

Monday, January 23
Environment & Management
Room: B314

S-M31 An attempt at alleviating heat stress of broiler chicks with dietary Sel-Plex, selenium and stocking density. T. El-Sheikh^{*1} and N. Ahmad², ¹South Valley University, Sohag, Egypt, ²South Valley University, Sohag, Egypt.

This study was conducted to determine the effects of vitamin E selenium (Na₂-SeO₃) and organic selenium (Sel-Plex) on performance of broiler reared under chronic heat stress during summer season (30.0-43.5°C). A total of 180 one-day-old broiler chicks were randomly assigned to three selenium treatments, and two stocking density with two replicates of 15 birds each. The birds with a 3 x 2 factorial design received vitamin E+Se, Sel-Plex and basal diet as control or two stocking densities of 10 and 8 bird/m². Body weights and feed conversions were determined at hatch, 2, 4 and 6 weeks of age, and mortality was recorded on a daily basis. Scores of feather tracts were scored subjectively on the basis of feather size and skin surface covered at 21, 28, 35, and 42 d of age. Birds receiving organic selenium in their diets had improved body weight, feed conversion, livability and eviscerated weight compared to Vit E+Se and control groups. Selenium supplementation increased feathering, with organic selenium (selenised yeast) being superior to inorganic selenium (sodium selenite). The Sel-Plex induced more rapid whole body feathering. The influence of Sel-Plex was evident from 21 through 42 d of age. Feathering of broilers in the low stocking density was slightly faster than the feathering of broilers in the high stocking density. The levels of triiodothyronine (T₃) and thyroxine (T₄) were significantly lowered with control group as compared to selenium treatments groups. The plasma concentration of cortisol, glucose, cholesterol, total protein and globulin was significantly higher with control group as compared to selenium treatments group. Relative weight of adrenal gland increased in control group. It also increased with high than low density. From the results of the present study, it was concluded that supplementation of vitamin E+Se or organic Se (Sel-Plex) provides the greatest performance broiler chicks reared under heat stress and these additives can be considered as a protective management practice in broiler diets, reducing the negative effects of heat stress.

Key Words: broiler, Sel-Plex, feathering, heat stress, blood constitute

S-M32 Effect of incorporating Availa-Z/M in broiler feeds raised on three litter types: Broiler performance, litter condition and footpad quality. A. Nilipour^{*1}, R. Fabrega¹, C. Rosales¹, E. Robles¹, C. Moran², and R. Jaramillo², ¹Empresas Melo, S.A., Panama City, Rep of Panama, ²University of Panama, Panama City, Rep of Panama.

In tropical climates, in open broiler houses with high humidity, leg problems have become a major obstacle in marketing a bird having quality footpads. This not only affects the bird performance, but also reduces the wholesomeness of the product for premium sale. Another factor affecting foot pad quality is the litter type. A study was conducted at the Empresas Melo Experimental station where three types of litter were used with or without the Availa-Z/M providing 40 ppm Zn and 40 ppm Mn. A total of 1662 Ross X Ross female and male broilers were sexed and randomly allocated into 36 pens of 47 chicks each. Standard management practices applied and commercial feeds were used. A factorial arrangement of treatments included three shaving types [(coarse wood shavings (WS), polished wood (PWS) and rice hulls

(RH)] and two diets (with and without ZPM). Six replicates of 3 female and 3 male pens with total of 282 birds each were used. The birds were individually weighed on arrival and weekly for seven weeks. Feed consumption per pen was weighed weekly and accumulative feed conversions, percentage mortality and culls were calculated. The final body weights, feed conversion and mortality were improved when ZPM was used regardless of litter type. The highest body weights and lowest conversion and mortality were obtained when WS used, while PWS had the lowest body weight and highest conversion and mortality. The total performance index was best when ZPM was used in any of the litter types. Utilizing ZPM decreased the footpad lesions 22.5% across all litter types. The broilers raised on PWS had the most improvement when fed ZPM. It is concluded that raising broilers on different litter types affects broiler footpad quality and when ZPM is incorporated into the diet the severity and incidence of these lesions is decreased.

Key Words: zinc, manganese, Availa-Z/M, foodpad quality, litter

S-M33 Performance of Japanese Quail (*coturnix coturnix japonica*) under different climatic conditions. M. Mady^{*1}, A. Hassanin¹, H. Khalil¹, and M. Gerken², ¹Suez Canal University, Ismailia, Egypt, ²University of Goettingen, Goetingen, Germany.

The effect of different climatic conditions on body weight, weight gain, feed intake, water consumption, egg production, rectal temperature, hematocrit value and mortality rate were studied in Japanese quail. Three experimental groups (winter conditions (control), long day-light (lighted) and hot climate (heated) were used. A total of 195 quail chicks (65/group, 40 females and 25 males) were used. Results showed that significant differences in the most traits studied occurred among the treatment groups. Winter conditions had a significantly lighter body weight compared to the other groups between 6 and 14 weeks of age. During this period, rectal temperature was significantly higher in winter group compared to the other groups. Egg production was the lowest in the control group compared to the other groups. Birds kept under high environmental temperature had the lowest hematocrit value than the other treatment groups. In general Egyptian winter conditions had adversely influence on most traits studied in Japanese quail. It is assumed, therefore, that during winter increased lighting period and ambient temperature are important to increase productive and reproductive cycles in Japanese quail by enhancing physiological responses.

Key Words: Japanese quail, heat stress, light period, egg production, rectal temperature

S-M34 Determination of nutrient mass balance in turkeys. S. Adedokun^{*1}, W. Powers², R. Angel³, A. Mitchell⁴, and T. Applegate¹, ¹Purdue University, West Lafayette, Indiana, ²Iowa State University, Ames, ³University of Maryland, College Park, ⁴USDA, ARS, ANRI, Beltsville, Maryland.

Apparent phosphorus (P) and nitrogen (N) retention and excretion were determined for turkeys fed two diets at three ages via mass balance

based on nutrient composition and weight of consumed feed, carcass and litter. The two diets consisted of an industry diet (I) and a low P + 600 U phytase/kg (LP) diet. The non-phytin P concentration of the diet was 0.70, 0.65, 0.60, 0.55, 0.45, or 0.40 % for I diets and 0.52, 0.42, 0.34, 0.30, 0.24, or 0.20 %, for LP diets from 0-3, 3-6, 6-9, 9-12, 12-15, and 15-18 wk of age, respectively (12 replicates/diet, five birds/pen). Birds from four pens per diet were weighed and killed at 12, 15, and 18 wk of age for nutrient retention (in whole carcasses) and excretion (in litter) determinations. Diet did not affect BW or feed intake from 12 to 18 wk of age (18 wk BW = 16.04 kg). Mass of P excreted at 12, 15, and 18 wk of age was 37, 46, and 40 % more for birds fed the I diets when compared to that of birds fed the LP diets. Phosphorus retained as percentage of P consumed was greater at 12, 15, and 18 wk for birds fed the LP diets (67.0, 63.8, and 53.8 %) than for birds fed the I diets (47.3, 44.0, and 32.8 %; $P < 0.05$). Difference between P excretion as calculated from litter compared with feed intake less carcass retention was less than 5 % at 18 wk. The N retained averaged 90.7, 136.7, and 184.2 g/bird while N excreted averaged 377.6, 620.7, and 921.8 g/bird at 12, 15, and 18 wk of age, respectively. Total excreta production at 18 wk was not different between treatments and averaged 12.2 kg/bird. While there were no differences in BW, N excretion (g) and DM excretion (kg), P excretion (intake - carcass) was 201.3 g and 94.6 g, respectively for birds fed the I and LP diets. Additionally, with an 18 wk average litter DM of 78.0 % the calculated N volatilization at 18 wk was 427 and 405 g/bird for birds fed the I and LP diets, respectively (40 and 37 % of excreted N).

Key Words: excretion, mass balance, nitrogen, phosphorus, turkey

S-M35 Effect of diet on air emissions from laying hens of different ages. W. Wu^{*1}, W. Powers¹, R. Angel², and T. Applegate³, ¹Iowa State University, Ames, ²University of Maryland, College Park, ³Purdue University, West Lafayette, Indiana.

Manure from poultry feeding operations is associated with diminished air quality. The objectives of the current study were to evaluate the effectiveness of feeding a reduced emission diet (R) containing 6.9% of a gypsum-zeolite mixture and slightly reduced CP to 21-, 38-, and 59-wk old Hy-line W36 hens (trials 1, 2, and 3, respectively) on egg production and emissions of NH₃, H₂S, NO, NO₂, SO₂, CO₂, CH₄ and non-methane total hydrocarbon as compared to feeding a commercial diet (C). At each age, 640 hens (BW = 1.36, 1.47, and 1.52 kg in trials 1, 2, and 3, respectively) were allocated randomly to eight environmental chambers for a 3-wk period. On an analyzed basis, the C diet contained 18.0, 17.0, and 16.2% CP and 0.25, 0.20, and 0.20% S in trials 1, 2, and 3, respectively. The R diet contained 17.0, 15.5, and 15.6% CP and 0.99, 1.20, and 1.10% S in trials 1, 2, and 3, respectively. Diets were formulated to contain similar Ca and P content. Gaseous concentrations were monitored from each chamber in a sequential manner resulting in 10 to 11 daily observations per chamber. Average daily egg weight (ADEW; 57.4 g), average daily egg production (ADEP; 82.5%), average daily feed intake (ADFI; 92.6 g) and BW change (BWC; 24.3 g), across ages, were unaffected by diet ($P > 0.05$). Age affected ADEW (52.1, 58.9, and 61.2 g), ADEP (86.7, 87.1, and 73.7%), ADFI (86.8, 96.2, and 94.6 g) and BWC (65.2, 17.3, and -9.7 g) in trials 1, 2, and 3, respectively ($P < 0.01$). Diet ($P < 0.01$) and age ($P < 0.01$) affected NH₃ emissions. In trials 1, 2, and 3, daily NH₃ emissions from hens fed the R diets (185.5, 312.2, and 333.5 mg bird⁻¹) were less than those of hens fed the C diet (255.0, 560.5, and 616.3 mg bird⁻¹). Daily emissions of H₂S across trials

from hens fed the R diet were 4.08 mg bird⁻¹ compared to 1.320 mg bird⁻¹ from hens fed the C diet ($P < 0.01$). Diet ($P < 0.05$) and age ($P < 0.05$) affected emissions of CO₂ and CH₄. A diet effect ($P < 0.01$) NO emissions and an age effect on SO₂ emissions ($P < 0.01$) was observed. No diet or age effects ($P > 0.05$) were observed for NO₂ and non-methane total hydrocarbons. Results demonstrate that diet and laying age influence air emissions.

Key Words: hens, air emissions, diet, ammonia, hydrogen sulfide

S-M36 Impact of feeding program after light stimulation on reproductive performance of broiler breeder hens. L.C. Gibson*, A.J. Davis, and J.L. Wilson, *University of Georgia, Athens.*

Using a skip-a-day (SAD) feeding program from 2 weeks (WK) through 5% egg production is a common industry management practice to increase the uniformity of bird access to feed. To investigate the influence of this practice on reproductive performance, pullets were fed on a SAD basis during rearing and then divided into treatment groups at 21 WK of age. A sample of pullets was weighed weekly from 2 through 38 WK of age to ensure BW was maintained near breeder guidelines. All pullets were weighed at 20 weeks of age, to ensure that lay pens were similar in average body weight and body weight uniformity. At 21 weeks of age pullets were moved into laying facilities and 15 of the 30 experimental pens (35 hens and 4 roosters per pen) were changed to everyday feeding (ED) while the remaining 15 pens continued on SAD feeding until 8% egg production. At WK 26.5 all hens were placed on ED feeding. The coefficient of variation of bird weight was not significantly different between treatments at 26 WK and this relationship was maintained through peak egg production. Hens that received ED feed began lay at an earlier age (11 d), and through 38 WK of age ED fed hens laid significantly greater number of total eggs and hatching eggs than SAD fed hens. The results suggest that a SAD feeding program after light stimulation is detrimental to follicular development and maturation.

Key Words: broiler breeder hens, skip-a-day feeding, everyday feeding, egg production

S-M37 Influence of feeding level and body weight on reproductive performance, mortality and morbidity of slow feathering broiler breeder hens. A. Mendoza-Reilly^{*1}, A.J. Davis¹, G. Zavala¹, W.A. Dozier, III², and J.L. Wilson¹, ¹The University of Georgia, Athens, ²USDA-ARS, Southcentral Poultry Research Center, Mississippi.

Body weight (BW) uniformity and feeding level of breeding flocks has a profound effect on egg production. To determine if BW at sexual maturity and feeding level in lay influences reproduction characteristics in slow feathering broiler breeder hens, approximately 300, 12 WK old, pullets were obtained from a commercial facility. Low (L), average (A) or high (H) BW pullets were selected and transported to the experimental facility to complete the growth cycle. At 21 WK of age 288 pullets were placed in individual cages. All birds were fed the same diet (15% CP, 2920 kcal of ME/kg) but at a standard (STD) or STD plus consumption rate (STD+). The STD+ females received 4-8% more feed than the STD fed birds. Egg production, mortality, morbidity, and BW data were summarized on a weekly basis. At 40 wk of age hens were killed and reproductive measurements (ovary weight, oviduct weight,

and follicular development accessed) were completed. The H BW hens came into lay earlier and produced a greater number of total eggs and hatching eggs; A BW hens were intermediate in performance while the L BW weight hens had the lowest performance through 40 WK of age. Feed amount did not effect egg production. Overall mortality through 40 WK was 2% and morbidity was 8%. These hens stopped eating or severely reduced feed intake within 2-3 days of dying or becoming prostrated. Although, the morbid hens recovered, only 20% of them returned to a normal level of egg production. In a competitive environment, these morbid hens would likely not survive. Eighty percent of the hens that died during the trial were in the STD+ feed treatment. No differences were noted at 40 WK of age in ovary weight, oviduct weight or follicular development. These data confirm the importance of growing uniform breeder flocks and preventing excessive weight gain to optimize egg production.

Key Words: broiler breeder hen, body weight, feed amount, mortality, morbidity

S-M38 Effects of heavy or light body weight broiler breeder hens on reproductive characteristics and hatchability. A. Swaffar*, R.K. Bramwell, and D.E. Yoho, *The University of Arkansas, Fayetteville.*

Commercial broiler breeder hens are fed primarily to initiate and then maintain egg production. However, maintaining a previously determined body weight standard is also considered important. Hens that are either too heavy or underweight according to standards for that strain of breeder are believed to be inferior as broiler breeders. A study was set up to evaluate the effects of over or underweight breeder hens on reproductive characteristics such as egg production and hatchability. Forty seven wk old Cobb 500 broiler breeder hens were weighed and divided into three groups of birds with 55 hens per weight group. Average body weights for the three groups of birds were 7.60 lbs (L), 8.51 lbs (M), and 9.51 lbs (H) at the initiation of this trial. Five broiler breeder males were housed with each group of hens with the males rotated twice weekly between the three pens of hens. Egg production, egg weight, fertility, hatchability and complete embryo diagnosis was obtained from each of the pens of hens for four consecutive weeks. At the conclusion of the four-week period all males were removed from each pen of hens to determine average duration of sperm penetration for each of the body weight groups. Eggs produced per hen housed was greater for the M group of hens during the treatment period while fertility was greater for the L group as compared to the M and H groups (95.8, 91.8 and 92.8 % respectively). While hatchability was also greater for the L group of hens (81.6%) as compared to the M and H groups (75.5 and 79.0 %) overall chicks produced per hen housed for the duration of the trial was not significantly different between any of the three body weight groups. While there were numerical differences resulting from the embryodiagnosis, significant separation of the groups was not evident. In summary, while underweight broiler breeder hens had better fertility and hatchability, the lower egg production resulted in negligible effects of body weight on the number of chicks produce from each treatment group.

Key Words: broiler breeders, body weight, fertility, hatchability

S-M39 Feeding broiler breeder hens into a second production cycle following forced molting. D.E. Yoho*¹, R.K. Bramwell¹, C.N. Coon¹, and C. Wiernusz², ¹*The University of Arkansas, Fayetteville,* ²*Cobb-Vantress, Inc., Siloam Springs, Arkansas.*

The production cycle of most commercial broiler breeder flocks typically ends at about 65 weeks of age. Occasionally circumstances present themselves that utilizing a breeder flock for a second production cycle becomes necessary. In this trial a broiler breeder flock was molted and brought back into a second production cycle using either a patient or an aggressive feeding approach. At 65 weeks of age, 4080 Cobb 500 broiler breeder hens were obtained from a contract hen producer and randomly divided into 48 pens with 85 birds per pen and housed at the University of Arkansas Broiler Breeder Research farm. Feed was restricted and day length reduced until the flock had lost 25% of their initial body weight at housing, wherein the flock had achieved a complete cessation of their previous laying cycle. Following the previously designated weight loss all birds were fed an initial feed allotment of 17.5 lbs/100 hens per day. A 2 x 2 x 2 factorial experiment was designed with either a patient or more aggressive feeding approach. The three feeding programs implemented were: a) fed either a skip-a-day (SD) or every day (ED) feed until 5% production, b) weekly feed allotment increases of 1.25 (S) or 1.75 (F) lbs per 100 hens per day until 5% production, c) after 5% production fed a diet to obtain a peak feed of either 440 (LE) or 460 (HE) kcal at 60% production. All birds were fed on the same breeder-feeding program after they reached their apex in egg production. Each treatment group fed on the more aggressive feeding program (ED, F, and HE) laid more eggs per hen housed and those fed on the HE feed program obtained an overall higher peak egg production. In summary, taking a more aggressive approach when feeding broiler breeder hens into production for a second lay cycle following a forced molt resulted in more eggs produced per hen housed.

Key Words: broiler breeders, molting breeders

S-M40 Effect of broiler breeder male feeding program around photostimulation and during the production period on fertility and progeny performance. H. Romero-Sanchez*, P. Plumstead, and J. Brake, *North Carolina State University, Raleigh.*

Two experiments were conducted to evaluate different feed allocation programs around photostimulation and during the production period on broiler breeder fertility and broiler performance. In Experiment 1, Ross 344 males were randomly assigned to three treatments (Slow, Medium, or Fast) that varied in the rate of feed allocation from 16 to 26 wk of age. These feed programs provided a gradual increase from 85 to 110 g/male/d. Male feed allocation was also increased 5 g/d in at 55 wk of age after fertility had declined. In Experiment 2, the interaction between the Slow and Fast feeding programs in combination with two feeding programs during the production period (Constant or Increasing) was evaluated using a 2 X 2 factorial design. Birds were photostimulated at 21 wk of age when they were moved into the production facility. All males were weighed individually at 4, 8, 12, 16, 20, 24, 26, 28, 32, 40, 48, 56 and 64 wk of age. Furthermore, in Experiment 2, at 32 and 50 wk of age broilers were hatched to evaluate the treatment effect on progeny performance. Percentage fertility and embryo mortality was evaluated biweekly in both experiments.

In Experiment 1, the males on the Slow feed program exhibited significantly heavier BW at 40 wk and higher fertility after 46 wk of age.

However, no significant differences were observed after feed was increased in all treatments. In Experiment 2, late fertility was decreased for males that received the Constant program during the production period and this resulted in a lower progeny BW and poorer adjusted feed conversion at 42 d of age. Males that received Fast feed increments around photostimulation gained BW more rapidly and apparently required more feed to sustain their BW and maintain fertility. Increasing male feed allocation subsequently during production improved fertility and favorably impacted progeny performance.

Key Words: broiler breeders, feed program, fertility, broiler progeny

S-M41 Similarities and differences between the sperm quality index and sperm mobility index of broiler breeder semen. P.R. Dumpala*, H.M. Parker, and C.D. McDaniel, *Mississippi State University, Mississippi State.*

The sperm quality index (SQI) and sperm mobility index (SMI) both predict sperm motility and fertility. However, recent research, in which semen was diluted excessively (40 fold) for the SQI, failed to establish a link between the SMI and SQI. Therefore, we compared the SMI with the SQI of semen diluted only 10 fold. In the following four experiments, the response of the SQI and SMI were examined when: 1.) motile sperm and heat-inactivated, immotile sperm were incubated over time, 2.) motile sperm and immotile sperm were combined, 3.) live and dead sperm lysed by freezing were combined, and 4.) sperm were rendered immotile by the addition of Zn. For Experiment 1, the SQI for motile samples increased during the first 5 min of incubation and then stabilized, whereas the SQI for immotile semen remained at zero the entire study. Surprisingly, the SMI of immotile semen, after 15 min of incubation, rapidly increased yielding SMI values higher than motile samples after 30 min of incubation. The SMI of motile sperm steadily increased over incubation. For Experiment 2, the SQI increased quadratically with percentage of motile sperm, yet no relationship between the SMI and percentage of motile sperm could be established. In Experiment 3, the SQI also increased quadratically as viable sperm increased, whereas no relationship between the SMI and sperm viability was found. In fact, the SMI of semen that was nonviable was numerically higher than viable samples. For Experiment 4, the SQI of semen exposed to Zn declined linearly with incubation, while the SQI of semen stored in saline increased over incubation. The SMI of semen exposed to Zn was lower than that stored in saline. The SMI declined rapidly during the first 30-45 min of incubation and then stabilized during the rest of the study for both treatments. In conclusion, both the SQI and SMI of sperm decrease in response to Zn. However, it appears that immotile and dead sperm are capable of increasing SMI values but not SQI values.

Key Words: sperm quality index, sperm mobility, sperm motility, sperm viability

S-M42 Effect of temperature and egg size during incubation on broiler chick development and body weight. N. Leksrisompong*, H. Romero-Sanchez, P. Plumstead, and J. Brake, *North Carolina State University, Raleigh.*

An experiment was conducted to study the effects of incubation temperature and egg size on embryological development and chick BW.

Eggs were collected from a Ross 344 x Ross 308 parent flock, weighed, and sorted into three groups with median egg sizes of Small (52.5g), Average, (58.0g) and Large (63.5g). Egg temperatures and embryo development were determined for 12 eggs of each egg size which were labeled and set in the center of each of 8 replicate trays of 180 eggs located within two Natureform NMC-1000 incubators. During the first 13 d of incubation air temperature was maintained between 37.5 and 37.7 C following which one incubator was assigned to a High (39.4 - 40.6 C) and one incubator to a Normal (37.5 - 38.3 C) incubation temperature. Relative humidity was maintained at 53% in both machines. Egg temperatures were monitored with a Braun Thermoscan infrared thermometer. At 19 d eggs were transferred to specially modified plastic hatching baskets with identity of the 36 labeled eggs within each tray maintained by placing these within individual pedigree hatching baskets. At 21 d of incubation, chicks from each pedigree basket were removed individually and necropsied to determine BW and organ development. High incubation temperature decreased chick BW and the relative heart weight at hatch, while relative weights of the yolk sac, liver, gizzard, proventriculus, and small intestines were not affected. Chick BW was proportional to egg weight and Small eggs produced chicks with a smaller unabsorbed yolk sac than Average and Large sized eggs while Average and Large sized eggs produced chicks with proportionately smaller hearts and gizzards. There was no obvious relationship between egg temperature and egg size in our measurements to 19 d of incubation. However, negative effects of high incubation temperature on chick BW at hatching were greater for Large eggs than for Small eggs. These data suggest elevated incubation temperature and larger egg size to be detrimental to embryo development.

Key Words: incubation, egg sizes, temperature, broiler, organs

S-M43 Effect of ventilation during incubation on broiler egg temperature and embryonic development. K. Brannan*, P. Plumstead, H. Romero-Sanchez, N. Leksrisompong, and J. Brake, *North Carolina State University, Raleigh.*

High egg temperatures have been shown to be detrimental to embryonic development and effective ventilation in an incubator can be important to remove excess heat produced by the developing embryo during the last few days of incubation. Two experiments were conducted to evaluate the effects of altered ventilation rate during the hatching period (17-21 d) on egg temperature and subsequent embryological development. 1,710 Ross 344 x 508 broiler eggs were incubated to 17 d and then transferred to 9 plastic hatching baskets. Airflow through select hatching baskets was modified using tape to close openings around the top half or bottom half of the basket. The three treatments consisted of a bottom (tape applied across the bottom half of the basket), top (tape applied across the top half of the basket), and control group (a standard basket with no tape applied). Three replicate baskets of 190 eggs were assigned to each treatment at 17 d and egg temperatures monitored daily to 21 d using a Braun Thermoscan infrared thermometer. Following hatch, chicks were sexed and a sample of 7 male chicks in experiment 1 or 22 male chicks in experiment 2 were selected from each tray and killed prior to measuring BW, body length, unabsorbed residual yolk, heart, liver, proventriculus, gizzard, and small intestine weights. In experiment 1, while BW between treatments was similar, chicks hatched from the Top taped baskets had absorbed significantly more yolk versus the other two treatment groups and also had increased percent heart and liver. In experiment 2, treatment effects on BW and yolk appeared to be

dependent on position effects within the incubator. However, the top taped group again showed a significant increase in relative heart and liver weights when compared to the bottom taped and control groups. These data suggest altered air flow to modify the adverse effects of high egg temperatures in these experiments.

Key Words: Ventilation, Egg temperature, Organs, Embryonic development, Incubation

S-M44 Intraflock dynamics of *Salmonella* contamination in broilers throughout the production and processing continuum. V. Volkova*¹, K.B.R.C. Dazo¹, R.H. Bailey¹, J.A. Byrd², and R.W. Wills¹, ¹Mississippi State University, Mississippi State, ²USDA, ARS, Food and Feed Safety Research Unit, College Station, Texas.

The preliminary analysis reported here is part of an on-going project undertaken to identify risk factors associated with *Salmonella* status of broiler flocks at sequential segments of the production and processing continuum. One of the risk factors considered is a flock's *Salmonella* contamination status as it changes from upon arrival from the hatchery at a grow-out farm to the end of the carcasses processing. Flock's *Salmonella* status was measured by different sample types at sequential production segments: upon arrival from the hatchery at a grow-out farm (30 transport tray pads (TP) and gastrointestinal track (GI) samples from 30 chicks from the corresponding trays); one-week before processing (whole carcass rinse (WC), ceca (CA) and crop (CP) samples from each of 30 birds); upon arrival at the processing plant (WC, CA and CP samples from each of 30 birds); prior to the chill tank (rinses from 30 carcasses); and immediately after the chill tank (rinses from 30 carcasses). Presence of *Salmonella* was evaluated in 54 broiler flocks from 27 farms. Logistic regression was used to model the relationships between a flock's *Salmonella* status at sequential production segments as measured by different sample types. Preliminary analysis revealed significant associations among several sample types at different segments providing insight into the dynamics of *Salmonella* contamination of broilers throughout the production and processing continuum.

Key Words: *Salmonella*, Food safety, Epidemiology, Broilers, Poultry

S-M45 Broiler performance as affected by phytase and chloride supplementation to reduced phosphorus broiler grower and finisher diets. P. Plumstead*¹, R. Maguire², H. Romero-Sanchez¹, N. Lekrisompong¹, and J. Brake¹, ¹North Carolina State University, Raleigh, ²North Carolina State University, Raleigh.

A study was conducted to evaluate effects of supplementing a thermo stable bacterial derived phytase (Quantum™) at two levels of dietary chloride (Cl) in broiler grower and finisher diets with reduced available phosphorus (AvP). Fourteen male and 14 female Ross 344 x 508 broiler chicks were assigned to each of 72 floor pens. All birds received 906g of a broiler starter feed (0.45% AvP) after which 12 dietary treatments were applied in a randomized complete block design to each of six replicate pens during the grower and finisher phases to 28, and 42 d of age, respectively. A 3 x 2 x 2 factorial treatment structure was used with 3 AvP levels in the grower and finisher diets of High (0.35%, 0.35%), Med (0.35%, 0.25%) or Low (0.25% and 0.25%) to which combinations of two levels of Cl (0.34% and 0.56%) and two levels of added phytase (0 and 600 FTU) were applied. The AvP level of phytase amended diets was held constant by replacing 0.10% of the inorganic phosphorus from dicalcium phosphate with 600 FTU of phytase, while the Cl level of treatments was increased by adding 3.8g/kg of ammonium chloride. All diets were pelleted with conditioning temperatures in excess of 80 °C. Independent of AvP level, phytase supplementation significantly increased 42 d male and female BW by 25 and 30g, respectively, and reduced 42 d mortality corrected feed conversion from 1.84 to 1.82 (P<0.05). AvP level had no effect on 42 d BW. Effects of AvP or phytase on 42 d BW may have been further reduced by high heat stress related mortality of faster growing birds from 35-42 d. This was supported by the mean BW of all mortality being 327g higher for the High vs. Low AvP regimen and 387g higher for treatments receiving the phytase amended diets. Elevated Cl level increased BW at 28 d but beneficial effects were no longer evident at 42 d which was in part due to high late mortality of this treatment.

Key Words: Poultry, Broiler, Phosphorus, Phytase, Ammonium Chloride

Monday, January 23 Processing & Products I Room: B315

S-M46 Thyme as an antioxidant in broiler chicken meat. A.M. Raji* and F.O. Ajasin, *Adewura Farms, Lagos and Federal College of Animal Health and Production Technology, IAR&T, Ibadan, Nigeria.*

Lipids in various foods undergo oxidative deterioration at all stages from handling through processing, storage, distribution and utilization. Antioxidants are capable of delaying or preventing the development of deterioration reaction due to oxidation. Thymus vulgaris(thyme) oil and a number of its constituent compounds have been shown to possess strong antioxidative properties. Because of the concern being raised as to the safety of synthetic compounds as conventional antioxidants; world-

wide interest from natural sources is growing. This study was carried out to investigate the potential of dried leaves of *Thymus vulgaris* as an antioxidant in refrigerated fresh broiler-chicken meat. 24 male broiler-chickens averaging 2.9kg live weight were used. The muscle tissues of each were separated, minced and mixed thoroughly, divided into 5 parts and weighed. Thyme at 0, 0.5, 1.0, 1.5 or 2.0% w/w was added to each portion in grinder and thoroughly mixed. One pack each of fresh meat portions were frozen immediately. Extent of oxidation of the meat was determined by quantification of malonaldehydes content using the thiobarbituric acid (TBA) test. Encouraging results obtained indicate that thyme is a natural antioxidant in muscle tissue. With increasing inclusion level of thyme up to 2.0% evaluated, oxidation of fats and