11 Effect of broiler breeder age on progeny performance, bone mineralization, and organ development up to 21 d of age. Hernan A. Cordova* and Diego A. Chaves, Universidad Central del Ecuador, Quito, Ecuador.

Broiler breeder age could have a major effect on the development of organs and leg health of their progeny, which could affect on live performance later in life. This experiment was conducted to evaluate the effect of broiler breeder age on performance, bone mineralization, and organ development of the progeny from 0 to 21 d of age. A total of 432 1-d-old male birds from 3 different breeder ages (40-, 60-, and 73-wk-old molted breeders) were randomly allocated to 36 cages with 12 replicates per breeder age. For the 73-wk-old molted breeder treatment, 216 female hens were molting at 55 wk of age. The fasting period for molting was 14 d. Broiler body weight was recorded at hatch, 7, 14, and 21 d of age. Feed conversion ratio, BW gain, and feed intake were calculated at the end of each wk. At 14 d, one bird per cage was euthanized and shank samples were collected to analyze ash content. Breast meat yield, relative organ weights, and villi height were calculated at 21 d. Data were analyzed as completely randomized design using JMP software. No significant effect (P > 0.05) of breeder age was detected for BW, feed intake, BW gain, and feed conversion ratio at 14 and 21 d of age. However, significant effects of breeder age were observed on bone ash content (P < 0.01). The highest value of ash content was detected in broilers from younger breeders (40 wk old). Whereas the value of ash content obtained in broilers from older breeders (60 and 73 wk old) showed no significant difference between these 2 treatments. Villi height was not affected (P > 0.05) by treatments for duodenum and ileum regions. We concluded that female breeder age did not affect live performance parameters of male broilers at 21 d of age. However, bone mineralization in progeny could be affected by breeder age.

Key Words: breeder age, progeny, bone mineralization, organ development, molted breeders.

12 Effect of different feeding schedules on reproductive quality on broiler breeders. Angélica Londero*, Alexandre Pires Rosa, Catiane Orso, Janaina Santos de Moura, Karine P. Pontin, Mariane Oliveira Fernandes, Daniele Pozzebon Rosa, and Lourdes Bernadete Padilha Brittes, Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil.

The objective of this study was to evaluate different feeding schedules on productive and reproductive performance of broiler breeder. The feeding schedules were: a single feeding at 8:00 am, twice daily feeding (50% at 8:00 am and 50% at 3:00 pm), and single feeding at 3:00 pm. We used 330 females and 45 males (Cobb 500) broiler breeders from 28 to 65 wk of age. The experimental design was completely randomized with 3 treatments of 5 replicates with 22 females and 3 males. Productive parameters were body weight (BW), egg production (EP), and eggs laid on the floor (EF). The reproductive parameters were fertility (F), hatchability of fertile eggs (HF), and hatchability of total eggs (HT). The non-hatched eggs were subjected to embryo diagnostics and classified through a macroscopic visual examination as infertile, embryonic mortality at the first 48 h of incubation (EM1), between 3 and 7 d (EM2), 8 and 14 d (EM3), and 15 d until hatched (EM4). Also total embryonic mortality (TM), pipped (P), contaminated (C), and number (NC) and weight of chicks (WC). At the 65 wk of age, 3 hens per pen were used to evaluate ovary (O) and oviduct weight (OW), number of small white follicles (SWF), small yellow follicles (SYF), and big yellow follicles (BYF). The data were analyzed by ANOVA when significant at 10% were submitted to Tukey’s test. Broiler breeders fed at 3:00 pm had greater BW than others (P < 0.0010). Hens fed at 3:00 pm had lower EP in the total period (P < 0.0621) and higher EF than hens fed twice at 8:00 am and 3 pm (P < 0.0674). The HT was greatest for hens fed 8:00 am (P < 0.0042). The F (P < 0.0799) and HF (P = 0.0152) for hens fed at 8:00 am was higher than for hens fed at 3:00 pm. The EM2 was greater for hens fed at 3:00 pm than others (P < 0.0103). Hens fed at 3:00 pm had higher TM (P < 0.0068) and lower NC (P < 0.0279) than hens fed at 8:00 am. Hens fed at 3:00 pm had the highest ovary weight (P < 0.0113). The variables EM1, EM3, EM4, P, C, WC, OW, SWF, SYF, and BYF did not differ for the different feeding schedules. We concluded that hens fed at 3:00 pm had greater increased body weight, resulting in the decline of reproductive parameters.

Key Words: egg, body weight, embryonic mortality, hatchability, follicle.

13 Efficiency of ultraviolet light in fertile eggs disinfection. José Renato de Oliveira Branco*, Francisco Ernesto Moreno Bernal, Bruno Stéfano Lima Dallago, and Conceita Margaret McManus Pimentel, Universidade de Brasília, Brasília, Distrito Federal, Brazil.

This investigation was divided into 2 experiments. The first part aimed to compare the disinfection efficiency of a 254-nm UV light (UV-C) and a routine protocol with paraformaldehyde. Eggs from mated hens at 36 wk of age were exposed to the following treatments: untreated eggs; 1, 3, 5, 7, 9 min of UV-C light and paraformaldehyde 5 g/m³. A prototype to turn the eggs was developed to expose all egg shell to the UV-C lamp placed on the upper part of the laminar flow cabinet used. For each treatment 35 eggs were individually and aseptically placed into sterile plastic bags containing 20 mL of sterile-phosphate buffered solution. After 1 min of gentle hand massage 1mL of the rinse solution of each bag was diluted on the proportion 1:10 and plated on aerobic plate counts (APC) for further incubation at 37°C during 48 h. Assessment of bacterial growth has detected a negative correlation with UV-C treatment duration and significant reduction of 0.68 log10 UFC after 5 min of exposition. Paraformaldehyde was significantly more effective than all UV-C treatments except for the 9 min protocol. All data were analyzed with Fisher’s exact test (P < 0.05) and means evaluated using Tukey method (P < 0.05). To study interference of disinfection protocols in the hatchability, 3 incubations with 35 untreated eggs, 35 eggs from paraformaldehyde group and 35 eggs treated with 9 min of UV-C were held. All eggs came from the same flock living 38, 42, and 48 wk at the moment they were collected and set. At first incubation the difference on hatchability of fertile eggs was at maximum 0.70% between all treatments. This difference persisted at second and third incubation between disinfected groups. From the results of these trials it was possible to infer that egg shell disinfection using UV light has growing potential according to the time of exposure. Bacterial reduction similar to paraformaldehyde protocol was detected only after 9 min of UV-C exposition, and hatchability of fertile eggs was not negatively affected by UV-C light when compared with the paraformaldehyde or to the control group.

Key Words: eggshell, exposure, paraformaldehyde, treatment, hatchability.
14 Effects of single and multistage incubation systems under commercial conditions on broiler live performance and leg health. P. H. S. Ferzola*1,2, E. O. Oviedo-Rondón1, A. H. Sarsour1, and H. A. Córdova1, 1Prestige Department of Poultry Science, Raleigh, NC, USA, 2Federal University of Rio Grande do Sul, Porto Alegre, RS, Brazil.

Incubation conditions affect embryo development and consequently growth and development of chicks post-hatch. This experiment was conducted to evaluate the effect of single (SS) and multistage (MS) incubation systems on large broiler live performance and leg health. 240,000 eggs were randomly distributed into 5 setters, one SS Jamesway and 4 MS ChickMaster. In the SS, machine set points were managed to maintain eggshell temperatures close to 37.8°C. In the hatchers temperatures were step down up to 35.6°C. In the other 4 MS setters, machine set points were 37.5°C for 18.5 d of incubation and in the hatchers temperatures were reduced up to 33.6°C at the end of incubation. At hatch, 76,400 chicks were placed in a farm with 4 identical houses (2/treatment). Random samples of chickens were weighed at 14, 28, and 49 d of age, and the whole flock weighed at the processing plant at 60 d of age. A total of 280 chickens per treatment were individually evaluated in each period for footpad dermatitis (FPD) severity and incidence, and leg health issues such as valgus (VL), varus, hock burns, red hocks (RH), twisted legs and crooked toes. Data were analyzed as a completely randomized design with ANOVA. No differences (P > 0.05) were observed on BW. At 49 d of age, MS broilers were on average 38.4 g heavier than SS broilers. No differences (P > 0.05) due to incubation conditions were observed on FPD at any of the times evaluated. Valgus incidence was not different at 14 and 49 d of age, but at 28 d of age VL, and RH were higher for SS chickens. The grow out data of the whole flock at 60 d of age clearly indicated that the MS flock had better BW, livability, feed conversion, lower first week mortality (1.44 vs. 1.52%), and half of the farm condemnations (0.11 vs. 0.25%) observed in the SS flock. In conclusion, incubation conditions evaluated in this trial did not cause significant differences on grow out parameters, incidence of FPD, and only a few effects were detected on leg health. Some deleterious effects of SS incubation were observed due mainly to elevated temperatures in hatchers.

Key Words: single stage, multistage, live performance, footpad dermatitis, leg health issue

15 Weight gain estimate of broiler chicks using digital image analysis. Carlos Gutemberg de Souza Teles Júnior*1, Richard S. Gates2, Ilda de Fátima Ferreira Tinôco1, Monique de Oliveira Vilela1, Cecília de Fatima Souza1, Marcia Gabrielle Lima Candido1, Leticia Cibele da Silva Ramos Freitas1, Tatiani Carvalho dos Santos1, Catia Borges Ferreira3, and Keller Sullivan Oliveira Rocha2, 1Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil, 2University of Illinois, Urbana, IL, USA, 3Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil.

The aim of this study was to develop an algorithm to determine the broiler’s surface body area increase through digital image analysis and estimate their weekly body mass gain, based on the body surface area increase and its age. The animals were subjected to 3 different thermal conditions (thermoneutral condition, moderate cold, and severe cold). The animals’ weight gain was recorded weekly in each considered thermal environment. A sample of 120 animals per thermal environment for the weight gain determination was used. The images relating to the animals’ activities monitoring were processed and analyzed using the computer program MATLAB 7.9, from which information regarding the broiler body surface area were extracted. The data related to weekly weight gain and increased weekly body surface area of the animals were subjected to nonlinear regression in SigmaPlot software, which was extracted estimation model of weekly gain weight of animals based on generated response surface. The model chosen to represent the variation in weekly broiler weight gain, due to their age and your body surface area increase, was Lorentzian. It was found that weight gain and broiler body surface area increase showed an increasing trend over the creation weeks, independent of the thermal environment to which the animals were created. The model was evaluated based on the significance of the regression and of the regression parameters and of the coefficient of determination (R^2), also evaluated the percentage error, by comparing the estimated results by the model and the animals’ weight gain data measured in the traditional way. The proposed model for the broiler weight gain estimate was adequate with coefficient of determination R^2 equal to 0.9995. In addition, variance regression analysis and evaluation of the regression parameters were significant with (P < 0.05). The proposed model showed a low error percentage on average 0.7% and high correlation R = 0.9998 between the data obtained by the model and the manual weighing.

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Key Words: mathematical modeling, precision animal production, production management, productive performance, thermal environment