

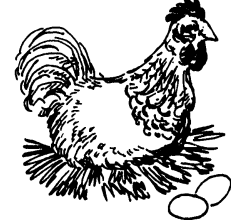


The University of Georgia

**Cooperative Extension Service**

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## **COMMERCIAL EGG TIP . . .**

### **A NON-INVASIVE METHOD TO MONITOR BONE WEAKNESS IN COMMERCIAL LAYING HENS**

Nodulation and folding at the costo-chondral junction of the ribs is a common consequence of osteoporosis in laying hens. Cransberg et al. (2001) used a 6-point scale to score rib deformity in cage-housed laying hens and found that 80% of the hens in their research flock were affected by 42 weeks of age, with about 30% having severe deformities. They thought that the rib deformity developed around 27 weeks of age because they noticed that hens with severe rib deformities had reduced body weight and egg production between 27 and 31 weeks of age. Wilkins et al. (2004) demonstrated that keel palpation was a reliable means to identify healed keel bone breaks of laying hens, but used the method to investigate bone breakage from collision of free-flying hens with fixed structures in open housing systems rather than attempting to evaluate bone weakness. Caged laying hens often have keel deformities from healed breaks. These breaks are probably due to osteoporosis because the cage environment provides little opportunity for forceful impact with fixed structures.

While there may be little one can do at present to prevent osteoporosis in caged White Leghorn hens because highly productive hens are prone to the condition, unforeseen problems that affect feed intake or calcium metabolism, such as disease challenges, heat stress, or management errors, can make the condition worse, leading to bone fragility, cage layer fatigue, and even reduced egg shell quality. Egg producers should track changes of bone quality in flocks so that problems can be noticed quickly and corrective steps taken to minimize impact on the hens.

A reliable palpation scoring system would give egg producers a non-invasive way to examine large numbers of hens to monitor osteoporosis in a flock. A University of Georgia study was carried out to verify the prevalence of rib and keel deformity in commercial flocks of caged White Leghorn hens, and to see if the severity of bone deformity was associated with bone strength. Cransberg's 6-point scale was used to score rib deformity and a 4-point scale was used to score keel deformity. In flocks on a multi-age complex, virtually no bone deformity was found at 18 weeks of age. However at 28 weeks almost 70% of hens had some degree of rib deformity, although incidence of severe deformities was still quite low. About 90% of 55 week-old hens had rib deformity, with more than 20% having the more severe forms. 100 week-old hens also had a 90%

#### **PUTTING KNOWLEDGE TO WORK**

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total incidence of rib deformity but with about 35% having severe deformities. The incidence of keel deformity was lower; nonetheless, 15% of 28-week old hens had some keel deformity, with this climbing to about 32% and 39% in 55 and 100 week-old hens. Even at 28 weeks, about 4% of hens had severe keel deformities, with the rate reaching 16% and 20% at the two older ages. These percentages are probably representative, with some flock to flock variation, of commercial White Leghorn layers housed in a similar fashion.

The associations between breaking strengths of the femur and tibia (leg bones) and the humerus (a wing bone), and rib or keel deformation score were evaluated using hens aged 58-69 weeks selected from four different complexes. Unexpectedly, the severity of rib deformity was not associated with bone breaking strength. However, hens with the more severe keel deformities had progressively weaker bones.

Since a multi-category palpation scoring system may be more complicated than necessary for evaluation of commercial flocks, the data were re-analyzed to see if bone strength varied according to a 2-point scoring system, i.e. a bird did, or did not, have a bone deformity. Once again, no significant differences were found between groups based on rib deformity, but the simplified keel scoring system did separate groups of hens with different bone breaking strengths. Hens with keel abnormalities had bone strength reductions amounting to 15%, 10%, and 16% for the femur, tibia, and humerus bones relative to normal hens.

A simple 2-point keel palpation scoring system, therefore, can be used to monitor the onset and developing severity of bone weakness due to osteoporosis in White Leghorn laying hens. The size and prominence of the keel bone make it easy to palpate and judge the presence of a deformity. If one wishes to use a quick, non-invasive method to monitor bone quality in a commercial flock of laying hens, the 2-point keel palpation method might be the best option.

**References:**

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Wilkins, L. J., S. N. Brown, P. H. Zimmerman, C. Leeb, C. J. Nicol. 2004. Investigation of palpation as a method for determining the prevalence of keel and furculum damage in laying hens. *The Veterinary Record* 155:547-549.

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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”