

Endocrine Function in Laying Hens as Related to Egg Shell Quality

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One of the highest priority problems in the commercial egg industry in the United States today is a deterioration in egg shell quality which takes place as the egg laying period progresses. Under commercial production conditions the egg shell quality problem routinely develops in the following way. Egg shell quality appears to be good during the initial four to six months of the laying period. Beginning at this time and extending through the remainder of the egg production period, there is a significant progressive deterioration in egg shell quality which is characterized by a decrease in shell thickness, shell texture, and shell strength. This decrease in egg shell quality develops in about 25 percent of the layers in any given flock. While the eggs are being processed and moved in market channels, a large number of these thin shelled eggs may become cracked, checked, or broken. As a result, the economic loss to the producer is substantial. Counter measures of many kinds have been taken to correct the problem, but none have been entirely effective.

One of the most promising areas for study on this problem involves endocrine function as it is related to calcium and phosphorus intake, mobilization, and deposition in the egg shell. No data are available to indicate what fluxuations, if any, occur in the blood plasma concentrations of the different hormones under practical production conditions during an extended egg production period. In addition, it is not known whether changes in plasma hormone levels, if they do occur during this time, are related to the determination of egg shell quality.

A strain of commercial hybrid hens, which is known to develop the egg shell quality problem, has been divided into groups according to degree of shell thickness, shell texture, and shell strength by measuring egg specific gravity. Clutch size, time sequence of ovulation, and time sequence of oviposition for hens with both good and poor shell quality have been established. Blood samples have been taken by heart puncture from hens within each shell quality classification six hours prior to ovulation. These blood samples are to be analyzed by radioimmunoassay for estradiol, testosterone, and progesterone.

terone. Data obtained on plasma concentrations of these hormones will be used to determine if any correlation exists between possible differences in plasma hormone levels and egg shell quality. If correlations do exist, further studies involving these and other hormones will be undertaken.
