or treated if the condition is caught early. In order for normal bone calcification to occur, calcium and phosphorous must be supplied in adequate amounts and they also need to be supplied in the correct ratio to each other (2:1). Too much or too little of these minerals can result in rickets. Vitamin D3 is important because it regulates the absorption of calcium. Mycotoxins are the toxins produced by molds or fungus and can have detrimental effects on poultry including interfering with the absorption of nutrients. Mycotoxin induced rickets can be treated by replacing toxin-contaminated feed and supplementing vitamin D3 to three or fourfold the usual levels.

**Caged layer fatigue (CLF)** was first observed in the mid-20<sup>th</sup> century shortly after layer producers began to house laying hens in cages. Although diets for laying hens are specifically formulated to be nutritionally complete, CLF is described as a nutritional disease and is a major cause of death in laying hens housed in cages. This condition usually occurs in birds around peak egg production and may also be associated with osteoporosis, a condition that causes brittle bones. The primary cause of CLF is thought to be the depletion of the body stores of calcium usually a result of a delay in feeding with high calcium feeds during high production. The condition can also occur from a metabolic malfunction that impairs calcium absorption or bone calcification during the production stage. Birds suffering from CLF will lose control of their legs and lie on their side. Usually there is no loss in egg production nor is shell quality or interior egg quality reduced. Some bones may be fractured and some will break when the birds are handled.

Because the condition is more prevalent in caged layers rather than floor pen birds, exercise can play a role in preventing or treating the condition. Hens will recover when they are removed from the cages and

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allowed to walk normally on the floors. It has been observed that CLF is more prevalent in single-hen-cages rather than multiple-hens cages because multiple birds in a cage will get more exercise when competing for feed and water. Feeding the hens a diet with the right proportions of calcium in a timely manner will prevent the depletion of calcium from the medullary bones.

**Fatty liver syndrome (FLS)** is one of the most important metabolic disorders observed during high production periods in laying hens. It was first described in the 1950's as excessive fat in the liver associated with varying degrees of hemorrhage. The actual cause of the disease is still unclear and the first sign is often an increase in mortality in the flock. Several factors can cause increased deposition of fat in the cells of the liver including; high egg production, toxins, nutritional imbalances, excessive consumption of high energy diets, deficiency of nutrients that mobilize fat from the liver (lipotropic agents), endocrine imbalances and genetic components. FLS in chickens is a result of excessive accumulation of fats when lipoprotein transport is disrupted. The liver is the main site of lipid synthesis in the avian species which is very active in adult females which are producing eggs.

Necropsy of dead hens with FLS will reveal that the birds have enlarged and pale livers (the pale yellow color of the liver can also be a result of dietary xanthophylls); affected birds also have pale combs. The liver cells are distended with fat vacuoles and different size hemorrhages. The abdominal cavity of the birds contains large amounts of fats. Fatty liver syndrome without excessive fat is associated with mycotoxins in feeds. A FLS liver will contain about 55% fat as opposed to a normal liver with 36% fat. Death usually occurs from the rupture of the liver along with gross hemorrhaging.

Fatty Liver Syndrome occurs when birds are in a positive energy balance (an over supply of energy), therefore monitoring the body weight can be used to diagnose the condition. Dietary modification can be used to prevent or treat FLS. Substituting carbohydrate with supplemental fat will not increase the energy content of the diet and can be beneficial. Replacing corn with other cereals such as wheat and barley is often beneficial. The use of by-product feeds such as dried distiller's grains and solubles, fish meal, oat hulls and alfalfa meal can reduce FLS. The best way to prevent FLS is to prevent excessive positive energy balance in older birds. Body weight can be monitored when potential problems are seen. When increased body weight is observed action should be taken to limit energy intake by feeding lower energy diets and or a change in feed management.

### **Conclusions**

Rickets, CLF, and FLS are nutritional diseases that affect laying hens and can account for a high percentage of the flock mortality. The laying hens' diet is specifically formulated to be nutritionally complete, however, the occurrences of these diseases are prevalent especially in hens in high production and the mortality rate in flocks can be high. Presently little can be done to avoid conditions such as osteoporosis in laying hens housed commercially in cage systems. The disease can be considered a production disease therefore best husbandry practices can improve flock health. Altering the diet by replacing some of the corn with lower energy feedstuff such as wheat bran can help to treat FLS.



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**\*\*Consult with your poultry company representative before making management changes.\*\***

“Your local County Extension Agent is a source of more information on this subject”