



The University of Georgia

**Cooperative Extension Service**

College of Agricultural and Environmental Sciences / Athens, Georgia 30602-4356

JULY 2003



## ***HATCHERY/BREEDER TIP ...***

### **UGA RESEARCH UPDATE**

**Reducing breeder house dust and bacterial contamination**, L. J. Richardson, B. W. Mitchell, C. L. Hofacre and J. L. Wilson

Dust is an irritant and an effective carrier of microorganisms, making it a concern for bird health and worker health and comfort. Broiler breeder facilities may be some of the dustiest confinement animal facilities due to the length of time the birds are in the facilities (20-22 weeks for pullet rearing and 40-45 weeks for breeder laying houses). This project used a system developed by Dr. Bailey Mitchell (Southeast Poultry Lab, USDA-ARS, Athens, GA) to electrostatically charge the air in an experimental breeder laying facility and compare it with an untreated facility. If the particle size of the dust is small enough to be drawn into the lungs, the bacteria can infect or colonize an animal. The theory behind this study was that the charged air would cause the suspended dust to be attracted to the grounded surfaces in the facility such as interior walls, metal equipment and animal bedding. The amount of dust that the birds breathed into their lungs would be reduced along with potential bacterial infections (ex. *Salmonella*). Electrostatic charging of the air has proven to reduce dust and microorganism levels inside the hatcher while the chicks are hatching, so this project seeks to determine if this technology is applicable in a breeder laying facility. In addition, any possible detrimental impact on bird performance was closely monitored (such as avoidance behavior due to any possible electrical charge on feeding, drinking or nesting equipment).

In the electrically charged facility, airborne dust was reduced by 60%, while airborne total and gram-negative bacteria levels were 50% less in the treated facility than the untreated facility. The gram-negative bacteria on the egg shell surface was reduced by 29% and those on the egg collection belt were reduced by 63% in the treated facility. When hens were swabbed, those in the treated facility were less positive for *Salmonella enteritidis* than hens in the control facility (57% less positive birds). In addition, broiler chicks from eggs laid in the treated facility were less positive for *Salmonella enteritidis* than chicks from the control facility. This study proved that electrically charging the air in confinement broiler breeder laying facilities was an effective means to reduce dust and bacteria and had no detrimental effects on egg production or broiler chick numbers.

### **PUTTING KNOWLEDGE TO WORK**

The University of Georgia and Ft. Valley State College, the U.S. Department of Agriculture and counties of the state cooperating.  
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**Zinc Source in broiler breeder diets**, B. P. Hudson, W. A. Dozier, III, **J. L. Wilson**, J. E. Sander and T. L. Ward

Zinc plays a role in several reproductive functions that include sperm storage, eggshell formation and embryonic development. No dietary requirement has been identified for broiler breeder pullets and hens; however, the dietary requirement for commercial laying hens is 35 ppm. Most nutritionists are providing zinc well above this level in broiler breeder diets (range of 100-180 ppm). Other issues with zinc include whether birds (chicks or adults) derive more zinc from the provided supplement if it is in an organic versus an inorganic source. Zinc from organic complexes has been reported to be more available to chicks than zinc provided by inorganic sources. The theory was that by providing organic zinc to broiler breeder hens reproductive performance might be enhanced. In this study dietary zinc was provided in an organic amino acid complex (Availa<sup>®</sup>Zn), inorganic form (ZnSO<sub>4</sub>) and in a 50:50 mix of the organic and inorganic forms at 160 ppm for all hens.

Hens provided diets supplemented with a combination of ZnAA and ZnSO<sub>4</sub> had improved specific gravity, fewer cracked eggs and greater settable egg production. This difference in egg production resulted in 2.3 chicks per hen housed. Immune response of hens was enhanced when exposed to an antigen and antibody titers to Newcastle disease virus were increased when birds were given diets supplemented with 160 ppm zinc from ZnAA. Generally, supplementing diets with a combination of ZnAA and ZnSO<sub>4</sub> or ZnAA resulted in superior performance of broiler breeder hens compared with hens provided diets with added zinc from ZnSO<sub>4</sub>.

**Sperm mobility in broiler breeder roosters**, E. R. Bowling, D. P. Froman, A. J. Davis and **J. L. Wilson**

Sperm mobility or the ability of a sperm cell to move through a thickened solution has been related to flock fertility, with higher sperm mobility associated with higher fertility. In this study, a sperm mobility assay was used to evaluate two strains of commercial broiler breeder males. Semen samples were collected from over 300 roosters. High and low mobility males were identified. These roosters were periodically evaluated through 65 weeks of age. While roosters that were characterized as low mobility males had some slight improvement in mobility during their early weeks of semen production, the high mobility males had little improvement as they aged. When semen from the high and low mobility roosters were used to artificially inseminate hens, fertility was higher in hens given the high mobility semen. Mobility readings between strains were not similar; indicating that mobility among commercially available strains could be different.

This study proved that sperm mobility is a good semen quality measurement of broiler breeder roosters. These observations were similar to those published by Dr. David Froman (at Oregon State University) using noncommercial roosters. When semen from high mobility roosters is artificially inseminated into hens more fertile eggs result than when semen from low mobility roosters is used.

These projects were completed by graduate students in the Poultry Science Department at The University of Georgia. Please call or email if you would like more complete details (706/542-9137 or [jeannaw@uga.edu](mailto:jeannaw@uga.edu)).



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