

California Poultry Letter'

JANUARY 1996

CALIFORNIA POULTRY LETTER INDEX

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Back copies of either the California Poultry Newsletter or Egg Economics Update may be obtained from:

Don Bell, Poultry Specialist

Phone: (909) 787-4555, Fax: (909) 787-7251

MOUTH LESIONS AFFECT EGG WEIGHT

A recent study by Drs. Jesse Grimes and William Bridges of Clemson University investigated the relationship of mouth lesions in table egg layers to egg weight and various egg shell quality characteristics. Their work was conducted on eight contract layer farms and involved 3000 individually inspected hens ranging in age from 40 to 70 weeks. Two strains were observed. Each hen was individually weighed and scored relative to the number of mouth lesions (yellowish-white) found. Eggs were weighed and measured for shell weight, percent shell and shell density. Of the 3000 birds inspected, 60% had no lesions, 29% had one lesion, 10% had two lesions and 1% had three or more lesions.

No significant relationship was observed between lesion counts and body weights, % shell or shell density (mg/cm³). However, egg weight, was negatively correlated with lesion numbers. For each lesion, egg weight decreased by 5.6 grams - a major problem ! Shell weight also decreased by .84 grams for each lesion, but this was probably a result of the smaller egg size.

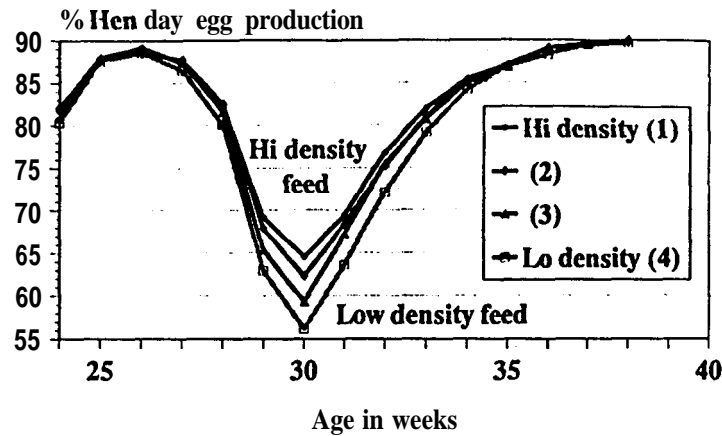
The authors referred to previous papers by other researchers which indicate that mouth lesions are associated with dietary mycotoxins and that when T-2 toxins are fed to layers, feed consumption is decreased, egg production goes down, and egg shell thickness is decreased. It is assumed that the lesions inhibit feed consumption and performance is adversely affected as a result.

The authors concluded that "Mouth lesions in layers can be utilized as a predictor of hen performance before noticeable production problems occur: mouth lesions were observed during this study without any other noticeable bird health or production indicators. Because lesion incidence can be an indicator of the presence of mycotoxins in feed, and because lesion incidence is related to egg weight and shell weight in young layers, it is advised that flock supervisors monitor birds for mouth lesions. Monitoring birds for mouth lesions is a step that can be incorporated easily into a bird health and feed quality control program."

Locally (southern California), lesions have been found in numerous flocks - oftentimes in numbers in excess of 30% of the flock. There is no suggested cure for these lesions once they occur. Their presence is, therefore, an indicator of a feed quality problem which needs to be corrected. A high incidence of lesions may also explain why egg size is not up to standard.

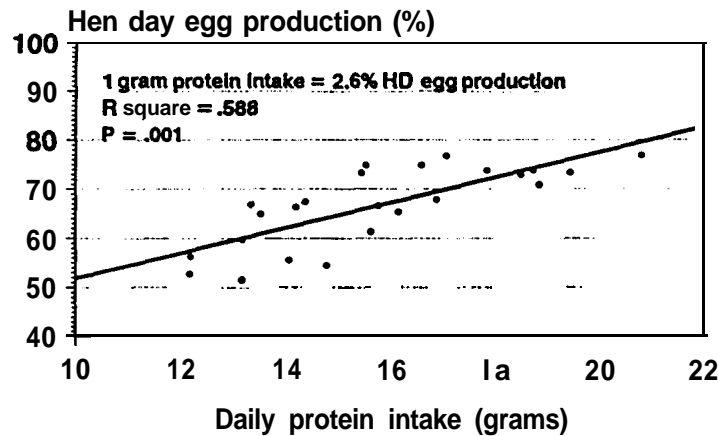
Donald Bell
Extension Poultry Specialist

Figure 1. Infectious Coryza and Its Effect on Egg Production Associated with 4 Different Feeds - (high to low density)



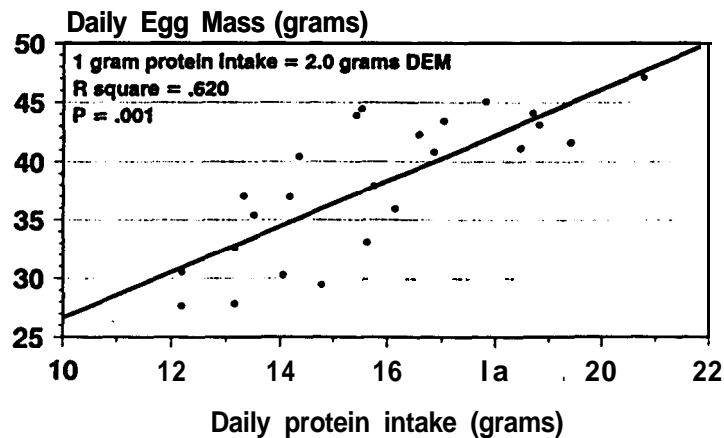
University of California, 1994

Figure 2. The Relationship of Daily Protein Intake to Hen Day Egg Production During a Coryza Outbreak



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Figure 3. The Relationship of Daily Protein Intake to Daily Egg Mass During a Cop Outbreak



University of California, 1994

B. Egg Shell Quality Assessment Using Vibration Analysis (Coucke, et al, Belgium)

Egg shell quality is routinely tested through candling, where crack detection is based on visual inspection or on modern sonic techniques. In search of a more accurate detection system, which can accurately detect cracks far from the egg's equator, the vibration behavior of the hen's egg was studied. When an egg is subjected to a non-destructive impact excitation at a frequency band of up to 6000 Hz, the shell will react with an oscillation response. Eggs with damaged shells show a greater number of peaks than intact eggs which can be separated by a computer sorting program specifically developed for this purpose. The current accuracy rate is 95%, however, sorting accuracy could be further improved by using a more sophisticated computation and by increasing the number of impacts on the shell.

C. Shell Porosity and Egg Quality (Campo and Ruano, Spain)

Shell porosity is an important factor in egg quality, and is directly related to shell strength, air cell size and the intrusion of microorganisms. Hatchability between breeds tested varied between 79-91% with a negative correlation to the porosity of the shells. Breeds with minimum shell porosity had maximum hatchability. Shell porosity also varied between poultry breeds from different climates. Poultry from hot, arid climates laid eggs with fewer pores and a thicker shell to reduce moisture loss. A negative correlation was also found between shell porosity and specific gravity. Shell porosity is measured as weight

loss of the egg stored under standard conditions (100°F dry bulb and 85°F wet bulb).

D. Genetic Improvement of Egg Quality (Arthur, USA)

Commercial poultry breeders have a long history of altering flocks for characteristics such as egg weight, shell strength, albumen height, shell color and incidence of meat spots. All lines have high heritability and genetic correlation for egg weight and albumen height. However, egg weight has a negative correlation with rate of lay. Despite intense selection for rate of lay, the negative correlation has not progressed in these populations enough to inhibit concurrent improvement in both egg production and egg size.

Among crosses of white egg-laying lines, there were significant differences for egg size, but not for cholesterol per gram of yolk, mg cholesterol per yolk or percent yolk. Meat spots do not normally occur in white egg lines. Brown egg lines also have a significant heritability for shell strength and blood spots.

E. Influence of Storage Duration and Temperature on Sensory Quality of Eggs (Campo, et al, Spain)

In Europe, cold-storage eggs are still considered B grade. However, low temperature has become an essential factor in controlling microbial development. The effect of storage on physico-chemical quality of eggs is well known. Little information is available on the effect of storage on sensory qualities (flavor intensity, yolk aroma and visual appearance). A trained taste panel was able to determine differences

WHAT'S NEW IN SHELL EGG AND EGG PRODUCT QUALITY - Part I

The 6th Egg and Egg Products Symposium recently held in Zaragoza, Spain is one of a series of similar events on poultry subjects like genetics, nutrition, poultry meat quality and others which are held every two years in different locations around Europe. The symposium series is one of the successful activities of the European chapter of the World's Poultry Science Association (WPSA). These symposia focused on specific subjects, are well attended by participants from around the globe, and, provide an excellent week-long forum for discussing and exchanging opinions between professionals who have common interests. In contrast, most other reputable conferences such as the US Poultry Science Association (PSA) and the World's Poultry Congress are wide-scope events. The Egg and Egg Product Quality Symposium was held together with the Poultry Meat Quality Symposium in September, 1995. The two programs ran parallel to each other with some combined general topics and professional tours.

The Egg Quality Symposium was divided into 6 sections:

- A. Egg Quality Assessment
- B. Egg Shell Structure / Formation
- C. Influence of Production Factors and Storage on Egg Quality
- D. Influence of Laying Hens' Nutrition
- E. Functional Properties of Egg Products
- F. Improving the Nutritional Value of Eggs
- G. Egg Microbiology and Quality Assurance

A major consideration in the symposium was given to the development of new methods of egg quality assessment.

The following papers represent only a few of the many that were presented at the conference.

A. Rapid Evaluation of Shell Egg Freshness (Rossi, et al, Italy)

Air cell depth and Haugh Units are the most common indicators of egg freshness. These parameters are used to determine grade deterioration but can not provide definite values which can be used for expiration dating. Therefore, a predetermined period from packaging time is used as the expiration date.

Two new rapid methods to determine shell egg freshness and expiration date were investigated:

7. Colorimetric method based on the increase of iron in the albumen during storage. The iron, which reacts with a specific reagent creates a colored product that grows more intense as storage is prolonged.

2. Albumen stability to alcohol - This method is based on the increase of albumen thermic stability during storage. The test reaction causes turbidity in the albumen, which can be read by a turbidimeter. The longer time the egg is stored, the more intense the turbidity. This method is an adaption of a test used to measure fluid milk quality.

in eggs of the same origin (Hy-line white eggs) which were stored for 1 to 3 weeks at (39, 64 or 90°F) and compared to fresh eggs. The eggs stored under 39 °F conditions maintained sensory quality throughout the 3 week test period. At 64°F, a part of the sensory quality was lost after 2 weeks, while several days at 90°F were enough to substantially reduce eating qualities. Temperature was found to have the greatest effect on the visual acceptability of eggs.

F. The Effect of Nutritional Factors on Egg Quality at High Environmental Temperatures (Nys, France)

High temperatures (above 86°F) reduce hens feed consumption, egg production and egg quality. Respiratory alkalosis induced by hyperthermia is the main cause. Diet modification can partially restore egg quality losses. Shell quality is reduced when the hen consumed less calcium than the 4.2g/day needed for shell calcification. Increasing dietary calcium does not reduce the problem because the palatability of the diet is also reduced. However, coarse calcium carbonate particles improve calcium intake and shell quality. Lower levels of phosphorous and chlorides improve shell quality while electrolyte balance (Na, K, Cl or carbonate ions) has little effect. The use of carbonated water has a positive effect.

G. Modification of Fatty Acid Composition and Cholesterol in the Avian Egg (Codony, et al, Spain)

The presentation was an excellent review of recent data on egg composition and techniques used to modify fatty acids and cholesterol in eggs.

H. Vitamin E and Egg Quality (Surai, et al, Ukraine)

Vitamin E levels in the egg yolk are affected by the vitamin E levels in the feed. Quail eggs accumulate more vitamin E than any domestic fowl (250 mg/kg yolk) followed by pigeon eggs (150) and chicken (100 +) while turkey eggs have the lowest (25).

Maximum levels of vitamin E in the yolk were reached after 21 days when large amounts of vitamin E were fed. When the vitamin E supplement was removed the maximum level of vitamin E was retained for 10 days before it gradually declined. This indicates that the vitamin E stored in liver and adipose tissues were transferred to the eggs. The accumulation of vitamin E in the egg started after 2 days of vitamin E supplement feed.

For copies of articles contact:

**DR. GIDEON ZEIDLER
COOPERATIVE EXTENSION
UC RIVERSIDE
(909)787-5039 - fax (909)787-5091**

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Donald Bell, January Editor
Extension Poultry Specialist
UC Riverside

Ralph A. Ernst, Technical Editor
Extension Poultry Specialist
UC Davis