

S-T118 Effects and counteraction of Ochratoxin A and deoxynivalenol in broiler chickens. V. Starkl*¹ and H. Sarandan², ¹*Biomin GmbH, Herzogenburg, Austria*, ²*Faculty of Veterinary Medicine, Timisoara, Romania*.

The public health concerns related to both acute and chronic effects of mycotoxins in animals have prompted more than 100 countries to establish regulatory limits for some of the well-known mycotoxins. In the current trial the effects of Ochratoxin A (OTA) and Deoxynivalenol (DON) on growing broiler chickens were evaluated.

OTA is considered as being highly nephrotoxic, immunosuppressive and carcinogenic. Intoxication with DON is characterized by vomiting, feed refusal, diarrhea, necrosis and lesions in various tissues. A trial was performed to evaluate the effects of OTA and DON contamination on performance and health status of broiler chickens during 42 days of trial period. Additionally the detoxifying capacity of a product based on biotransformation of OTA and DON (Mycofix®Plus) was tested. Five different treatments were performed using a total of 270 day-old chickens including a positive and a negative control (500ppb OTA, 1000ppb DON), two treatment groups with two different inclusion rates of the product to counteract the mycotoxin challenge (Mycofix®Plus 0,5kg/t and 1kg/t, respectively, + 500ppb OTA, 1000ppb DON) and finally one group with 1kg/t Mycofix®Plus to evaluate effects based on the sole product.

Performance parameters were determined on a weekly basis. At the end of the trial, blood samples were taken for hematological, biochemical and immunological analysis. Subsequently, those chickens were slaughtered and liver, kidney and crops histopathologically analyzed. Liver, kidney and bile were qualitatively analyzed on OTA and DON residues.

The negative impact on broiler performance was completely overcome by 1kg/t Mycofix®Plus. Mycotoxins were not detected neither in liver nor in kidneys. Severe renal and hepatic lesions were detected in the mycotoxin groups. The severity of the lesions was reduced in direct proportion to the inclusion rate of the product in the diet. Contact necrosis of the crop was almost annihilated by using the product. The intoxication with OTA and DON severely affected natural humoral immunity and phagocytosis which was both counteracted using Mycofix®Plus.

Key Words: ochratoxin A, deoxynivalenol, biotransformation, broiler, mycotoxin

S-T119 Examination of broiler performance as affected by roller mill-ground corn addition to incomplete-pelleted feed. W. Dozier*¹, K. Behnke², M. Kidd³, and S. Branton¹, ¹*USDA/ARS Poultry Research Unit, Mississippi State, Mississippi*, ²*Kansas State University, Manhattan*, ³*Mississippi State University, Mississippi State*.

This study examined the effects of adding increased amounts of rolled corn to pelleted feed (containing an incomplete corn content) on pelleting parameters and growth performance of male broilers. Sixteen hundred Ross x Cobb d-old male chicks were randomly distributed to 32 floor pens (50 birds /pen; 0.08 m² bird) and reared in a common environment until 17 d. Four dietary treatments were employed from 18 to 41 d of age: 1) control – no added corn, 2) 15% added rolled corn to pelleted feed, 3) 25% added rolled corn to pelleted feed, and 4) 35% added rolled corn to pelleted feed. The final diets were identical in ingredient composition. The corn used in the pelleted feed was ground through a hammer mill (800 microns), whereas corn added post-pellet was ground through a roller mill (1,500 microns).

The addition of ground corn post-pellet increased (P=0.05) pelleting production rate by 4.7% compared with the control group. This did not include the amount of ground corn added post-pellet, thus added corn would have accentuated these differences in total production rate. From 18 to 29 d of age, including rolled corn at 25% post-pellet did not alter growth performance, but at 35%, growth rate (988 vs. 1,014 g) and feed conversion (1.51 vs. 1.49) were adversely affected (P=0.05) compared with the control group. These differences were not apparent from 30 to 41 and 1 to 41 d of age. Because final broiler performance was not affected by adding corn post-pellet, the potential savings to an integrated feed mill can be substantial by reducing electrical cost to a feed mill and improving over production rate. If 28% rolled corn was added, the electrical cost and production rate would be improved by 36 and 27%, respectively. These improvements collectively would translate to a savings of \$10,800/wk for a feed mill producing 10,000 tons/wk. These data indicate that adding ground corn up to 35% post-pellet can improve feed production rate without adversely affecting broiler performance.

Key Words: broiler, corn, feed processing

Tuesday, January 24 Environment & Management III Room: B314

S-T120 Estimating weight of broilers through digital imaging. J.L. Purswell*, W.B. Roush, W.A. Dozier, III, and S.L. Branton, *USDA-ARS Poultry Research Unit, Mississippi State, Mississippi*.

Monitoring growth is important in assessing flock performance during growout. Weighing birds within a flock can be labor intensive; therefore, a non-contact method of weighing is desirable. The objective of this study was to determine if projected area of the bird is a viable method to estimate BW. One hundred Ross x Ross 708 chicks were placed into four environmental chambers at 1 d of age. Thirty five male birds were labeled with leg bands and weighed at 1, 3, 5, and 7 wks of age. A digital still camera was suspended on two tripods 86 cm above the floor and used to acquire images of each bird directly after weighing. The birds

were individually placed on a matte-black backdrop for photography, and no attempts to correct posture or position were made. The height of the camera remained constant throughout the growing cycle to maintain the same image scale such that total image area would remain constant, and projected area could be directly compared. Images were edited to isolate the two-dimensional projection of the bird and stored as 8-bit binary images; projected pixel area was determined via histogram analysis.

Regression analysis was performed on BW using various combination of linear, logarithmic, and power transformations. Correlations between BW and projected area were observed (R² = 0.92), regardless of posture or orientation and transform type. A natural log transform of both BW

and projected area provided the best fit ($R^2 = 0.98$), yielding the following relationship: $BW = e^{[-18.109 + 1.388 \times \ln(\text{area})]}$. Eight birds from a separate ongoing trial were weighed and photographed for use as a validation set and the predicted BW was compared to actual BW using a paired t-test. Mean predicted BW was not significantly different from actual BW ($P = 0.36$). Results of this research suggest that estimating broiler weight through digital imaging may provide a non-contact method for assessing performance during growout.

Key Words: body weight, weight measurement, imaging

S-T121 Hand vs. mechanical catching and loading of broilers.

Y. Vizzier-Thaxton^{*1}, J.P. Thaxton¹, K. Christensen², P. White³, R. Stuckey³, S. Wongpichet¹, N.A. Cox⁴, L.J. Richardson⁴, S. Anderson¹, M. Putskum¹, and V.J. Radhakrishnan¹, ¹Mississippi State University, Mississippi State, ²O.K. Farms, Inc., Fort Smith, Arkansas, ³TechnoCatch, Inc., Kosciusco, Mississippi, ⁴USDA/ARS/R. Russell Research Center, Athens, Georgia.

Mechanical catching was originally designed to address labor supply problems. As a result of early studies on damage at the processing plant, mechanical catching was quickly designated as a more humane method of handling. Assessment at the plant contains confounding variables that occur after catching and tends to be subjective. Efforts to use more objective measurements have been done in laboratory type settings with mixed results. In an effort to determine if there are significant differences in bird quality as a result of catching method using objective measurements, two separate trials were conducted using commercial straight-run broilers. A tunnel ventilated house was divided into equal units and each unit housed 13,700 birds. All management practices met industry accepted standards. On d 54, the birds in one unit were caught manually by an experienced catching crew. The birds in the other unit were caught by a mechanical catcher operated by experienced personnel. Birds in both units were placed in standard cages. Immediately before catching, 12 females and 12 males were caught at random. Then one cage in each unit was designated to be used for experimental purposes. Immediately after the birds were placed in the holding cage, they were placed along one wall and 12 females and 12 males were selected at random for microbiological monitoring. After a 2 h holding period, another 12 females and 12 males were selected at random for microbiological assessment. The microbiological condition of the birds did not vary significantly. Management data indicate that the birds from each section of the house were as close to the same possible.

Key Words: catching, broilers, microbiology

S-T122 Physiology of catching and loading broilers.

J.P. Thaxton^{*1}, Y. Vizzier-Thaxton¹, K. Christensen², P. White³, R. Stuckey³, S. Wongpichet¹, S. Anderson¹, M. Putskum¹, V.J. Radhakrishnan¹, and M.W. Schilling¹, ¹Mississippi State University, Mississippi State, ²O.K. Foods, Inc., Fort Smith, Arkansas, ³TechnoCatch, Inc., Kosciusco, Mississippi, ⁴USDA/ARS, Poultry Research Unit, Mississippi State, Mississippi.

Two separate trials were conducted using commercial straight-run broilers. A tunnel ventilated house was divided into equal units and each unit housed 13,700 birds. All management practices met industry accepted

standards. On d 54, the birds in one unit were caught manually by an experienced catching crew. The birds in the other unit were caught by a mechanical catcher operated by experienced personnel. Birds in both units were placed in standard cages. Immediately before catching, 12 females and 12 males were caught at random. Then one cage in each unit was designated to be used for experimental purposes. Immediately after the birds were placed in the holding cage, they were placed along one wall and 12 females and 12 males were selected at random for physiological monitoring. Additionally, after a 2 h holding period, another 12 females and 12 males were selected at random for physiological monitoring. The following parameters were determined on each bird at each of the three bleeding times: body temperature, plasma glucose, cholesterol and corticosterone, blood pO₂, pCO₂, hemoglobin, hematocrit, pH, sodium, potassium, calcium, bicarbonate, chlorine, and anion balance. Physiological responses of manually and mechanically caught birds differed little, with the exception that mechanically caught birds exhibited higher peak corticosterone levels immediately after and at 2 h after catching than birds caught and loaded by the manual technique. Both catching techniques resulted in metabolic acidosis as indicated by a decrease in blood pH concomitant with increased anion balance, increased bicarbonate levels, and decreased blood pO₂ levels. It would appear that elevated corticosterone should favor gluconeogenically induced resistance to metabolic acidosis.

Key Words: catching, broilers, corticosterone, stress, welfare

S-T123 The effects of broiler catching method on breast meat quality.

M.W. Schilling^{*1}, V. Radhakrishnan¹, Y. Vizzier-Thaxton², K. Christensen³, and J.P. Thaxton², ¹Mississippi State University, Mississippi State, ²Mississippi State University, Mississippi State, ³OK Foods, Inc., Fort Smith, Arkansas.

A randomized complete block design with two trials (n=24) was utilized to evaluate the effects of hand and machine catching on broiler breast meat quality. A tunnel ventilated house was divided into two equal units with 13,700 birds in each unit. At 54 days of age, birds (n=24) were randomly selected and caught manually from one unit. In the other unit, birds (n=24) were caught using a mechanical catcher operated by trained personnel. The birds were slaughtered and breast pH was evaluated at 15 min postmortem. Carcasses were then cooled and breasts were then deboned at 4 hr postmortem and evaluated for pH. The breasts from each bird were evaluated for pH decline, ultimate pH, color, drip loss, brine absorption, cook loss, shear force, and expressible moisture. Each treatment was also evaluated for percentage pale meat, percentage pale soft and exudative (PSE) meat, and percentage meat that was not tender. The hand catching treatment had a slightly higher incidence of pale meat, lower (p<0.05) water-holding capacity, and a lower (p<0.05) ultimate pH than the breasts from the machine catching treatment. The machine catching treatment had a higher (p<0.05) mean shear force value than the hand catching treatment and also had an increased incidence of breast meat that was not tender. Data reveals that mechanical catching does not negatively affect breast meat quality in comparison to hand catching and may slightly improve quality through a slower pH decline and increased water-holding capacity.

Key Words: hand catching, machine catching, broiler breast, meat quality, pH

S-T124 Growth and foliar N status of plant exposed to atmospheric NH₃. A. Adrizal*¹, P. Patterson¹, M. Hulet¹, and R. Bates², ¹Penn State University, State College, ²Penn State University, State College.

Two chamber studies were conducted to evaluate the growth and leaf N status of plant species exposed to continuous NH₃ for 12 (Exp 1) or 6 wk (Exp 2). Studies were to evaluate plant species that could be used to trap NH₃ discharged from poultry houses. Plants (240) of 4 species (cedar, locust, poplar, and grass) and another 168 plants (spruce, arborvitae, poplar, and willow) were used in Exp 1 and 2, respectively. All the plants were transplanted into polyethylene pots and grown in 4 chambers. Plants placed in two of four chambers received continuous anhydrous NH₃ at 4 to 5 ppm (Exp 1) or 5 to 7 ppm (Exp 2) while plants in the other chambers received no NH₃. Exp 1 results showed that locust was the fastest growing species, supported by its total biomass, root, and root DM weights. There was a trend for all plants exposed to NH₃ to have greater leaf DM than their non-exposed counterparts at 6 (43.0 vs. 30.8%; P=0.09) and 12 wk (47.9 vs. 36.6%; P=0.07), and significantly greater (P=0.05) leaf N at 6 (6.44 vs. 3.67%) and 12 wk (7.05 vs. 3.51%) when exposed to NH₃. An increase in leaf N due to NH₃ exposure was also noted in Exp 2 (4.99 vs. 2.83%; P=0.05), but with no indication of species interaction. Numerically greater leaf DM due to NH₃ exposure was consistently measured in poplar at both periods (Exp 1). Poplar, as well as locust and grass, deposited 1.5 to 2 fold greater N in their leaves than cedar tissues as a result of NH₃ exposure compared to non-exposed plants. Foliar N content (g 100 g⁻¹ fresh foliage wt) after NH₃ exposure at 6 and 12 wk were 1.25 and 1.34 for locust, 2.47 and 6.09 for poplar, and 0.45 and 0.87 for grass. However, only locust likely benefited from ambient NH₃ as indicated by its consistent leaf color quality and lower damage score, compared with other species that were adversely affected by atmospheric NH₃.

Key Words: plant growth, leaf N, color and damage scores, atmospheric NH₃

S-T125 Dietary modification to reduce manure ammonia emission, phosphorus excretion, and potassium excretion. C. Hale*, *EcoCal Products LLC, Brownstown, Indiana.*

Ammonia emitted from manure adversely affects poultry health and productivity.

From a global perspective, ammonia emissions play a key role in acid rain formation. Ammonia is also a causative factor in watershed degradation through eutrophication, primarily through wet/dry deposition of dissolved gaseous or fine particulate materials. Phosphorus entering the watershed also causes eutrophication.

Poultry manure contains phosphorus and ammonia. When poultry manure is used as a fertilizer, albeit an imbalanced one from an N:P ratio perspective, ammonia and phosphorus can enter the watershed via runoff, with detrimental results.

Feed strategies to reduce the levels of ammonia (NH₃) emitted from, and phosphorus excreted in laying hen manure have been studied, with some success. Feeding urease/uricase-inhibiting materials, yucca extracts, and acidogenic compounds have been tested, and have achieved moderate ammonia emission reductions. Reduction of excess fed nitrogen by feed formulation based on amino acid requirements rather than crude protein has met with some success, but there are limitations to the implementa-

tion of this method. Feeding zeolites to reduce manure ammonia emissions has also been tested, but with conflicting results. Feeding phytase has been shown to reduce phosphorus excretion.

Feeding a combination of acidogenic materials to force protonation of manure ammonia to the less volatile compound ammonium (NH₄⁺) and clinoptilolite zeolite to act as an ammonium scavenging compound significantly reduce ammonia emissions from poultry manure. The clinoptilolite zeolite effectively sequesters and retains ammonium. Changes in the amounts and types of acidogens fed, as well as the amount of clinoptilolite zeolite in the diet, can affect the level of ammonia emission reduction noted.

Additionally, inclusion of clinoptilolite zeolite in the diet causes reduced excretion of phosphorus and potassium.

The reduction of phosphorus and potassium excretion, along with increased nitrogen retention in manure (in the form of sequestered ammonium) have beneficial effects on the N:P:K ratio of manure used as a fertilizer.

S-T126 Plant foliar N and temperature on commercial poultry farms in Pennsylvania. P. Patterson¹, A. Adrizal*¹, M. Hulet¹, R. Bates², C. Myers³, G. Martin⁴, R. Shockey⁵, and M. van der Grinten⁶, ¹Penn State University, University Park, ²Penn State University, University Park, ³Berks Co. Coop. Ext., University Park, Pennsylvania, ⁴Lancaster Co. Coop. Ext., University Park, Pennsylvania, ⁵USDA National Resources Conservation Service, Harrisburg, Pennsylvania, ⁶USDA-NRCS-Big Flats Plant Materials Center, Corning, New York.

Trees have been planted for many years in agriculture for wind breaks and for shade. A new, but largely untested benefit may be as a visual screen for combating neighbor issues, as a barrier for flies, and as a filter for fan emissions including gases. This field study was aimed at evaluating the potential of trees planted around commercial poultry sites to trap NH₃, the gas of greatest environmental concern to the poultry industry. Four plant species (spruce, poplar, and two willows) were planted at 8 commercial farms from 2003 to 2004. Trees were planted in front of the fans and along buildings. Temperature (T) was monitored as a tree stressor with data loggers in front of the fans and at control distances away from the buildings in 2005 for 4 seasons. Foliage samples from poplar and spruce were taken in August from a turkey and 2 layer farms for DM and N analysis. The two layer farms had poplar plantings and all three farms had spruce for foliage analysis. These data were subjected to a nested model while the T data were analyzed descriptively. The results showed that farm had no effect on poplar leaf DM (41.3 vs. 50.7%) but spruce DM at the turkey farm was less than layer 1 or layer 2 (P=0.05). In contrast, planting location affected poplar leaf DM with higher DM in front of the fans compared with controls (55.4 vs. 36.5%; P=0.01), but had no effect on spruce tissues. Foliar N levels in both species were not affected by farm type. However, those planted in front of the fans appeared to have greater N levels than controls (4.3 vs. 2.8%-poplar and 3.07 vs. 1.87%-spruce; P=0.01) indicating a capacity for tree foliage to trap NH₃. Summer T were similar in front of the fans and at a control distance away from the fans at all 3 farms (25.45 vs. 25.54C-turkey, 25.80 vs. 25.32C-layer 1, and 25.50 vs. 25.90C-layer 2) suggesting no greater T stress associated with fan proximity.

Key Words: commercial poultry farms, temperature, trees, foliar N

S-T127 Ammonia volatilization from broiler litter and cake via laboratory acid trap system. D.M. Miles*¹, P.R. Owens², D.E. Rowe¹, and P.A. Moore, Jr.³, ¹USDA-ARS Waste Management and Forage Research Unit, Mississippi, ²Purdue University, West Lafayette, Indiana, ³USDA-ARS Poultry Production and Product Safety Research Unit, Fayetteville, Arkansas.

Litter pH, temperature and moisture are recognized as the primary parameters influencing the mechanisms of ammonia evolution from broiler litter. Aerobic microbial activities converting nitrogen (N) compounds in the feces to gaseous ammonia usually amplify with increases in any of the above parameters. The objective of this study was to compare differences in ammonia volatilization between cake and litter (43% vs. 29% moisture) to assess the effects of management practices that break up the cake, leaving it in the house for the subsequent growout. Litter and intact cake samples were collected from the center of a commercial broiler house after a 42 d old flock was sold and the bedding was tilled. The litter had been used for 13 previous flocks. Preliminary tests using litter from earlier flocks indicated excellent repeatability for ammonia volatilization in the laboratory acid trap system with (1) litter only and (2) comparing litter, 21% moisture, to pad samples (the built up compacted litter underneath the friable layer, 30% moisture). In the present study using a randomized complete block design, twenty-four 50g litter samples and an equal number of 50g single-piece cake samples were placed in 1000 ml containers with inlet air supplied at 90 ml/min. The exhaust air and volatilized ammonia were trapped in boric acid which was titrated daily with HCl to determine N lost. Cumulative N losses from cake after the 21 d incubation averaged 5.22 g N/kg whereas litter averaged 1.7 g N/kg. All samples experienced moisture loss during incubation; final moisture content for litter and cake were 13% and 24.5%, respectively. During the layout between flocks, some drying of the broken up cake and litter would be expected. Litter and cake pH were similar (8.6 vs. 8.64) before incubation. At the test completion, the final litter pH was 8.26; the cake pH was 8.43. The interaction of pH and moisture loss has not yet been quantified. These results suggest that the break up of cake causing the exposure of high moisture surfaces exacerbates ammonia evolution from the litter bedding and that cake from reused litter should be removed between flocks.

Key Words: ammonia, broiler, cake, litter, management

S-T128 EU promoted research for replacement of antibiotic growth promoters in the poultry industry. G. Schatzmayr*¹, S. Nitsch¹, M. Mohl¹, A. Klimitsch¹, V. Klose², and R. Plail², ¹Biomim GmbH, Herzogenburg, Austria, ²University of Natural Resources and Applied Life Science, Tulln, Austria.

Livestock industry in Europe is facing the problem that antibiotic growth promoters (AGPs) are forbidden since 1st of January 2006. Therefore multinational research projects on finding alternatives to AGPs are funded by the European Union. One of the projects, which was conducted with 5 industrial and 3 research partners aimed at the development of a defined multi-species competitive exclusion product for poultry. Numerous bacteria were isolated out of the intestinal tract of healthy chicken. A polyphasic approach was used to characterize those isolates. Subsequently the isolates were selected according to their ability to inhibit *Salmonella*, *E. coli*, *C. perfringens* and *Campylobacter*. Further selection criteria were adhesion capability to mucosal cell lines, pH-reduction, formation of different organic acids and immunological activity (*in vitro* phagocytic activity of cell line 3D4/21 and production of NO by

macrophages). Based on these results a product consisting of 5 isolates belonging to the genera *Enterococcus*, *Pediococcus*, *Lactobacillus* and *Bifidobacterium* has been designed. This product (Biomim®PoultryStar) was tested in a feeding trial. 400 mixed sex Ross 308 broiler chicken were randomly allocated to 2 groups with 4 replications each. The control group received a standard diet, the test group received additionally the probiotic product added to drinking water on days 1, 2, 3, 7, 8, 9 and 14, 15, 16 (= changing starter - grower). At the end of the trial live weight of all broiler chicks exceeded the expected weights. Birds receiving Biomim®PoultryStar in drinking water performed better and were able to increase their average body weight as well as weight gain about 3.1%. The difference in final live weight was statistically significant ($P < 0.05$). Birds in the test group consumed 117 g more feed totally and showed a slightly improved feed conversion. Mortality was slightly improved in the probiotic group (1% control vs. 0.5%). Overall fattening efficiency of broiler chicks supplied with Biomim®PoultryStar in drinking water was clearly improved (285 vs. 298).

Key Words: competitive exclusion, probiotic, *Salmonella*, European Union, alternative to antibiotic growth promoters

S-T129 Addressing safety and efficacy of composted broiler litter for vegetable production. W. Evans*^{1,3} and Y. Vizzier-Thaxton^{1,2}, ¹Mississippi State University, Mississippi State, ²Mississippi State University, Mississippi State, ³Truck Crops Branch, Crystal Springs, Mississippi.

Five rates from of broiler litter (CBL) were tested for fertilizer value and microbial safety in vegetable fields in central Mississippi in 2005. The CBL was applied and blended into the top 15 cm of soil prior to transplanting vegetable plants into each plot. Both the collard and tomato studies were arranged as randomized complete block designs with four replications in ground not previously fertilized with CBL in recent years. CBL was tested for nutrient concentration and microbial concentration (*Campylobacter* and *Salmonella*) prior to use. Soil samples from each plot were tested for available nutrients prior to applying CBL and at the end of the growing season for each crop. Shoot fresh weight and dry weight of both tomato and collard were monitored during the growing season. Concentrations and levels of several plant essential nutrients, arsenic, copper, and microbial pathogens were determined from samples taken at middle fruit harvest in tomato and final harvest in collards. CBL application rate correlated well with crop growth and yield for both tomato and collards. As in our previous year of study, lab analysis did not find any significant levels of bacterial concentration on the leaves of collards or on tomato fruit at final and middle harvest, respectively.

Key Words: broiler litter, compost, contamination, metals

S-T130 Litter beetle counts in broiler houses treated with several insecticides. J.B. Hess*, K.S. Macklin, and B.A. McCrea, Auburn University, Auburn, Alabama.

Litter beetles (*Alphitobius diaperinus*) remain an important poultry production pest on several fronts. They have been shown to damage poultry houses and harbor both food safety and avian pathogens. Litter beetles have been linked with the distribution of viral, bacterial and protozoan organisms, as well as parasitic worms. This trial examined

beetle counts in commercial broiler houses treated with 1 of 2 insecticide trt, applied dry or wet. Three levels of dry (4, 5 and 6 oz/100 sqft) and one level of liquid application of an organophosphate (Rabon) and cyfluthrin (Tempo) dry (1% dust) and wet (20% Wetttable powder) were compared to an untreated control house across one growout. Six pvc pipes (1" x 10" long) were filled with a rolled up piece of chick paper. They were placed in each house for a 3 day period during brooding, at 3 wk of age and prior to marketing the birds. The tubes were placed in plastic bags and refrigerated for 24 hr prior to counting larval and adult litter beetles. Adult and larval counts were transformed to $\log_{10}(x+1)$ to allow statistical analysis of data with substantial variation between tubes.

All treatments reduced larval and adult litter beetles in relation to the untreated control house. The organophosphate did not reduce adult beetle numbers as quickly as cyfluthrin, but showed good control by the 3rd week. As expected, the 5 and 6 oz/100 sqft application rates of the organophosphate reduced beetle numbers, while the 4 oz level did not control beetles as well. Products applied dry showed better control than those applied as a liquid, with larvae levels increasing as the flock aged in the liquid trt. The products tested controlled litter beetles at suggested application rates, with dry applications showing better control than liquid applications.

S-T131 Response of broilers receiving a coccidial vaccination versus dietary salinomycin when reared on fresh and used litter: 8 week live performance, carcass characteristics, and breast meat yield. E. Moran*, M. Leslie, and N. Joseph, *Auburn University, Auburn, Alabama.*

Coccidial vaccination prior to placement for live production is known to impair early performance of broilers. Repercussion when the mucosa also confronts an increased microbial challenge with used litter was examined. Ross X 308 males were obtained from a commercial hatchery where vaccinations for Marek's disease, New Castle disease, and infectious bronchitis were given. One half of the chicks were exposed to an atomized coccidial vaccine (Coccivac-B, Sterwin Laboratories) prior to placement in pens having either fresh pine shavings or used litter that had not been top-dressed. Remaining chicks received dietary salinomycin (0.05% Bio-Cox 60, Roche Vitamins) from 0 to 6 weeks of age as a means to coccidia. Common corn-soybean meal feeds without supplemental antimicrobials during 0-3, 3-6, and 6-8 weeks of age were continuously accessible together with lighting. Treatments were factorially arranged using 8 replicate pens (4.18 sq.m) with each having 35 birds. All responses to method of coccidial protection were independent of whether the litter was either used or fresh. Vaccination had an adverse effect on live weight gain and feed conversion that were apparent through each phase of production to 8 weeks of age; however, used litter only impaired early performance but this disadvantage remained through to completion. Vaccination led to reductions in carcass abdominal fat and yields of fillets and tenders, however, no significant differences ($P>.05$) were apparent when birds had been reared on either fresh or used litter. Incidence of defects associated with carcasses and their totals as Percentage grade A were similar among treatments. Although extensive early exposure to coccidia by vaccination and direct placement on used litter both impaired broiler performance, each did so in an independent and additive manner.

Key Words: breast meat yield, broiler chicken, carcass quality, coccidial vaccination, litter

S-T132 Effect of pressurization on aerosol application of F strain *Mycoplasma gallisepticum*. S. Branton*, J. Evans, S. Leigh, W. Dozier, W. Roush, S. Collier, J. Purswell, and H. Olanrewaju, *USDA/ARS Poultry Research Unit, Mississippi State, Mississippi.*

A limited survey of the table egg industry showed that application pressures used for the aerosol administration of live F strain *Mycoplasma gallisepticum* (FMG) vaccine were virtually unknown. However, when pressures were determined, those pressures ranged from 35 to 70 psi. Using the CPJ self-propelled, constant speed vaccinator equipped with a pressure selectable pump, results of this in vitro study showed that use of 40 psi versus 60 psi (as indicated by the pressure gauge) for the administration of live FMG vaccine yielded denser and more uniform spray patterns together with higher colony counts. Further, no difference in colony density or spray pattern was observed at pressure gauge indications of 35, 40 or 45 psi.

Key Words: poultry, egg production, layer

S-T133 Presence of *Campylobacter* in day-of-hatch broiler chicks from commercial hatcheries. J.A. Byrd*¹, R.H. Bailey², R.W. Wills², and D.J. Nisbet¹, ¹*USDA-ARS-Food and Feed Safety Research Unit, College Station, Texas,* ²*Mississippi State University, Mississippi State.*

Previous published research has identified *Campylobacter* as one of the leading causes of foodborne illness. Poultry and poultry products have been identified as a major source of *Campylobacter* in human infections. Although many risk factors have been identified that contribute to *Campylobacter* levels, precise identification of the most effective sites for intervention has not been established. Epidemiological studies have identified *Campylobacter* in the broiler breeder's reproductive tract and fertile eggs allow for possible contamination of day-of-hatch chicks. Numerous studies have shown that day-of-hatch broilers were found to be *Campylobacter* negative using conventional culture methods. The purpose of the present study was to demonstrate the prevalence of *Campylobacter* found in day-of-hatch broilers using a peptone water pre-enrichment followed by conventional *Campylobacter* culture methods. Using this pre-enrichment method and conventional trayliner culture methods, the isolation distribution of *Campylobacter* from eight commercial broiler hatcheries (n=2000) was evaluated. A total of 15 trayliners were positive from three different hatcheries. Of 2000 chick paperpad trayliners sampled, 0.75% were positive for *Campylobacter*. These data support previous findings indicating the potential for *Campylobacter* to be spread by vertical transmission. This study represents the first indication that *Campylobacter* has been found on the trayliners from commercial broiler hatcheries.

Key Words: *Campylobacter*, hatchery, trayliner, broiler, method

S-T134 Presence of antibiotic resistant salmonella among broiler house environmental samples. J.A. deGraft-Hanson*, *West Virginia University, Morgantown.*

335 *Salmonella* isolates from 333 broiler house environmental samples were tested against 12 antimicrobials for susceptibility or resistance. Cultures were obtained from chick pads, chick feces, water lines and cups, feeders and hoppers, litter, insects, mud, standing water, wild bird

feces, boot, wall, fan, and drag swabs, and animal feces. 90% of the isolates were made up of *S. typhimurium*, *S. hadar*, *S. typhimurium* var. *copenhagen*, *S. senftenberg*, *S. heidelberg*, *S. litchfield*, and *S. newport*. 129 (38.51%) of the isolates were sensitive to all antimicrobials tested, with 206 (61.49%) being resistant to one or more of the antimicrobials. 17.01% were resistant simultaneously to streptomycin and tetracycline, with 2.39% and 12.24% resistant to streptomycin and tetracycline respectively. 12.54% of the isolates were resistant simultaneously to ampicillin and ceftiofur. 8.06% were resistant to ampicillin alone.

None of the isolates were resistant to ceftiofur alone. Serotypes with high levels of resistance among isolates were *S. hadar* (93.55%), *S. heidelberg* (85.71%), *S. typhimurium* var. *copenhagen* (68.33%), *S. senftenberg* (55.55%) and *S. typhimurium* (43.86%). None of 5 isolates each of *S. litchfield* and *S. newport* were resistant to any of the 12 antimicrobials. None of the isolates were resistant to neomycin, nalidixic acid, ciprofloxacin, enrofloxacin or ofloxacin.

Key Words: *Salmonella*, broiler house, antibiotic resistance, environmental samples

Tuesday, January 24 Nutrition IV Room: B315

S-T135 Comparison of total and digestible amino acid formulation and methionine sources for two replacement pullets strains.

D. Faria*, L. Rombola, M. Rizzo, A. Santos, and H. Souza, *Universidade de Satilde Sao Paulo, Satilde Sao Paulo, Brasil.*

The objective of this study was to evaluate the effects of different feed formulation criteria and methionine (Met) sources on performance of two replacement pullets strains. A total of three hundred eighty-four birds were randomly assigned in a 2x2x2 factorial arrangement with main effects of bird strain (Hy-Line W36 and Hy-Line Brown), Met source (2 Hydroxy-4-(methylthio) Butanoic acid; HMTBA, 88% or DL Met, 99%) and feed formulation criterion (total or digestible amino acids) resulting in eight treatments with six replicates of eight birds each. The experimental diets were formulated using corn, soybean meal, wheat (4.5 to 5.0%), meat and bone meal (4.5 to 5.0%), and poultry viscera meal (4.5 to 5.0%) to contain 20.50% CP, 2,917 kcal ME/kg, 0.45% total Met and 0.37 digestible Met for starter phase, and 15.90% CP, 3,050 kcal ME/kg, 0.42% total Met and 0.37% digestible Met for grower phase. The chemical compositions of the ingredients and its digestible amino acids coefficients were previously obtained by analyses. The characteristics evaluated during starter (1-6 wk) and grower (11-16 wk) phases were intakes of feed (FI), Met (MI), lysine (LI), crude protein (CPI), and energy (EI), body weight (BW), weight gain (WG), and feed conversion (FC). As expected, Hy-Line Brown showed higher FI, MI, LI, CPI, EI, BW and WG than Hy-Line W36 pullets. The sources of Met and feed formulation criteria did not influence the performance characteristics, and the birds fed diets formulated based on total amino acids concept showed increased ($P < .01$) amino acids intake, ranging from 10.58% to 13.53% and from 10.81% to 22.35% for Met and Lys, respectively. It was concluded the Hy-Line W36 and Hy-Line Brown replacement pullets showed satisfactory performance irrespective of feed formulation criterion and Met source.

Key Words: amino acid, grower, ingredient, replacement pullet, starter

S-T136 Arginine:Lysine ratios in diets formulated based on total and digestible amino acids containing two sources of methionine for laying hens in the summer. D. Faria*, L. Rombola, M. Rizzo, A. Santos, and H. Souza, *Universidade de Satilde Sao Paulo, Satilde Sao Paulo, Brasil.*

The experiment was conducted to evaluate the influence of different Arginine:Lysine (Arg:Lys) ratios, feed formulation criteria, and methionine (Met) sources on performance and egg quality of layers from 25 to 41 weeks of age in the summer (average of 30 °C). A total of two hundred eighty-eight Hy-Line W36 layers were randomly assigned in a 2x3x2 factorial arrangement with main effects of feed formulation criterion (total or digestible amino acids), Arg:Lys ratio (0.9:1, 1:1, and 1.1:1), and Met source (2 Hydroxy-4-(methylthio) Butanoic acid; HMTBA, 88% or DL Met, 99%) resulting in twelve treatments with six replicates of four birds each. The experimental diets were isonitrogenous (18% CP) and isocaloric (2,850 kcal ME), and formulated using corn, corn gluten meal, soybean meal, and wheat to contain 0.88%, 0.47%, 0.19% or 0.78%, 0.42% and 0.17% of Lys, Met and Trp for total or digestible amino acids, respectively. Several characteristics of performance (feed intake, egg production, egg weight, egg mass, feed conversion, and body weight), egg internal quality (Haugh unit and percentages of albumen and yolk), and egg external quality (specific gravity, shell percent, and shell thickness) were evaluated. The results showed no influence of feed formulation criteria and Met sources on performance characteristics. However, there was a positive linear response ($P < .01$, $P < .05$ and $P < .05$, respectively) of Arg:Lys ratio on feed intake ($Y = 0.069X + 81.243$), egg weight ($Y = 0.07X + 48.35$), and egg mass ($Y = 0.0955X + 39.51$). Egg quality characteristics were not influenced by the factors studied. It was concluded that increasing the Arg:Lys ratio can be beneficial for young laying hens under hot climate conditions.

Key Words: egg quality, hot climate, performance, pPoultry

S-T137 Impact of feed ingredients and dietary protein level on microbial activity in the digestive tract of broilers.

D. Hoehler*¹, A.J.M. Jansman², C.M.F. Wagenaars², and A. Lemme¹, ¹*Degussa Corporation, Kennesaw, Georgia,* ²*Wageningen UR, Animal Sciences Group, Lelystad, The Netherlands.*

Chicken diets have been supplemented with growth-promoting antibiotics for years. There are, however, increasing concerns regarding the use of those substances. Microbial activity and composition of microflora in the gastro-intestinal tract, intestinal health and mucosal function in broilers might be influenced by the choice of ingredients as well as by nutrient levels. Two experiments with male d old Ross 308 broilers following a 2 x 2 x 2 design were conducted using the experimental