

**Monday, January 24**  
**Pathology**  
**Room: B315**

**S41 Effects of F-strain *Mycoplasma gallisepticum* inoculation at twelve weeks of age and diet supplementation on the performance and egg characteristics of commercial layers.** S. Park\*<sup>1</sup>, E. Peebles<sup>1</sup>, S. Branton<sup>2</sup>, M. Kidd<sup>1</sup>, S. Whitmarsh<sup>1</sup>, P. Gerard<sup>1</sup>, <sup>1</sup>Mississippi State University, <sup>2</sup>USDA-ARS, SCPRL.

The effects of a 12 wk F-strain *Mycoplasma gallisepticum* (FMG) inoculation and various dietary supplementation regimens on performance and egg characteristics in Hy-Line W36 hens between 22 and 52 wk were investigated. At 12 wk of age, 120 sham (control) and 120 FMG- (treated) inoculated birds were randomly assigned to individual cages in one of two enclosed and isolated ends of a caged layer facility according to inoculation treatment. One of four isocaloric diets was randomly provided to birds in each end at 20 wk of age. Diets included 1) normal basal diet (NB); 2) NB with 1.25% additional poultry fat (PF); 3) NB with 2.00% additional PF; and 4) NB with 2.00% additional PF and supplemental phytase and 25-hydroxyvitamin D<sub>3</sub>. Inoculation type and diet treatment combinations were thrice replicated, with ten hens in each replicate group. Parameters investigated were BW, mortality, feed consumption, egg production (EP), egg weight (EW), percentage eggshell (PSW), yolk (PYW), and albumen (PAW) weights, eggshell weight per unit of surface area (SWUSA), and yolk/albumen ration (YAR). Only age effects were noted for all egg characteristic parameters. Supplemental phytase and D<sub>3</sub> slowed the increase in BW in FMG-treated birds, and EP decreased more rapidly in sham inoculated controls when fed either 1.25 or 2.00% supplemental PF. FMG-inoculation accelerated the decrease in EP in birds fed the unsupplemented NB diet; however, 1.25% added PF helped to reverse this effect. Supplemental PF at the 1.25% level may improve EP in commercial layers inoculated with FMG at 12 wk of age.

**Key Words:** Commercial layers, Egg characteristics, *Mycoplasma gallisepticum*, Performance, Poultry fat

**S42 Maternal antibody transfer from dams to their egg-yolk, egg-white and offspring in two meat lines of chickens.** K. R. Hamal\*<sup>1</sup>, I. Y. Pevzner<sup>2</sup>, G. F. Erf<sup>1</sup>, <sup>1</sup>University of Arkansas, <sup>2</sup>Cobb-Vantress, Inc..

The amount of maternal antibody transferred to the egg and the amount taken up by the developing chicks are important parameters that may greatly influence the health and survival of the chicks. Therefore the study of these parameters will be very important in improving the livability of chicks. Considering the short life span of broiler chicks from hatch to slaughter, the importance of maternal antibodies is highly relevant. Total IgY and IgA levels were determined in dams from 2 meat lines of chickens (Line A and B, 20 dams/line), in five eggs/dam, and in 5 offspring/dam. Plasma samples were taken from dams prior to collection of fertile eggs and in chicks at 3, 7, 14, and 21d of age. Egg-yolk and egg-white extracts were prepared from each egg. All samples were kept at -20 C until analysis for total IgY and IgA levels by ELISA. All samples were analyzed in triplicate and each plate included its own standard curve. Total plasma IgY levels were higher in dams from Line B compared to Line A (6.02 vs. 3.26 mg/mL, respectively; P<0.001). The same trend was observed for total IgY levels in egg-yolk (P=0.030), egg white (P<0.001), and offspring at all ages (P<0.001). Plasma IgY levels in chicks were highest at 3d and decreased by 14d to the lowest level. By 21d, plasma IgY levels in chicks started to increase again. Total IgA levels were similar in plasma from Line B dams compared to Line A dams (0.35 vs. 0.30 mg/mL, respectively; P=0.305). Total IgA levels in egg-yolk and egg-white were higher in Line B compared to Line A (P<0.001 for both comparisons). Line B offspring had higher plasma IgA levels than Line A at 3 and 7d of age. At 14 and 21d, plasma IgA levels were similar in chicks from both lines. The total plasma IgA levels in offspring were lowest at 3d of age and increased thereafter. The results indicate that levels of maternal antibodies in eggs and chicks appear to be associated with antibody levels in the dams. Differences between lines in maternal antibodies may be correlated with broiler livability.

**Key Words:** Maternal antibody, Egg-yolk and egg-white, IgY and IgA, Chickens, ELISA

**S43 Evaluation of Advent<sup>®</sup> for induction of intestinal immuno-responsiveness to a mixed *Eimeria* challenge.** C. L. Wazlak\*<sup>1</sup>, L. A. Carvalho<sup>1</sup>, C. L. Novak<sup>1</sup>, H. D. Danforth<sup>2</sup>, M. A. Quiroz<sup>3</sup>, D. J. Caldwell<sup>4</sup>, A. P. McElroy<sup>1</sup>, <sup>1</sup>Virginia Polytechnic Institute and State University, <sup>2</sup>USDA/ARSL/LPSI/PBEL, <sup>3</sup>Novus International, Inc., <sup>4</sup>Texas A&M University.

Coccidiosis is a prevalent disease in broilers resulting in decreased body weight gain and increased feed conversion. With *Eimeria* resistance to anticoccidials alternative methods for preventing *Eimeria* infections need to be explored. Coccidia vaccines are widely being used in layer and breeder operations, but are still not common place in broiler operations. This study compared vaccinated (VAC) to non-vaccinated (NV) broilers and the response to a mixed heterologous *Eimeria* challenge. Day of age chicks were divided into NV and VAC groups (n=350/treatment). The VAC birds were administered Advent<sup>®</sup> with a spray cabinet on day of age. On d28 of age, broilers in the NV and VAC groups were divided into control (non-challenged) and challenge groups (n=125/treatment). Broilers in the NV challenge and VAC challenge groups were administered a mixed challenge of *Eimeria acervulina* (EA), *Eimeria maxima* (EM), and *Eimeria tenella* (ET). Body weight gain and feed conversion (d0-14, 0-21, 0-28, and 0-6 d post-challenge (PC)), lesion scores (d6 post-vaccination (PV) and 6PC), and intestinal morphology were evaluated. Significant differences were observed in body weight gain on d0-21 between NV and VAC groups with NV broilers gaining more. On d0-6PC NV challenged birds gained less body weight when compared to all other groups. Feed conversion showed differences on d0-14 with NV broilers having a lower feed conversion as compared to VAC broilers. On day0-34 NV challenged birds had higher feed conversion when compared to all other groups. NV challenged broilers had higher lesion scores for EA and ET when compared to all other groups on d6PC. There was also a difference in EA lesion scores on d6PC with NV control birds having more severe lesions than VAC challenge or VAC control. Additionally, NV control broilers had less severe lesions for EM on d6PC as compared to VAC control broilers. These data provide evidence that this live coccidia vaccine could be used in broilers to prevent infection and not severely effect the performance of the broilers.

**Key Words:** *Eimeria*, Broilers, Vaccine, Body weight, Coccidia

**S44 Effect of a probiotic culture on horizontal transmission of *Salmonella enteritidis* in turkey poults.** J. L. Vicente\*, A. Torres-Rodriguez, S. E. Higgins, C. Pixley, G. Tellez, B. M. Hargis, Department of Poultry Science, University of Arkansas.

To evaluate the effect of a commercially available probiotic (FM-B11; IVS/Wynco) on horizontal transmission of *S. enteritidis* in day-of-hatch turkey poults, two experiments were conducted. In the first experiment, three treatments (control, probiotic at low dose [PLD= 10<sup>6</sup>cfu/ml], and probiotic at high dose [PHD=10<sup>8</sup> cfu/ml]) were evaluated. The probiotic was administered in the drinking d1-3. Poults (240) were obtained from a commercial hatchery and randomly placed in six pens holding 32 contact poults per pen. The remaining 48 (seeders) were challenged with a high dose (5.0 x 10<sup>7</sup> cfu/bird) of *S. enteritidis* in a separated pen. Following challenge (24h), 8 (20%) seeders were placed to each pen. All seeders and 50% contact birds were removed for culture at 7d. The remaining poults were humanely killed at day 14. Cecal tonsils were aseptically removed and placed in selective enrichment medium, incubated for 18-24h, and then plated on XLD agar with novobiocin and naladixic acid to which the challenge was resistant. All seeders were positive for *S. enteritidis*. At day 7, a significant reduction (P<0.05) of *S. enteritidis* colonization was observed in the PHD (15/30; 50%) group whereas no difference was detected in the PLD (25/30; 83%) group compared to the control groups (24/26; 92%). At 14d the recovery of *S. enteritidis* was significantly reduced (P<0.05) in both treated groups (PHD=24/30; 80% and PLD=24/29; 83%) while the controls were 100% (30/30) positive for *S. enteritidis*. The second experiment was similar except *S. enteritidis* challenge was reduced (5.7 x 10<sup>5</sup>cfu/bird). At day 7, there was no difference in Salmonella recovery between PHD (27/32; 84%) and control (31/32; 97%), but a significant reduction (P<0.05) was observed in the PLD (25/

32; 78%). *S. enteritidis* recovery decreased significantly in both treated (PHD=26/32; 81% and PLD=25/32; 78%) groups compared with the control (30/31; 97%) 14d after challenge in the second experiment. These results suggest that the administration of this probiotic culture may reduce the horizontal transmission of *Salmonella* in turkey poults.

**Key Words:** Probiotic, *S. enteritidis*, Turkey poults

**S45 Effects of Cytosine-phosphate-Guanosine oligodeoxynucleotides (CpG-ODN) on *Salmonella* vaccination or BSA immunization of neonatal chickens.** A. Barri<sup>\*1</sup>, K. Ameiss<sup>1</sup>, J. El-Attrache<sup>1</sup>, A. McElroy<sup>2</sup>, D. Caldwell<sup>1</sup>, <sup>1</sup>Texas A&M University, <sup>2</sup>Virginia Tech. University.

The objective of this investigation was to evaluate cytosine-phosphate-guanosine oligodeoxynucleotides (CpG-ODN), or appropriate non CpG-ODN controls, as potential oral adjuvants when co-administered with a commercially available *Salmonella typhimurium* vaccine in single-comb-white-Leghorn (SCWL) chickens (Experiment 1). Additionally, CpG-ODN were evaluated for adjuvant properties when co-administered with BSA by a drinking water route of immunization in both SCWL and broiler chickens (Experiment 2). While *Salmonella* specific IgG levels were not elevated ( $P>0.05$ ) in ODN administered animals when compared to vaccine alone experimental groups in Experiment 1, elevated protection against field strain *Salmonella typhimurium* challenge was associated with non CpG-ODN administration. As compared to vaccine alone experimental animals, non CpG-ODN and a one time administration of ST vaccine on day of hatch was shown to be as effective as vaccine administration alone with a day 14 boost when evaluating ST internal organ invasion following day 28 challenge. Experiment 2 evaluated anti-BSA IgG levels in broiler and SCWL chickens immunized against BSA by a drinking water route of administration alone, or in combination with two different concentrations (50µg/chicken or 75µg/chicken) of CpG-ODN or Non CpG-ODN. Nineteen days following the final day of immunization, serum samples obtained from experimental animals demonstrated that the administration of CpG-ODN (75µg/chick) with BSA resulted in anti-BSA IgG levels that were elevated ( $p<0.05$ ) above BSA alone immunized broiler chickens. The results from this investigation confirm and extend previous reports from our laboratory on the potential immunostimulatory properties associated with CpG-ODN administration in commercial strain chickens.

**Key Words:** CpG-ODN, *Salmonella typhimurium*, Adjuvant, BSA

**S46 Anomalies and egg small end head orientation increase incrementally with late broiler embryo loss.** R. Keirs<sup>\*</sup>, P. Gerard, E. Peebles, *Mississippi State University.*

Field studies on broiler hatching efficiency were conducted from January 2003 through October 2004 to test the premise that as late embryo losses (16-21 d of incubation) increase there is an associated increase in embryonic anomalies as well as head orientation toward the small end of the egg. These studies included 94 breeder flocks, 27 through 61 wk of age, of five different breed crosses. Eggs from each flock were set and hatched in two different incubational units on the same day. Flocks were sampled during 28 hatch dates in 11 hatcheries located in seven different states. This included five incubational machine types, for a total of 188 machines. Results showed that incremental increases in late embryonic loss (16-21 d of incubation) were very highly significantly correlated with increases in embryonic anomalies and with increases in egg small end orientation of embryo heads.

**Key Words:** Anomalies, Broiler, Embryo, Hatchability, Late embryo loss

**S47 Essential oils to enhance gut immunity against a challenge of *Eimeria* spp., and replace growth-promotant antibiotics and ionophores.** E. O. Oviedo-Rondón<sup>\*1,2</sup>, S. Clemente-Hernández<sup>1,3</sup>, D. Caldwell<sup>4</sup>, K. Ameiss<sup>4</sup>, P. Williams<sup>5</sup>, R. Losa<sup>5</sup>, <sup>1</sup>Stephen F. Austin State University, <sup>2</sup>Facultad de Medicina Veterinaria y Zootecnia, Universidad del Tolima, Colombia, <sup>3</sup>Universidad Autónoma de Chihuahua, <sup>4</sup>Department of Poultry Science, Texas A&M University, <sup>5</sup>Akzonobel/Crina S.A..

One trial was conducted to evaluate the effects of two specific blends of essential oil (EO) compounds (Crina<sup>®</sup> POULTRY and Crina<sup>®</sup> ALTERNATE). Cocci-

vaccinated or non-vaccinated chickens were challenged with mixed *Eimeria* spp. The eight treatments consisted of three controls, Uninfected-Unmedicated (UU), Unmedicated-Infected (UI), and BMD<sup>®</sup> +Coban<sup>®</sup>; two treatments with the EO blends at 100 ppm, plus three treatments vaccinated at 1 d of age with Advent<sup>®</sup> cocci-vaccine. Cocci-vaccinated treatments included one group without feed additives and two with the EO products. Cobb-500 male chickens were raised up to 13 d of age in used litter top-dressed with fresh wood shavings and were later moved to battery cages. Challenge with *E. acervulina*, *E. maxima*, and *E. tenella* was done at 19 d of age. Lesion scores (LS) and oocyst counts (OC) were performed 7 d post-challenge and anticoccidial indexes were calculated. Results after challenge indicated that non-cocci-vaccinated chickens fed Crina<sup>®</sup> ALTERNATE and vaccinated chickens fed diets without feed additives had equal FCR to the UU. The relative BWG of these two groups was better than that of the group fed diets with antibiotic and ionophore. However cocci-vaccinated chickens fed diets containing EO had lower relative BWG, without being statistically different. The lowest OC was observed in vaccinated birds without feed additives. Both vaccinated and non-vaccinated chickens fed diets with EO had lower LS and OC than chickens fed diets with antibiotic and ionophore. EO blends can help in mixed *Eimeria* spp infection and could be used to replace antibiotics and ionophores. However, the effect over mucosal immunity should be clarified.

**Key Words:** Essential oils, *Eimeria* spp, Coccidia vaccination, Broiler chickens, Antibiotics and ionophores

**S48 Dynamics of cecal microbial ecology in chickens fed diets supplemented with essential oils and challenge with mixed *Eimeria* spp.** E. O. Oviedo-Rondón<sup>1,2</sup>, M. E. Hume<sup>\*3</sup>, S. Clemente-Hernández<sup>1,4</sup>, <sup>1</sup>Stephen F. Austin State University, Texas, <sup>2</sup>de Medicina Veterinaria y Zootecnia, Universidad del Tolima, Colombia, <sup>3</sup>USDA, ARS, Southern Plains Agricultural Research Center, Food and Feed Safety Research Unit, <sup>4</sup>Universidad Autónoma de Chihuahua, México.

Populations of digesta microflora in chickens change with age and are affected by diet, stressors, coccidia, and feed additives. This study measured the changes in cecal microbial communities (MC) of broiler chickens fed diets supplemented with two specific essential oil (EO) blends, Crina POULTRY<sup>®</sup> and Crina ALTERNATE<sup>®</sup>, during pre- and post-challenge with mixed *Eimeria* spp. Five treatments were randomly distributed: three controls (Uninfected-Unmedicated (UU), Unmedicated-Infected (UI), and BMD<sup>®</sup>+Coban<sup>®</sup>), and two treatments with the EO blends at 100 ppm. Cobb-500 male chickens were raised to 13 d of age on used litter top-dressed with fresh wood shavings and latter move to battery cages. Challenge with *E. acervulina*, *E. maxima*, and *E. tenella* when chickens were 19 d-old. Cecal samples were taken from 6 birds per treatment immediately before and 7 d after the challenge and frozen at -70°C. Denaturing gradient gel electrophoresis was used to examine PCR-amplified fragments of a 16S ribosomal DNA variable region from cecal bacteria. Denograms of amplicon patterns indicated clear effects of feed additives over cecal MC. In pre-challenge period, two main clusters were observed with 79.6% similarity coefficient (SC). Crina POULTRY was in the smaller cluster and shifted MC when compared with the other treatments. The larger cluster contained the control treatments, BMD+Monensin, and treatment supplemented with Crina ALTERNATE. BMD+Monensin had 87.6% SC with control groups, indicating little change over cecal MC pre-challenge. BMD+Monensin and Crina ALTERNATE had the same effect over MC with a 92% SC. Challenge causes changes in MC (69.7% SC). UU control treatment was in one cluster and all treatments that were challenged in another with a 84.4% SC. The SC between pre- and post- challenge samples, within each treatment, were between 36.2 and 86.4%. Crina POULTRY and UI treatments had similar effect in MC (91.5% SC). These two specific essential oil (EO) blends had measurable effects over cecal MC, which differ in pre- and post- *Eimeria* spp. challenge periods.

**Key Words:** Broilers, Essential Oils, Cecal Microbial Ecology, DGGE, Coccidia

**S49 Dynamics of cecal microbial ecology in chickens vaccinated and challenge with mixed *Eimeria* spp..** E. O. Oviedo-Rondón<sup>1,2</sup>, M. E. Hume<sup>\*3</sup>, S. Clemente-Hernández<sup>1,4</sup>, <sup>1</sup>Stephen F. Austin State University, Texas, <sup>2</sup>Facultad de Medicina Veterinaria y Zootecnia, Universidad del Tolima, Colombia, <sup>3</sup>USDA, ARS, Southern Plains Agricultural Research Center, Food and Feed Safety Research Unit, <sup>4</sup>Universidad Autónoma de Chihuahua, México.

Intestinal microbial communities (MC) influence local mucosal physiology and immunity responses. This study determined the dynamics of cecal MC of broilers vaccinated at 1 d of age with viable attenuated *Eimeria* spp. oocysts (Advent<sup>®</sup>), challenged with field mixed *Eimeria* spp., and fed diets supplemented or not with specific essential oil (EO) blends (Crina POULTRY<sup>®</sup> or Crina ALTERNATE<sup>®</sup>). Six treatments were randomly distributed: three controls (Uninfected-Unmedicated (UU), Unmedicated-Infected (UI), and BMD<sup>®</sup>+Coban<sup>®</sup>) and three vaccinated treatments. Coccidia vaccinated treatments included one group without feed additives (FA), and two with the EO blends at 100 ppm. Cobb-500 male chickens were raised up to 13 d of age on used litter top-dressed with fresh wood shavings and latter move to battery cages. Chickens were challenged with *E. acervulina*, *E. maxima*, and *E. tenella* at 19 d of age. Cecal samples were collected from 6 birds in each group immediately before and 7 d after the challenge, and frozen. DNA was isolated, and denaturing gradient gel electrophoresis was used to examine PCR-amplified fragments of a 16S ribosomal DNA variable region from cecal bacteria. Dendrograms of amplicon patterns indicated that vaccination with live oocysts of mixed *Eimeria* spp. do not affect MC compared with control treatments (87.8% - 92.9% SC). Feed additives Crina POULTRY and Crina ALTERNATE do affect (85.7% SC vs controls) MC of vaccinated birds and their effect is similar (88.4% SC). Cocci-challenge influenced cecal MC, with 65.6% SC between UU and the other treatments. Crina POULTRY and the UI treatment had similar cecal MC (91% SC). Cocci-vaccinated treatments fed diets without FA and UI chickens had the highest SC % between pre and post-challenge periods. Chickens fed diets with EO products had SC values of 67.9 and 60.4%, indicating changes in this treatments due to challenge. Cecal MC of broilers have very small changes when broilers are coccidia vaccinated. FA supplementation of cocci-vaccinated birds changes the cecal MC. Challenge with mixed *Eimeria* spp. inevitably shifts cecal microflora.

**Key Words:** Broilers, Cecal Microbial Ecology, Coccidiosis Vaccination, Essential Oils, DGGE

**S50 Modulation of intestinal microbial communities and luminal IgA secretion by an amylase, xylanase and protease-based feed enzyme system in broiler chickens vaccinated and challenged with mixed *Eimeria* spp .** E. O. Oviedo-Rondón<sup>\*1,2</sup>, J. Apajalahti<sup>4</sup>, J. Parker<sup>1</sup>, J. Remus<sup>3</sup>, E. Pierson<sup>3</sup>, <sup>1</sup>Stephen F. Austin State University, <sup>2</sup>Facultad de Medicina Veterinaria y Zootecnia, Universidad del Tolima, Colombia, <sup>3</sup>Danisco Animal Nutrition, <sup>4</sup>Danisco Innovations.

Modulation of gut microflora, crude protein levels (CPI) and vaccination have been linked to immunity against coccidia. This trial measured the modulatory effects of a combination of amylase, xylanase and protease (Avizyme<sup>®</sup> 1502) designed for corn-soybean meal diets over microbial communities in the ileum and caeca of broilers vaccinated and challenged with mixed *Eimeria* spp. This trial was conducted in Petersime brooding units with 504 day-old male Cobb-500 chickens distributed in 72 cages. There were twelve treatments in a 3 x 3 factorial, plus 3 negative controls (No additives-No challenge) within each CP level were distributed. CP levels (19, 21, 23%) and anticoccidial control programs (Cocci-Vaccine=CV, Antibiotic + Ionophore, and Cocci-vaccine+Enzyme=CV+E) were evaluated as main effects. All chickens, but those in the control treatments were cocci-vaccinated at 1 d with Advent<sup>®</sup>. All chickens, except those in negative control treatments were gavaged at 17 d with *E. acervulina*, *E. maxima*, and *E. tenella*. Seven d post-challenge, ileal digesta were collected and frozen. Microbial cells were isolated from the digesta. Isolated DNA was subjected to cesium chloride-bisbenzimidazole density gradient centrifugation to obtain %G+C profiles microbial communities. IgA concentrations were measured with ELISA. Coccidial challenge alone had very small effect on microbial numbers in the ileum, but suppressed IgA production. CV+E increased ileal microbial numbers at the lower CPI. In the caecum, coccidial challenge reduced microbial numbers when compared with the non-

challenged controls. CV+E resulted in microbial numbers and %G+C profiles similar to the control; especially at 19 and 21% CP. Coccidial challenge had the greatest effect on the %G+C profiles when the diet had either 21 or 23% CP. Results indicate a correlation between changes in the microbial numbers, %G+C profile, and improved performance in CV+E birds. Microbial responses were dependent on dietary CP level.

**Key Words:** Feed enzyme system, Gut microbial communities, Coccidiosis, Coccidia immunity, Live vaccine

**S51 High throughput viral RNA isolation for molecular diagnosis and surveillance.** X. Fang<sup>\*</sup>, R. Willis, W. Xu, Q. Hoang, M. Bounpheng, *Ambion, Inc.*

There are many challenges to develop a versatile high throughput method of RNA isolation from various specimens for molecular diagnosis of viral. Our bead technology has been successfully used for high throughput Exotic Newcastle disease viral RNA isolation during the 2002/2003 END outbreak in California, which yielded 99.7% sensitivity and 100% specificity based on 1360 virus isolation confirmed samples.

We have further developed this technology into a standard high throughput viral RNA isolation kit. The protocol is thoroughly examined to ensure highest sensitivity and easy to use. We have successful cut down the process while increasing the sensitivity. And the method can be used for many types of specimens, such as oral swab, nasal swab, colocal swab, milk, plasma, serum, and whole blood. The optimized procedure takes about 40 min to process 96 samples in a microtiter plate. Every step is in process is under room temperature, and no special instrument is required.

Armored RNA and an RNA transcript were used to monitor RNA isolation efficiency. As quantified by real-time RT-PCR, RNA recovery was more than 50% from all type of specimens tested with high consistency (standard deviation of Ct values from RRT-PCR is less than 3%). We successfully isolated and detected END virus from as little as 50uL negative swab media where 1 pfu/mL END virus was spiked. This technology has been widely tested for many viral RNA isolation from various specimens, such as avian leukosis viral RNA from plasma; BVDV viral RNA from serum and plasma samples; FMDV viral RNA from oral swab, milk and epithelium; CSF viral RNA from nasal swab. All the tests done showed that our high throughput method has equivalent or better performance than the gold standard Trizol method.

In conclusion, the magnetic bead-based viral RNA isolation method is very robust, easy to use, and cost-effective. It can be widely used for high throughput viral RNA isolation for molecular diagnosis and surveillance from various specimens.

**Key Words:** High throughput, RRT-PCR, RNA isolation, Molecular diagnosis, Surveillance

**S52 An assessment of echocardiography as a diagnostic tool for dilated cardiomyopathy in turkey (Meleagris gallopavo).** K. Gyenai<sup>\*</sup>, H. Hammade, D. Kamara, R. Pyle, W. Pearson, P. Sponenberg, C. Larson, E. Smith, *Virginia Polytechnic Institute and State University.*

The turkey, *Meleagris gallopavo*, is a consensus animal model for dilated cardiomyopathy (DCM), an abnormality that is a significant cause of mortality in animals including poultry and humans. Existing methods of identifying turkeys have been limited thus making it difficult for a large-scale study of the genetic factors that underlie this abnormality which is a concern both to the agricultural and biomedical industries. Here, we investigated the use of echocardiography (ECH) as a non-invasive and non-destructive technique for identifying DCM-affected turkeys. To induce DCM, 700 ppm of Furazolidone (Fz) was fed to turkey poults from day-old until four weeks of age. Among the several ECH parameters evaluated, the left ventricular end diastolic dimension (LVEDD) and left ventricular end systolic diastolic (LVESD) were the most consistent indicators of DCM affected birds. Over the four-week period in which the FZ-containing feed was fed, the ECH measurement of LVEDD showed an increase over the control group birds of 25%, 32%, 47%, and 80% in week 1, 2, 3 and 4, respectively. A similar though larger difference between control and FZ-treated birds in LVESD measurements was also observed over the 4-

week study period. Necropsy of birds alive at the end of the 4-week study confirmed the ECH measurements that identified birds as DCM. Our data suggest that ECH may be a reliable and consistent tool for identifying birds suffering

from DCM. This will help us and others now begin to investigate the genetic factors that influence DCM.

**Monday, January 24**  
**SCAD (Avian Diseases)**  
**Room: B312**

**Key Words:** Echocardiography, Dilated cardiomyopathy, Furazolidone, *Meleagris gallopavo*

**S53 Effects of probiotics on the development on the ileal bacterial community of the broiler chicken.** M. Lee\*, J. Lu, *The University of Georgia.*

The intestinal microbiota is part of a complex ecosystem that affects a bird's resistance to colonization with enteropathogens. Probiotic bacterial formulations are commonly fed to animals to augment formation of a mature intestine. In order to study the effects of probiotic administration on the development of the small intestinal bacterial community, we used two 16S ribosomal DNA community analysis protocols to profile the changes in composition of the ileal microbiota over the growout. Significant differences were found between the control and probiotic-treated groups by pairwise-analysis of the abundance of certain bacteria and diversity profiles of the bacterial communities. *Enterococcus* and *Clostridium* species were more likely to be detected as dominant bacteria in the ileum of young birds fed the probiotic while *Streptococcus* species were prevalent in the control group. The ilea of both groups contained an abundance of *Lactobacillus* although the dominant species varied between the groups. Probiotics were found to stabilize the development of the bacterial community although the composition of the community was different from that of the control birds.

**Key Words:** Probiotic, Intestine, Microflora

**S54 The microbial composition of poultry litter and potential as a reservoir of antibiotic resistance.** J. Maurer\*, G. Avellaneda, J. Lu, M. Lee, C. Hofacre, *The University of Georgia.*

As the US population has grown, so has our food production system grown and evolved to mass-produce meats, eggs, and produce. Food animal production systems have become more consolidated and integrated, producing large, concentrated animal populations and their unwanted waste by-product. However, animal wastes, cattle manure and poultry litter in particular, serve as an inexpensive means to supplement soils of pasture and crop lands with nitrogen. At issue is the impact animal waste has on the environment, especially with regards to water quality and safety. Using a molecular approach, we set out to define microbial composition of poultry litter, stability of this population in response to antibiotic usage, and diversity of antibiotic resistance genes present within this microbial community. The microbial community of litter consisted primarily of gram-positive bacteria, some of whom were representative of fecal microflora present in litter as well as group that appeared to be unique to this environment. PCR screens failed to detect specific veterinary and foodborne pathogens. If these pathogens were present, they were at cell density far below the limit of PCR detection. Usage of growth-promoting antibiotics did seem to have a significant affect on microbial community structure. Streptogramin, macrolide and other antibiotic resistance genes and associate, mobile genetic elements were present within microbial community of poultry litter, regardless antibiotic usage. What remains to be determined is the fate of these microorganisms and their resident, antibiotic resistance genes once applied to soils.

**Key Words:** Litter, Microflora, Antibiotic, Resistance, Environment

**S55 Novel clostridia that colonize the small intestine of young broilers.** M. Lee\*, J. Lu, X. Qin, C. Hofacre, *The University of Georgia.*

The intestinal microbiota is part of a complex ecosystem that is involved in the health of animals. Our microbial ecology studies, using the chicken intestine as a model of intestinal ecology, indicate that some diets result in small intestinal communities rich with clostridia of unknown virulence. While the cytotoxic activities of pathogenic clostridia have been well studied, similar activity associated with commensal isolates has not been investigated. The toxins of pathogenic clostridia often exhibit enzymatic activity on host macromolecules as substrates. However, some of the mucinase activities of clostridia, including neuraminidase, glycosylhydrolase, protease, and sulfatase, are very similar to those produced beneficial commensal organisms. Therefore, some bacterial enzymatic activities are involved in promoting normal host intestinal development while others produce damage to host cells. In order to study the effects of these novel clostridia on the host, we produced a metagenomic library of intestinal bacterial community DNA and screened it for hydrolytic enzymatic clones. We did not detect phospholipase-producing clones indicating that these bacteria were unlikely to produce a-toxin activity. However, we have identified two novel neuraminidase genes among the genomes of the intestinal bacterial community. The findings of these studies and their implications for broiler intestinal health will be discussed.

**Key Words:** Clostridium, Toxin, Intestine

**S56 Detection of specific antibody responses to *Salmonella enteritidis* in lung wash samples from infected hens.** P. Holt\*, H. Stone, R. Gast, R. Moore, *USDA/ARS Southeast Poultry Research Laboratory.*

We have developed a simplified method for collecting lung lavage samples from adult chickens. Adult white leghorn hens previously infected with *Salmonella enteritidis* (SE) were euthanized using carbon dioxide inhalation and the tracheas were exteriorized. Narrow gauge tygon tubing (6/32 inch) was inserted down the trachea near the bronchi. Using a 30 ml syringe, containing 10 ml of glycine buffer and attached to the tubing, a vacuum was applied to remove all air from the lung through the buffer. The buffer was slowly introduced into and then slowly aspirated from the lung. Samples contaminated with blood were discarded. Antibody responses in the lung were determined via an ELISA using SE lipopolysaccharide as the solid phase antigen. A detectable IgA anti-SE response was observed in the lung lavage fluids one week post infection and these increased substantially over the next several weeks. These results indicate that a detectable immune response will develop in the lung of individuals intestinally infected with an enteric pathogen.

**Key Words:** Mucosal immunity, Food safety, Lung antibody, *Salmonella enteritidis*, Enteric pathogen

**S57 Distribution of Fimbrial, Phage and Plasmid Associated Virulence Genes among Poultry *Salmonella enterica*. Serovars.** R. Whitaker\*, C. Hofacre, M. Lee, M. Maier, J. Maurer, *The University of Georgia.*

Taxonomic relatedness does not define the pathogenicity of a microbe, biological properties do. Microbes that are designated "pathogens" possess virulence