D (5% CBT with enzyme); E (10% CBT with enzyme); F (5% fermented CBT); and G (10% fermented CBT). The experiment lasted eight weeks. At the starter and finisher phases (0 – 8 weeks), there were significant differences ($P < 0.05$) between the treatments in the feed intake, weight gain and feed conversion ratio. The serum and hematological parameters (total protein, albumin, glucose, creatinine, cholesterol, white blood cell, red blood cell, packed cell volume and haemoglobin) studied were significantly different ($P < 0.05$) on all the diets. The noticeable trend in the result indicated that application of enzyme treatment and fermentation of the cocoa bean testa, improved the performance, hematology and serum biochemistry of broilers.

Key Words: Broilers, Cocoa bean testa, Growth response, Haematology, Serum biochemistry

Environment & Management II

M73 Assessment of a rural community-based poultry organization to rural development in Nigeria. A. Odeh*[1] and E. O. Uwagboe[2], [1]*Ajanla Farms*, *Ibadan, Oyo State, Nigeria*, [2]*University of Ibadan*, *Ibadan, Oyo State, Ibadan*.

In Nigeria, rural areas lack the enabling infrastructure required for both the transformation of rural space, enhancement of productivity and welfare of rural dwellers. The Government and Community Based Rural Development Organizations (CBRDOs) have executed some infrastructural projects such as potable water, transportation services, electricity, modern communication, and housing to solve problems of rural areas. This study therefore seeks to assess the contribution of Ajanla poultry farms towards rural community development. Systematic random sampling technique was used to select sixty respondents from the community. Questionnaire was used to elicit information from members of the community on their perception towards the contributions and constraints of this poultry organization to the development of their community. The data collected were presented with frequencies, percentages and analyzed with Pearson Product Moment Correlation (PPMC).
The result revealed that the mean age of the respondents was 35 years and most (75%) of the respondents are educated. Majority of the respondents agreed to have benefited from facilities provided by the farms as follows; electricity (80%), road (70%), employment (65%) clean water (50%) while few (20%) agreed to have benefited from health care and (10%) communication services. There is a significant relationship between the age, ranking of constraints and perception of the respondents towards the contribution of the farm to the community ($P \leq 0.05$). Most (70%) of the respondents were favourably disposed to the contribution of poultry farms to the community while 30% were not favourably disposed. Members of the community have benefited from the facilities provided by this poultry farms towards the development of the community but still need to focus on provision of health care facilities and communication

Key Words: Assessment, Poultry, Organization, Rural community-based, Development

M74 Efficacy of polymers in combination with biocides as sanitizers of *Salmonella* inoculated broiler hatching eggs. A. R. Ritter*[1], R. J. Buhr[2], L. J. Richardson[2], N. A. Cox[2], W. Bright[3], and J. L. Wilson[1], [1]*University of Georgia*, *Athens*, [2]*USDA-ARS, Russell Research Center*, *Athens, GA*, [3]*South Carolina State University*, *Orangeburg*.

Salmonella contamination of broiler hatching eggs can be carried through the hatchery and with the hatched chick into the broiler house. Commercially available chemical hatching egg sanitizers have achieved acceptable levels of eggshell decontamination of >70% reductions when applied prior to setting. To evaluate the potential benefits of recently formulated combination chemicals (polymers in combination with multiple biocides) by Byotrol Inc. on eggshell decontamination a series of experiments was conducted. Replicate trials containing 10 eggs / chemical / trial were drip inoculated with a naladixic acid resistant *Salmonella* serovar Typhimurium (10^3 cfu/egg). After drying at room temperature for 1 h, eggs were spray sanitized with either water, hydrogen peroxide (common effective chemical), MC4 (2 quaternary ammoniums, a biquanide, and a bronopol associated in a polymer solution), NIP5 (4 quaternary ammoniums and a polyhexamethylenebiquanide hydrochloride associated in a polymer solution), OPF4 (4 quaternary ammoniums associated in a polymer solution), Polysphere (4 quaternary ammoniums associated in a polymer solution), or remained as an untreated positive control. In addition, the relative safety of these sanitizing chemicals (at the same concentrations) on embryo viability and hatchability was also evaluated. The incidence of *Salmonella* recovery was 86% for the untreated control eggs, 83% for water spray control, 9% for hydrogen peroxide, 20% for Polysphere, 7% for OPF4, and 0% for both MC4 and NIP5. Hatchability of fertile eggs sanitized with these chemicals was not significantly different (87 - 93%) when compared to the control value of 91%. Furthermore, hatched chick quality of eggs sprayed with these chemicals was also not different from that of the controls. Combination chemicals can effectively reduce eggshell *Salmonella* contamination and both MC4 and NIP5 consistently eliminated *Salmonella* present on eggshells below the level of recovery without any signs of a depression in hatchability or chick quality.

Key Words: Broiler hatching eggs, Eggshell disinfection, Hatchability, Combination chemical, *Salmonella*

M75 Evaluating bird weighing procedures and time of weigh after feeding in broiler breeder females. A. D. Swaffar*, D. E. Yoho, J. R. Moyle, R. S. Harper, and R. K. Bramwell, *University of Arkansas*, *Fayetteville, AR*.

Weighing sample birds within a broiler breeder flock begins during the first few weeks of life and continues into the hen house. This practice is critical when evaluating the growth and development of breeders and the effectiveness of feed restriction programs. Therefore, body weights obtained must accurately reflect the flock average. In the pullet house, birds are weighed on "off feed" days to ensure no effect of feed in the crop. However, in the hen house birds are fed every day so feed in the crop could alter body weights. Commercially, hens are weighed following an extended period after feeding in order to avoid the effect of feed in the crop. Therefore, this study was designed to evaluate the procedure of catching and weighing penned birds and also to determine the correct time to weigh birds in the hen house to avoid the effects of feeding. In the first study, a pen of 71 birds was corralled in a catch pen and weighed with data recorded in the order birds were caught. This was repeated 24 times. Data were analyzed in groups of ten birds by order caught with the mean values for each subgroup compared. Results showed that the last group of birds weighed within a catch pen are significantly lighter than the first birds caught. In the second study, the same pen of broiler breeder hens were weighed individually before feeding, at feed cleanup, and at two, four, six, eight and ten hrs post feed cleanup. The experiment was repeated at 24, 28, 34 and 41 wks of age on the same pen of birds. Analysis of the data showed that anytime after feed clean-up bird weight was not significantly different. Data were analyzed using JMP statistical software comparing the mean values. In summary, data from this research indicates that all birds caught in a catch pen must be weighed to obtain an accurate pen average and that anytime after feed clean-up, broiler breeder hens can be weighed without feeding time having an effect on average body weight values.

Key Words: Broiler breeders, Body weight, Time of weigh

M76 Effect of quantity of starter feed for males and females and form of female feeding program during rearing on broiler breeder reproductive performance and mortality. N. Leksrisompong*, E. O. Oviedo-Rondon, and J. T. Brake, *North Carolina State University*, *Raleigh*.

A study examined how length of starter feed use (2 wk vs 6 wk) for both broiler breeder males and females interacted with the shape of the female feeding program during rearing to affect subsequent reproductive performance and mortality in a 2 x 2 x 2 factorial design. Ross 344 males and Ross 708 SF females were reared separately to 21 wk of age. An 18% CP starter diet was fed to females

and males to either 2 wk or 6 wk of age followed by 15% CP grower and layer diets. From 3 to 21 wk of age, two female feeding programs (Line or Curve) were used followed by the same feeding program and diet to 64 wk of age. The Line and Curve feeding programs provided the same cumulative female nutrition to 21 wk of age. At 21 wk, birds were moved to a curtain-sided slat-litter house and photostimulated. There were 60 females and 6 males allocated to each of the 16 pens during the laying period. BW was determined on a regular basis. Egg production and mortality were determined on a daily basis while percentage fertility and hatchability were evaluated on a weekly basis from sets of 60 eggs per replicate pen. The 6 wk starter feeding period significantly decreased female, but not male, hen-house mortality so that females that received 6 wk starter feed produced more eggs on a hen-housed basis. The interaction of 2 wk of starter feed for females with 6 wk of starter feed for males produced numerically the most female mortality while the interaction of 6 wk starter feed for both sexes produced numerically the least female mortality. This may have been related to a more robust female that could better withstand the rigors of mating and activity in a slat-litter pen. There were no other significant differences due to starter feed feeding period or female feeding program on hen-day egg production, fertility, or hatchability.

Key Words: Broiler breeder, Starter diet, Mortality, Feeding program

M77 Evaluating reproductive performance of broiler-breeder pullets fed on varying growth curves. R. S. Harper*[1], D. E. Yoho[1], J. R. Moyle[1], P. Sbanotto[2], and R. K. Bramwell[1], [1]*The University of Arkansas*, *Fayetteville*, [2]*Cobb-Vantress, Inc.*, *Siloam Springs, AR*.

Determining the optimum feeding regimen for broiler-breeder pullets is critically important to get pullets started off correctly. This is an ever-changing challenge as genetic advances in growth and feed efficiency make it necessary to continually alter growth curves of broiler-breeder pullets. This study was conducted to evaluate two growth curves and two dietary energy levels and their affect on broiler-breeder performance. Cobb 500FF pullets (4080) were obtained at day of age and were reared in four treatment groups, consisting of two separate growth curves constituting a 2 X 2 factorial design. The two growth curves were a standard pullet growth curve and a modified curve. The modified curve held bird body weight early in the rearing stage and then accelerated the growth towards lighting. Data were analyzed using JMP statistical software to compare mean values. Each curve had a high caloric feed (1280 kilocals) and low caloric (1197 kilocals) feed treatment with the high caloric group receiving that feed from 16-21 weeks of age. This resulted in the four treatment groups: Standard/Low (SL), Standard/High (SH), Modified/Low (ML), and Modified/High (MH).
After rearing (21 wks of age), pullets were moved into a production house and fed and managed the same until 65 wks of age. Egg production, egg weight, body weight hatchability, fertility, and mortality were recorded. The ML treatment group produced significantly fewer eggs than the SH treatment (158.7, and 163.7 eggs/hen housed, respectively). There was no significant difference in any of the variables based on growth curve or calorie level. Data indicates that when pullets are reared on a standard linear growth curve that they should be fed a higher calorie diet in order to ensure maximum egg production.

Key Words: Pullet rearing, Pullet nutrition, Broiler breeders

M78 Maintaining broiler breeder pullets on skip-a-day feeding after photostimulation until 5% egg production is reached alters ovariand development. S. M. Wiggle*, M. E. Freeman, J. L. Wilson, and A. J. Davis, *University of Georgia*, *Athens*.

Previously we reported that initiating an every day (ED) feeding program at the time of photostimulation for reproduction compared to continuing a skip-a-day (SAD) feeding program until 5% egg production is reached results in a significant increase in egg production in broiler breeder hens through 65 weeks of age. The objective of the current research was to investigate the impact of continuing a SAD feeding program after photostimulation on ovarian development. Cobb 500 slow feathering broiler breeder pullets were reared under a SAD feeding program. At 21 wk of age 140 of these hens were placed into individual cages and photostimulated for reproduction. Half of the pullets were switched to an ED feeding schedule while the other half was maintained on a SAD feeding schedule. The hens in the ED feeding treatment initiated lay during wk 23 of age and by the end of wk 25 of age, 53% of these hens were in production. In contrast, the SAD pullets initiated lay during wk 25 of age and reached 5% egg production at the end of wk 25 of age. The day that the SAD pullets reached 5% egg production, 40 of the SAD and 40 of the ED hens were killed for ovarian assessment. Fifty % of the SAD hens were found to have cystic ovaries compared to only 15% of the ED hens. Plasma estradiol concentrations did not differ between the SAD and ED hens at 25 wk of age. Plasma levels of total triiodothyronine (T3) and free T3 did differ between the SAD and ED hens from wk 21-25 of age. During this period, plasma concentrations of total and free T3 were significantly lower in the SAD hens compared to the ED hens on days that the SAD hens were not fed, but were significantly higher in the SAD hens on the days when both groups were fed. These results indicate that continuing SAD feeding after photostimulation delays ovarian maturation and may promote the development of ovarian cysts. These results also suggest that the significant shifts that occur in plasma thyroid concentrations in hens fed on a SAD feeding program after photostimulation need to be further investigated in relation to normal ovarian development.

Key Words: Thyriod hormone, Estradiol

M79 Mating behavior in commercial broiler breeders. J. R. Moyle*, D. E. Yoho, R. S. Harper, and R. K. Bramwell, *University of Arkansas*, *Fayetteville*.

Commercial broiler breeder managers have reported differences in fertility between strains of birds and concluding that hens with fewer feathers on their back were a result of more frequent mating. To further understand this difference, two studies were undertaken to compare the mating behavior of two different lines of broiler breeder hens and roosters. Each pen used in this study contained between 80 and 85 hens and nine males. Observation periods were one hr in length, with each observer watching two pens, one of each line side by side. Mating behavior activity recorded included; aggression (male-hen, male-male, and hen-hen), neck flares, male approaches, male waltz, hen crouches, attempted mounts, completed mounted, attempted mating, and completed matings. Mating success rate was calculated by dividing completed matings by attempted mounts. Sperm penetration, fertility, and hatchability were determined on eggs collected at the time each observation period. In the first study, the same male line was housed separately with each of one of two hen strains with 15 mating behavior observations. In the second study, two male lines were housed separately with a single hen strain and observed 31 times at various age intervals. Data were analyzed using JMP statistical software comparing the means from the observations. Results of the first study showed that while there was no significant difference in the number of attempted matings, the number of completed matings was significantly different. Results showed that the hen strain with greater feather loss had fewer completed matings indicating the feather loss is not a good indicator of mating activity. Sperm penetration, fertility and hatchability were not different between the hen lines. In the second study, results showed no significant difference between the two lines in any of the observed categories. In conclusion, it was found that while mating behavior varies in some lines of broiler breeders it does not fully explain the differences in feather loss or fertility.

Key Words: Mating behavior, Broiler breeder, Hatch