Broiler trials, using feeds with varying WE-AX and WU-AX levels (wheat and/or corn based) showed that the AME-uplift obtained by Nutrase Xyla is correlated with the level and type of AX. AX-dependant enzyme energy factors were calculated and put in the prediction model : AME_{NX} (kcal/kg) = AME + 100*WE-AX (%) + 25*WU-AX (%)
To validate the model, diets with very low and high AX levels were made, using respectively sorghum or rye as main cereal sources. Four treatments were tested : sorghum control, sorghum +Nutrase Xyla, rye control and rye +Nutrase Xyla. Each treatment had 12 floor pens of 15 Ross 308 broilers (6 males and 6 females). Feed intake, body weight (BW) and mortality were measured at d42, weight adjusted feed conversion (WAFC) was calculated.
In the sorghum diet (0.1 % WE-AX, 2.5 % WU-AX) an enzyme effect on AME of 73 kcal/kg is predicted. Adding Nutrase Xyla improved BW gain by 6.7 % and WAFC by 2.4 % ($P<0.05$). This equals an energy liberation of 74 kcal/kg and confirms the estimation based on the prediction model.
In the rye diet (1.4% WE-AX, 3.2% WU-AX levels) an enzyme AME increase of 220 kcal/kg is expected. Zootechnical results improved by 19.6 % for BW gain and by 9.7 % for WAFC ($P<0.05$) . Energy liberation corresponding to these zootechnical data is 301 kcal/kg. These results demonstrate that the energy uplift, calculated according to the prediction model, even underestimated the actual energy release by Nutrase Xyla. One may conclude that the model established mainly from wheat and corn trials was also valid for estimating energy upgrading in diets with extreme AX levels.

Key Words: Nutrase Xyla, bacterial endoxylanase, arabinoxylan, AME-uplift model, broiler

T114 Performance and amino acid utilization by broilers supplemented with a novel exogenous protease. S. L. Vieira*[1], D. M. Freitas[1], J. E. M. Peña[1], R. Barros[1], P. S. Xavier[1], A. C. Vian[1], and J. O. B. Sorbara[2], [1]*Universidade Federal do Rio Grande do Sul*, *Porto Alegre, RS, Brazil*, [2]*DSM Nutritional Products*, *São Paulo, SP, Brazil*.

A total of 1,512 Ross X Ross 308 male broiler chicks were placed in 54 floor pens, 28 in each. Birds were fed diets formulated with corn, soybean meal and meat and bone meal using Brazilian standard energy and nutrient recommendations. Diets were supplemented with 0, 100, 200, 400, 800 and 1,600 g/Ton of a novel protease (RONOZYME® ProAct: 75,000 PROT/g where 1 PROT is the amount of enzyme that releases 1 µmol of p-nitroaniline from 1 mM of Suc-Ala-Ala-Pro-Phe-pNA per minute at pH 9.0 and 37°C). Treatments were distributed in a complete randomized design with 9 replications. Broilers were fed the experimental diets from placement to 40 d when eight birds per pen were taken randomly from each pen and sacrificed after electrical stunning. Ileal contents were taken from each processed bird and pooled by pen for amino acid analyses. Titanium oxide was added as a marker in the last week's diet at 1 kg/Ton. There was no significant response for body weight gain; however, FC was linearly improved ($P\leq0.01$) as enzyme increased in the diet. Birds supplemented with the enzyme had improved ($P\leq0.05$) uniformity in body weight at 40 d. Ileal digestibilities of methionine and histidine improved ($P\leq0.10$) by 4 and 2%, respectively, when enzyme was added, regardless of enzyme level.

Key Words: enzyme, protease, amino acid, digestibility, performance

Pathology / Environment and Management IV

T115 Nitric oxide concentration and blood cell count in chicks challenged with LPS thypimurium with the use of a plant extract. J. C. Garcia-Lopez*, H. I. Contreras-Trevino, Y. Jasso-Pineda, and G. Alvarez-Fuentes, *Universidad Autonoma de San Luis Potosi*, *San Luis Potosi, SLP, Mexico*.

Back yard poultry production in México is a very important activity for low income producers in rural areas; poultry products are used as a source of animal protein, especially for children. However, broiler production is severe affected by gastro intestinal pathogens, among them is *Salmonella spp* that has a large negative effect on reproduction and production parameters. Antibiotics are not an option because of high cost, alternatives are under study to counteract this problem, medicinal plants could be an option for this kind of producers. A complete randomized experiment was performed to test the effect of the plant *Crhysactinia mexicana* extract. 80 day old Cobb chicks were assigned to following treatments: T1 control; T2 control with LPS challenge and no plant extract; T3 control with LPS challenge and plant extract and; T4 control no LPS challenge and plant extract. Plant extract was administered oral via 20 mg/ml during 14 days, on day 15 LPS thypimurium was injected intra abdominally, after five hours post injection blood samples were obtained by cardiac puncture and nitrate concentration and blood cell count was determined. There was a statistical difference ($P<0.05$) in nitrite concentration, with the highest level in T2 with 23.3 micromolar than the one found for T3 with 9.8 micromolar, T1 and T4 had lower levels as expected. There were statistical differences ($P<0.05$) in Erythrocyte count, T2 and T3 had the highest values versus T1 and T4, same occur in leukocyte count were T2 and T3 had the highest values. According with these results the use on the plant extract could be a toll for the backyard poultry producers by reducing the impact of bacteria in chick performance.

Key Words: chick, *Salmonella*, plant extract, nitric oxide, leukocyte

T116 Effects of fumonisins added to feed for broilers. J. A. Fierro*[1], J. C. Medina[1], R. Perez-Franco[1], and E. Rodriguez[2], [1]*NUTEK S.A. de C.V.*, *Tehuacan, Puebla, Mexico*, [2]*Investigacion Aplicada S.A. de C.V.*, *Tehuacan, Puebla, Mexico*.

Weight losses and liver lesions have been reported to occur in Brazil at levels under 50 ppm of FB1 on the diets of broilers. In order to verify the validity of this statement, an experiment was performed on broilers to demonstrate whether the concentration of 100 ppm of fumonisin B1 (FB1) produced any effects on weight gain and liver damage.
40 one day old Hubbard broilers were used, distributed into two groups of 4 birds, with 5 repetitions. The diets were identified as: Control Group (CG) and FB1 Group (FB1G). The fumonisins were collected from highly contaminated samples. The absence of other mycotoxins in the feeds was determined using analytical instruments: aflatoxins, zearalenone, T-2 toxin, ochratoxin A and deoxynivalenol. The concentration of FB1 in the contaminated feed was confirmed by HPLC.
The birds were weighed at day one of age and the individual weight was recorded on a weekly basis until the end of the experiment. The feed

intake was calculated weekly. At 21 days of age, 10 birds were bled and culled; the livers were removed and weighed individually. Samples were submitted to the laboratory for histopathology assays. The information generated was analyzed using SYSTAT, on Tukey test results. The signification value was based on a probability of 0.05.
No statistically significant differences were observed between both groups on weight gain ((CG: 782 ± 11.1g a vs. FB1G: 797 ± 10.5 g a) and feed intake during the experimental period (CG: 1.36 ± 0.017 a vs. FB1G: 1.33 ± 0.018 a). No macroscopic lesions were observed on the group with Fumonisins, and no effect on the histology was reported. There were no significant differences on the relative weight of the liver. The concentration of total proteins and gama-glutamil transferase was the same in both groups, except for the albumin (CG: 1.49 ± 0.024a vs. FB:1G 1.65 ± 0.051b).
It can be concluded that the FB1 at 100 ppm concentration has no toxic effect on the weight of the broilers. The concentration of other fumonisins was not determined.

Key Words: fumonisins, fumonisin B1, mycotoxins, liver, broiler

T117 The effects of 1.5 ppm T-2 toxin on performance, lesions and general health of male broiler and the efficiency of a mycotoxin deactivator to counteract. V. H. Starkl*[1] and M. Forat[2], [1]*Biomin GmbH*, *Herzogenburg, Austria*, [2]*Instituto Internacional de Investigación Animal*, *Querétaro, Mexico*.

T-2 toxin is a mycotoxin affecting broilers health and performance. Due to its chemical structure T-2 toxin cannot be adsorbed by mycotoxin binders. A trial was performed to evaluate the toxic effects of a low contamination of T-2 toxin and the efficacy of a mycotoxin deactivator based on biotransformation to destroy T-2 toxin during digestion. 90 Ross 308 male broiler were randomly allocated into 5 groups: group 1 - negative control, group 2 - 1.5ppm T-2 toxin, group 3 - 1.5 ppm T-2 toxin + mycotoxin deactivator 1, group 4 - 1.5 ppm + mycotoxin deactivator 2, group 5 - mycotoxin deactivator 2. Birds were fed respective diets from day 10 of life until day 39. Body weight was evaluated at the beginning (day 10) and at the end of the experiment. At day 39 consumption and weight gain, feed conversion and mortality were calculated. Lesions of the bucal cavity, feces and feathers were scored; general behavior was reported. Results showed that 1.5 ppm of T-2 toxin had a significant impact on overall feed consumption, weight gain, feed conversion and mortality. Contamination with T-2 toxin furthermore led to an increased number of birds with bucal lesions. All negative effects were completely overcome by the inclusion of mycotoxin deactivator containing a T-2 toxin degrading microorganism. None of the birds showed abnormalities in behavior or appearance. In conclusion it can be stated that T-2 toxin at low concentrations showed detrimental effects on broilers health and performance, and that the mycotoxin deactivator during digestion can be considered as an adequate approach to counteract the negative effect. The fact that lesions were reduced to a great extent in the treated groups confirms that lesions are not only caused by the skin-irritating effect of T-2 toxin but also by its systemic impact.

Key Words: T-2 toxin, broiler, biotransformation

T118 *Bacillus licheniformis* (GalliPro Tect) prevents necrotic enteritis and improves performance in broiler chickens. I. Knap* and B. Lund, *Chr. Hansen*, *Hoersholm, Denmark*.

Bacillus licheniformis can prevent necrotic enteritis in *C. perfringens* challenge studies. To understand both the mode of action of the NE preventing effect of *Bacillus licheniformis* and the performance under non- challenge condition, new studies were performed.
Three *C. perfringens* challenge studies were carried out at Southern Poultry Research, Inc.; two cage studies and one floor pen study. In the studies different doses of Bacillus spores were tested from 8E+5 CFU/G to 8E+7 CFU/G. All challenge studies included a non challenged control group, challenged group without additive and a positive control with Virginamycin 15 g/t . Unmedicated commercial chicken feeds commonly used in the United States were used in all studies. Feed and water were available ad libitum throughout all trials. The Clostridia challenge was made using fresh *C. perfringens* broth culture given to the birds in 2 or 3 days. Weight gain, feed consumption, feed conversion, lesion scores, intestinal Clostridia counts and mortality were reported. In the non challenged study weight gain and FCR were measured.
In all challenged trials a significant effect was seen of using *B. licheniformis* with regards to lesion score, mortality, weight gain and FCR. There was no significant difference between the *B. licheniformis* treatments and the Virginamycin treatment with regards to mortality and lesion score. A dose of 1.6E+6 CFU/G feed seems to be optimal to prevent necrotic enteritis. In the non challenged trial a significant effect on feed conversion was seen.
Bacillus licheniformis used as a DFM improves production performance and can prevent necrotic enteritis in challenged broiler chickens.

Key Words: *B. licheniformis*, necrotic enteritis, *C. perfringens*, DFM

T119 Bone biomechanical properties in four strains of turkeys. E. O. Oviedo-Rondón*[1], P. E. Eusebio-Balcazar[1], P. L. Mente[2], B. D. X. Lascelles[3], J. Grimes[1], and A. Mitchell[4], [1]*Poultry Science Department, North Carolina State University*, *Raleigh*, [2]*Department of Biomedical Engineering, COE, North Carolina State University*, *Raleigh*, [3]*Department of Clinical Sciences, CVM, North Carolina State University*, *Raleigh*, [4]*USDA-ARS, BARC*, *Beltsville, MD*.

Genetic selection can be used to reduce incidence of leg problems in poultry. However, it is important to identify the appropriate bone architecture and biomechanical parameters that correlate with less leg problems and stronger bones. The objective of this experiment was to establish differences on bone biomechanical properties among four strains of turkeys at 20 wks of age. These strains were identified as A, B, C and D. Strain D had significantly less leg problems than the other strains and higher bone mineral density (BMD) at 20 wks. Ten healthy tom turkeys of each strain were selected from flocks that were incubated, fed, and raised under the same conditions in floor pens in an experimental house. All turkeys were sacrificed, legs collected and frozen for analyses. Weights and morphologic measurements of femur, tibia and shanks were recorded. Tibia strength was evaluated by four point bending test and femur strength was evaluated in torsion test. The strain C had shorter ($P<0.05$) femurs than A, but the femur length of these two strains were not different from those of the other two strains. Strain D had the smallest diaphyseal angle ($P<0.05$), indicating more

curvature in their femurs. Turkeys of strain D had also the smallest (P<0.05) tibia perimeters of all four strains, but the thickest cortical thickness (P<0.05). This strain had the highest (P<0.05) applied bending moment and maximum bending stress values, indicative of stronger bone material. The lowest value (P<0.05) of applied moment in four point bending test for tibias, and the lowest maximum shear stress at failure in torsion test for femurs were observed in toms of the C strain. Differences in the parameters of right and left leg bones from the same toms were observed. Genetic differences on bone biomechanical properties were corroborated and these correlate with the incidence of leg problems in each strain. Higher BMD, tibial cortical thickness, and smaller femur diaphyseal angle are correlated with stronger bones.

Key Words: turkeys, bone biomechanics, bone strength, genetics, leg problems

T120 *Bacillus subtilis* (GalliPro) reduces the level of *Campylobacter* in broiler chickens. M. Raun, M. Bennedsen, N. Milora, and I. Knap*, *Chr. Hansen*, *Hoersholm, Denmark*.

To evaluate if *B. subtilis* can improve the food safety of broiler chickens by reducing the level of *Campylobacter* in the GI track, a study was carried out at Southern Poultry Research, Inc on male broiler chickens (Cobb X Cobb) in a battery trial. There were two groups, one control group fed with standard, non medicated commercial broiler feed and one group fed the same feed with the addition of *B. subtilis* at 08E+5 CFU/g feed. At day 22 the ileum and caecal sacs were removed. DNA was extracted from the samples with QIAmp DNA Stool Mini Kit (Qiagen). A standard curve was prepared by spiking ileum samples with a serial dilution containing a known concentration of *Campylobacter jejuni*, followed by DNA-extraction. Real-Time PCR on the samples was run using Taqman *C. jejuni* Detection Kit. With this kit a simple, reliable and rapid procedure for detecting the presence of a specific bacterial pathogen was provided. The assay utilizes the PCR to amplify a target unique to the microorganism. A TaqMan probes containing FAM dye signal for the target DNA and VIC dye signal for the internal positive control were used to detect the presence of the *C. jejuni* in the samples. The results on ceacum samples showed a significant reduction of 52% in *Campylobacter* in the *B. subtilis* treated group (CFU/g 2.13E+07) compared to the control group (CFU/g 4.08E+07) In the ileum samples there was a 40% reduction. The number of *Campylobacter* in the *B. subtilis* treated group was 5.64E+03 and 9.25E+03 in the control group. Use of probiotic *B. subtilis* can reduce the level of Campylobacter in broiler chickens and improve food safety.

Key Words: campylobacter, probiotic, food safety, chicken

T121 Comparative efficacy of citrex liquid (drinking water acidifier) or citrexpPowder (feed acidifier) for the control of necrotic enteritis caused by *Clostridium perfringens* in broiler chickens. G. F. Mathis*[1], C. Hofacre[2], and M. Contreras[3], [1]*Southern Poultry Research, Inc.*, *Athens, GA*, [2]*University of Georgia*, *Athens*, [3]*Citrex, Inc.*, *Miami, FL*.

The objective of the study was to evaluate the anticlostridial efficacy of acidifiers administered in the dinking water or feed or Virginiamycin. A randomized block design with 7 replications of 8 birds per cage was used. The treatments were nonmedicated, non-challenged (NMNC), nonmedicated, challenged (NMC), Citrex Liquid 200 ppm or 300 ppm, Citrex Powder 400 ppm or 600 ppm, and Virginiamycin (VIR) 22 ppm. Birds (12 days of age) were placed into cages and issued treatment water or feed (DOT 0). Treatment water or feed was available ad libitum throughout the test period (DOT 0-16). On DOT 2, birds were challenged with E. maxima and on DOTs 7, 8, and 9 with *Clostridium perfringens*. On DOT 10, three birds per cage were NE lesion scored (scoring range 0-3). The parameters measured were feed conversion and weight gain (DOT 0 to 10 and DOT 0 to 16), Necrotic Enteritis (NE) mortality and NE lesion scores. Using tukey (HSD) comparison of means test, the results showed that there was a significant improvement in performance (feed conversion and weight gain) at both weigh periods for all treatments compared to the NMC treatment birds. The percent NE mortality for NMC was 12.5 % was significantly higher than with all other treatments. The percent NE mortality for all treatments was not significantly different (range 0 to 3.6%). The average NE lesion score for NMC was significantly higher than observed with all other treatments. This study demonstrated the benefits using an acidifier either in the drinking water or feed of broiler chickens exposed to *Clostridium perfringens*.

Key Words: *Clostridium perfringens*, citrex Liquid, citrex Powder, Virginiamycin, necrotic Enteritis

T122 Feeding low crude protein levels and the effect on broiler breeder hatching egg fertility and hatchability. R. K. Bramwell*[1], J. R. Moyle[1], D. E. Yoho[1], S. M. Whipple[1], R. S. Harper[1], C. N. Coon[1], and K. J. Wilson[2], [1]*University of Arkansas*, *Fayetteville*, [2]*Georges, Inc.*, *Springdale, AR*.

Most feed management programs for Broiler Breeders are designed to maximize egg production more so than targeting hatchability, with fertility typically associated with male conditioning and mating activity. In the past, crude protein levels in Broiler Breeder diets have been manipulated and decreased in an effort to improve egg production. In this study, varying crude protein levels were fed to both the hen and the rooster in the same manner the majority of the poultry industry utilizes. Therefore, the objective of this study was to feed a control diet (15.5% CP; T1) and two lower protein diets (14.5% and 13.5% CP; T2 and T3, respectively) at onset of egg production to both the males and females and measure fertility, hatchability, hatch of fertile and embryo mortality and sperm penetration values. 500 female and 100 male commercial strain broiler breeders were reared from eight weeks to 21 weeks of age on the same diet and were fed according to industry standards. At 21 weeks of age, all birds were randomly assigned to one of the three treatment groups with three males and 25 females randomly placed in pens with six replicate pens per group. Birds were fed an identical ration until egg production reached five percent for an entire treatment group, at which time the treatment group was placed on either a T1, T2, or T3 CP diet and fed daily allotments to meet industry recommendations. There was no significant difference in fertility at 35 weeks of age 96.26%, 96.16% and 96.69% respectively or hatchability 89.95%, 89.27, and 87.51 respectively. Through 60 weeks of age hatch of fertile remained insignificant at 86.03%, 86.65% and 86.24% respectively. In this study, results indicate that lowering dietary crude protein had little effect on fertility and hatchability while lowering overall feed costs.

Key Words: broiler breeder, crude protein, fertility, hatchability

T123 Comparative physiological capacity for fertility in broiler breeder hen lines with differing body weight characteristics. R. K. Bramwell*, D. E. Yoho, J. R. Moyle, and S. M. Whipple, *Department of Poultry Science, University of Arkansas*, *Fayetteville*.

Evaluating fertility in commercial broiler breeder flocks has traditional been targeted at the male. However, previous research has shown variation in the ability of individual broiler breeder hens to become fertilized. This variability is consistent to specific hens throughout their reproductive life. This study was designed to evaluate the physiological capacity of different strains of Broiler Breeder hens (Cobb 500ff, 500sf, 700e, and Avian 48) to become fertilized under conditions of age and body weight. Two hundred pullets from each strain of broiler breeders were obtained from a commercial hatchery and reared into production according to industry standards. At 21 weeks of age, birds were light stimulated and separated into one of two groups; either at or below target weight (C), or heavy or above target weight (H) and housed in individual cages. H birds were maintained at +300 grams as compared to the C group. At 30 weeks of age hens were artificially inseminated with 100 million spermatozoa in a 0.05cc volume from a pooled semen sample. Inseminations continued at five week intervals until 60 weeks of age. All eggs were collected daily to determine fertility and sperm penetration of the germinal disc by day post-insemination. Values were analyzed by breeder hen strain and body weight group until the cessation of sperm activity was determined with the effect of age determined from each group through the duration of the study. Results indicate that each C group had higher weekly egg production values as compared to the corresponding H groups. While fertility varied by age, the C groups had consistently better fertility and duration of fertility as compared to the H groups with the exception of the Cobb 700e, where values remained relatively constant regardless of body weight. Results indicate that body weight has a significantly detrimental effect on fertility and sperm penetration values in most breeder hen strains regardless of age.

Key Words: broiler breeders, fertility, body weight

T124 Inoculated broiler hatching eggs that remain in setter flats experience lower 18 day embryonic loss than their counterparts that are routinely transferred to hatcher trays. R. W. Keirs*[1], E. D. Peebles[1], D. E. Rowe[1], and M. A. Dekich[2], [1]*Mississippi State University*, *Mississippi State*, [2]*AviTech, LLC*, *Salisbury, MD*.

Erradic late embryo losses (LEL) between trays of eggs following *in ovo* injection of broiler hatching eggs at approximately 18 d (432 h of incubation) stimulated field studies to uncover systematic variables other than *in ovo* injection itself that may be responsible for such results. Egg residue was examined in 36 trays across all 6 vertical hatcher columns and 6 horizontal rows of trays in a single hatcher machine. Inoculated eggs that remained in their respective setter flats were compared to those that were routinely transferred in a horizontal position to hatcher trays. Data analysis employed the Hatching Efficiency Analysis System (HEAS) methodology in conjunction with a latin square experimental design. Results showed that only 18 d embryonic loss was significantly ($P \leq 0.01$) reduced (54 %) by leaving eggs in their setter flats rather than subjecting them to routine transfer to hatcher trays. However, a numerical increase in hatching efficiency (2.13 %) and numerical decreases in 18 d (1.45 %), 19 d (0.99 %), and 21 d (1.33 %) LEL were also observed due to the elimination of routine transfer.

Key Words: broiler hatching eggs, embryonic loss, hatching efficiency, HEAS, latin square

T125 Post hatch body temperatures as affected by incubation temperature. M. J. Wineland*[1], H. R. C. Evans[1], A. P. McElroy[2], A. Barri[2], K. M. Mann[1], and E. O. Oviedo[1], [1]*North Carolina State University*, *Raleigh*, [2]*Virginia Tech*, *Blacksburg*.

Incubation parameters can influence metabolic heat production by the embryo and dissipation of metabolic heat from the egg. It can also influence initial body temperature at hatch. Eggs were divided into 4 groups and subjected to 4 different eggshell temperature profiles in a 2 x 2 factorial arrangement. The eggshell temperature during days 1-7 of incubation were either 37.5C(S) or 36.5C (L); days 8-14 all were 37.5C and from days 15-21 of incubation the eggshell temperatures were maintained at 37.5C(S) or 39C (H). The four groups were LH, LS, SH and SS. Hatchability was significantly lower when eggs were incubated at initially lower eggshell temperatures (76.4, 65.4, 84.7 and 82.6% respectively), also resulting in increased pips after 510 hours of incubation and slower hatch. Decreased relative heart weights were observed when embryos were subjected to H. Body temperature at placement into the broiler house pens were significantly less when eggs were subjected to L than S early during incubation (39.3c, 39.7b, 40.5Ca and 40.3Ca). Females also exhibited significantly elevated body temperatures compared to the males. Body temperatures were taken on days 1,2,3,4,5,6,7,9,11,13,15,21,and 29 during grow out. The body temperatures during this time were 41.6Ca, 41.5c, 41.6a and 41.6b. Body weights at hatch were not significantly different and also at 28 days when the trial was terminated. Examined also was the potential influence of conductance of the eggshell upon the body temperature.

Key Words: eggshell temperature, incubation, body temperature

T126 In ovo technology: Commercial evaluations and trials at the hatchery. C. Williams*, *Pfizer Animal Health*, *Durham, NC*.

Large scale in ovo application trials were conducted by an integrated poultry producer and customer of Pfizer Animal Health's Poultry Health Division over the course of approximately 2 month period. The trials compared Pfizer's Embrex® Inovoject® System and another commercially available egg injection system. The objective for the trial was to evaluate injection quality as measured by hatchability. The design of the test designated one half of the daily production to be injected with each system. Eggs were injected on day 18 of incubation for Monday and Tuesday hatch, and on day 19 of incubation for hatch on Thursday and Friday. Approximately 13 million total eggs were injected in the evaluation representing over 6 million eggs injected by each injection system.

Additionally, specific side by side paired testing was conducted involving both day 18 and day 19 injections. These trials were designed to enable a more detailed and statistical analysis to the comparative evaluations. Necropsies of unhatched eggs from paired trials were utilized to detail specific post-injection embryonic mortality. Data from the necropsy (normal hatched live embryos) was analyzed by a generalized linear mixed model (binomial distribution) with fixed effects of breeder flock age, injection day and treatment and random effects of flock, flock*treatment and hatch basket within flock*treatment.

Overall, hatchability as reported by the integrator during the 2 month test period was greater using the Inovoject system (83.44% vs 81.70%, Δ = 1.74%). Data comparing injections on both day 19 (83.69% vs 82.61%, Δ = 1.08%) and day 18 (84.05% vs 80.71%, Δ = 3.34%) of incubation also favored the Inovoject system. Detailed analysis from the necropsy data revealed that eggs vaccinated with the Inovoject system was found

to have significantly higher overall hatch of normal live embryos than that of the other system (p≤.05). In a direct correlation to the higher hatch of normal live embryos, data revealed that eggs vaccinated with the Inovoject had significantly less live pips (in shell) than the other system regarding injections done on day 18, day 19, and overall.

Key Words: application trial, commercial hatchery, egg injection

T127 Consumers' preference for egg shell and yolk colour in Nigeria: A case study of Iddo and Akinyele local government area of Oyo State, Nigeria. E. O. Uwagboe*[1], O. A. Ogunwole[2], O. I. Abiola-Olagunju[2], A. O. Akinsoyimu[2], and R .A. Hamzat[1], [1]*Cocoa Research Institute of Nigeria*, *Ibadan, Oyo State, Nigeria*, [2]*Department of Animal Science, University of Ibadan*, *Ibadan, Oyo State, Nigeria*.

This study determined the consumer preferences for egg shell and yolk colour in the study area. One hundred and eighty respondents that consume eggs were randomly selected in the study area. The result revealed that the respondents age range between 20 to 60 years and 160(88.9%) were males while 20(11.1%) were females. All the respondents had formal education with 10(5.6%) primary education, 50(27.8%) HND, 50(27.8%) BSc, while 60(33.3%) MSc qualifications. Majority 140(77.8%) of the respondents rear birds while 40(22.2%) do not rear birds. Among the respondents that rear birds 100(55.6%) rear layers, 40(22.2%) rear broilers and cockerels respectively. Majority 130(72.2%) of the respondents agreed that brown eggs are more preferable to other colour of eggs and 100(55.6%) of the respondents agreed that white shell eggs cracks faster than brown eggs. The result shows that majority 107(59.5%) of the respondents agreed that yellow yolk eggs has better aroma than white yolk.
In conclusion, most of the respondents prefer brown egg shell due to its attractiveness and hardness while yellow yolk is preferred due to its aroma. It is recommended that feed ingredients that would produce brown egg shell and yellow yolk should be used in layers mash to increase market for the eggs and enhance high profit.

Key Words: consumers, preference, egg shell color, egg yolk color, Nigeria

T128 Consumer preference for different meats of chicken in Nigeria: A case study of University of Ibadan employees. O. A. Ogunwole*[1], M. A. Y. Rahji[2], A. O. Olomola[1], R. A. Hamzat[3], E. O. Uwagboe[3], and A. A. Mako[4], [1]*Department of Animal Science, University of Ibadan*, *Ibadan, Oyo State, Nigeria*, [2]*Department of Agric. Economics, University of Ibadan*, *Ibadan, Oyo State, Nigeria*, [3]*Cocoa Research Institute of Nigeria*, *Ibadan, Oyo State, Nigeria*, [4]*Tai Solarin University of Education*, *Ijebu Ode, Ogun State, Nigeria*.

This study was designed to ascertain the consumers' preference for different meats of chicken in Nigeria and University of Ibadan was purposively selected for the study.
One hundred and seventy employees that indicated interest were randomly selected and interviewed for this study. The results revealed that majority of the respondents were in their middle aged of 31 and 40 years and 155 (91.2%) were males while 15 (8.8%) were females. Few (29.4%) of the respondents rear poultry while 120(70.6%) do not rear poultry. Also, the result revealed that 60 (35.3%) of the respondents prefer layer meat for consumption, 85(50%) preferred broiler meat and 25 (14.7%) preferred cock meat which indicates that majority of the consumers prefer broiler meat. Most of the respondents indicated that they consume chicken mostly in the festival period which could be due to the high cost of chicken meat. 25(14.7%) of the respondents consume chicken meat because it is tasty, 55(32.4%) tender while 35(20.6%) consume chicken meat because it is soft and meaty. The responses to attitudinal statements revealed that most of the respondents consume chicken occasionally as 85(50%) agreed that chicken is too expensive. Chi-square result revealed that there is a significant relationship between consumers' preferences for broiler to layers and cockerels (X^2=8.40, P≤0.05)
In conclusion, consumers of chicken meat consume chicken because of the tenderness and occasionally because it is too expensive. It is recommended that cost of rearing poultry should be reduced to enable consumers to afford it.

Key Words: consumers, preference, chicken, meat, university employees

SCAD II

T129 Experimental reproduction of runting and stunting syndrome in broilers. H. S. Sellers*, G. Zavala, and E. Mundt, *Poultry Diagnostic and Research Center, University of Georgia*, *Athens*.

Runting-stunting syndrome (RSS) is a transmissible, infectious disease affecting young broilers between 1-2 weeks of age. Clinical features of RSS include severe weight suppression lack of flock uniformity, diarrhea, and a significant increase in the rate of feed conversion. Cystic enteropathy is consistently observed by histopathological examination of small intestine samples from affected flocks. Although descriptions of RSS date back to the 1970s, the etiologic agent(s) has yet to be identified. In previous studies, we isolated several viruses from RSS-affected birds, but no single virus, to date, has reproduced the clinical disease. All evidence suggests this is a multifactorial disease. To examine factors associated with disease, it is imperative to experimentally reproduce the clinical disease. In these studies, intestines from RSS positive broilers were collected, homogenized and stored at -80C. Numerous infection studies were performed in day-old commercial broilers in Horsfall Bauer isolation units. First, oral infection of day-old commercial broilers with homogenized RSS stock or a 0.2 micron filtrate of homogenized stock resulted in the reproduction of the clinical disease in a dose dependent response by 12 days post challenge as assessed by significant body weight suppression and cystic enteropathy in the intestinal villus. These results confirm that the disease can be reproduced from intestinal contents and that viruses are capable of reproducing RSS. In subsequent studies, day-old broilers were challenged with chloroform (CHCl3)-treated filtrate to further characterize the viral populations that contribute to RSS. By 12 days post infection, body weights of the CHCl3-treated group were significantly lower than the negative controls. In addition, cystic enteropathy was observed histologically in the CHCl3-treated group implying that nonenveloped viruses can cause clinical RSS. The challenge model described can be reliably used to reproduce the clinical signs of RSS and is