Effect of Hydrated Lime on Selected Litter Microflora and Poult Growth Performance. D.D. Stanush1, R. Beltran1, C.M. Corsiglia2, D.J. Caldwell1, and B.M. Hargis1. 1Texas Agricultural Experiment Station, College Station, TX/USA, 2Cargill Foods, Waco, TX/USA.

Recently, we demonstrated that 10 or 20% (wt:v) hydrated lime in used poultry litter significantly reduced Salmonella enteritidis survival in vitro. Preliminary studies with day-of-hatch poults suggested that lime in excess of 5% (wt:v) in new litter caused mild but apparent ocular and respiratory irritation and were not further evaluated. Presently, we evaluated the effect of lower concentrations of hydrated lime in new dry pine wood shavings (0, 2, 1, or 5% wt:v) on recovery of Salmonella, Campylobacter, coliforms, total aerobic colony forming units (CFU) and poult performance (hatch to 7 weeks). Day-old poults were wing banded and 50 poults were randomly assigned to 2 pens (54 sq.ft.) per treatment, maintained at an age-appropriate temperature, and provided with feed (formulated to meet or exceed NRC recommendations) and water ad libitum. At 3 and 7 weeks-of-age each turkey was weighed and litter samples were obtained (n=4/pen) for evaluation of Salmonella, Campylobacter, coliforms, total aerobic colony forming units (CFU) and poult performance (hatch to 7 weeks). Day-old poults were wing banded and 50 poults were randomly assigned to 2 pens (54 sq.ft.) per treatment, maintained at an age-appropriate temperature, and provided with feed (formulated to meet or exceed NRC recommendations) and water ad libitum. At 3 and 7 weeks-of-age each turkey was weighed and litter samples were obtained (n=4/pen) for evaluation of Salmonella, Campylobacter recovery, and coliform and total aerobic enumeration. At 3 weeks of age, incorporation of lime at the selected concentrations did not significantly affect Salmonella or Campylobacter recovery as compared to untreated controls. However, incorporation of either 0.2 or 1% lime significantly reduced total aerobic CFUs as compared to untreated controls. While lime did not affect body weight at 3 weeks-of-age, at 7 weeks of age, turkeys from lime-treated pens (either 0.2 or 1%) were significantly (p<.05) heavier (219 gm/bird) than turkeys grown in control pens. Ammonia levels were determined at 7 weeks but were not different at the level of litter between treatments (<5 PPM). While incorporation of lime at the selected concentrations did not affect Campylobacter or Salmonella recovery, lime did reduce overall aerobic CFU and significantly increased weight gain in this experiment, possibly through reduction of other low level pathogens.

Key Words: Hydrated Lime, Litter, Turkey

Genetic selection in primary breeders is based on traits for high yield and performance. However, selection does not consider characteristics related to male reproductive success as primary selection traits. Consequently, this may negatively impact reproduction via: 1) reduced semen quality, 2) reduced male activity and mating; 3) female response (if male secondary sexual traits and/or courtship behavior are altered); 4) modified skeletal/muscle conformation that may impede sperm transfer during mating. Investigations were conducted to determine if differences in fertility could be attributed to semen quality. Sixty-six randomly selected males from two primary broiler breeder lines (A and B) were individually housed with 8 to 12 females. Four eggs per pen were sampled every 4 weeks from 30 to 50 weeks of age. True fertility was determined by examination of the germinal disc (GD). Sperm penetration through the perivitelline layer overlying the GD was used to estimate semen quality. Results show significant differences between both lines (P<0.001), with line A having lower true fertility (66.2%) than line B (81.4%). In both lines a high proportion of the percent infertile eggs (30.1% for line A and 15.4% for line B) was due to a total absence of sperm holes. Only 3.7% and 3.1% of infertile eggs (line A and B, respectively) contained 1 to 5 holes. For the mean number of sperm holes, no differences were found between lines as main effects (P>0.05), although the significant interaction of line by age (P<0.0001) revealed an earlier decline in mean sperm holes for line A than in line B. This result does not explain fertility differences across lines nor does it indicate that fertility can be attributed solely to semen quality in either line. Other factors affecting ejaculate transfer such as mating frequency and/or skeletal conformation of the modern male broiler breeder may better explain the differential fertility between strains.

Key Words: Broiler breeders, Reproduction, Fertility, Semen quality

4 The influence of feeding program on broiler breeder male mortality. S. D. Peak* and J. Brake, North Carolina State University, Raleigh, NC USA.

High male mortality continues to be a problem in the broiler breeder industry. There are probably several causes for this mortality, but recent evidence suggests that male feeding program may contribute significantly to the increases in mortality especially early in the laying period. In 1997, a flock of Ross males (BB11) was raised on a "straight line" feeding program. With this program, males were allocated 3 gm feed increases per male per week from 8 to 21 wk of age. Initial male mortality during the laying period (22-32 wk) was 20% and the overall male mortality was 49%. In the next two flocks (BB12 and BB13), Ross males were raised on a more "concave" feeding program that consisted of 2 gm feed increases per male from 5 to 11 wk, 3 gm feed increases 13 to 18 wk, 5 gm feed increases 19 to 20 wk, and finally a 7 gm feed increase at 21 wk. In these two flocks, male mortality was significantly reduced. Both flocks had initial male mortality of 13% (22-32 wk). BB12 had an overall male mortality of 38% while BB13 had an overall male mortality of 41%. From the data of these 3 flocks, it appears that male mortality can be reduced by feeding a concave shaped feeding program. In order to test this hypothesis, we placed 4 pens of 60 Ross males and fed the pens either on a "straight" or "concave" feed program. All birds received the same feed and the same total feed amount. At 22 wk, 20 males from each pen were randomly assigned to one of 12 pens of 200 females and photostimulated. The initial male mortality was 13.75% for the "straight" fed males and 8.75% for the "concave" fed males. The overall male mortality was 9.9% and 23.8% for the "straight" and "concave" fed programs, respectively. The results from this side by side comparison indicate that feeding program does influence male mortality and it is necessary to feed males in a "concave" manner to reduce initial and overall male mortality.

Key Words: Broiler breeder male, Feed program, Male mortality

5 Changes in carcass and reproductive characteristics in broiler breeder pullets in response to bonus feeding during sexual maturation. N. Tremblay*, C. Theriault, F. E. Robinson, and R. A. Renema, University of Alberta, Edmonton, AB.

This study investigated the carcass changes seen in response to excessive nutrient intake during sexual maturation. A total of 400 Shaver Starbro pullets were reared in a light-tight facility until 17 wk of age, at which time 252 birds were housed in individual laying cages (8L:16D). At 22 wk of age the birds were photostimulated (12L:12D) with an additional h of light being added at 23 and 24 wk. Pullets were assigned to one of 14 treatment groups (two feed allocation treatments and seven 14-d study period) in a factorial design. One feed treatment was a normal level (C), while the other was fed an additional 30 g bonus (B). The seven study periods (36 birds each) were 18-20 wk (20), 20-22 wk (21), 22-24 wk (24), 24-26 wk (26), 26-28 wk (28), 28-30 wk (30) and 30-32 wk (32). On day 14 of each study period, the 18 control birds and the 18 bonus-fed birds were killed and the carcasses dissected for determination of the weight of the breast muscle, fat pad, liver, ovudict and ovary. During each 14-d period, birds became significantly heavier that the C-fed birds, although the difference became proportionally smaller by wk 32. The C-fed birds had significantly greater breast muscle development (47.5 g) than did the B-fed birds (50.0 g). Overall, breast muscle weight increased from 345.0 g at 20 wk to 569.4 g at 32 wk. The greatest increase in liver weight seen in response to bonus feeding was from wk 24 to 26. The ratio of ovary weight of B/C birds was 1.2 (24 wk), 1.76 (26 wk), 1.15 (28 wk) 0.97 (30 wk) and 1.12 (32 wk). The ratio of number of large follicles of B/C birds was 2.94 (26 wk), 1.21 (28 wk), 1.10 (30 wk) and 1.09 (32 wk). These data indicate that the period from 2 to 4 wk post-lighting is the most sensitive period in terms of stimulating increased liver weight and large follicle development in response to excess dietary nutrient intake.

Key Words: Broiler breeder, feed intake, carcass composition, ovarian morphology, sexual maturation

6 Effects of light intensity and photoschedule on age at sexual maturation, carcass traits, ovarian morphology and first egg parameters in broiler breeder hens. C. A. Luzzi*, F. E. Robinson, R. A. Renema, and J. J. R. Feddes, University of Alberta, Edmonton, AB.

The effects of light intensity and photoschedule on breeder hen performance were evaluated. A flock of Cobb-500 pullets was reared in floor pens from 1 d to 20 wk of age. At 20 wk of age 256 pullets were paired according to BW and randomly placed 2 per cage into laying cages equipped with incandescent bulbs in a light tight facility. Photostimulation occurred at 22 wk of age when each cage was assigned to one of two photoschedules of short (S) 12L:12D or long (L) 16L:8D and one of four light intensities (1, 5, 50, 500 lx) in a 2 × 4 factorial design. One bird per cage was killed at first egg (n=128) and examined for carcass composition and reproductive morphology. Light intensity significantly affected age at first egg and first egg weight. High light intensity (500 lx) accelerated sexual maturity by 9 days but produced eggs that were 12% lighter than their low light (1 lx) intensity counterparts. Long and short day photoschedules also affected days to first egg, imparting a 2 day decrease in S compared to L, respectively. Carcase parameters were affected by photoschedule and light intensity. Absolute breast muscle weight was significantly higher in the low intensity, but as a percentage of body weight showed no significant difference. Light intensity affected abdominal fat-pad on an absolute and a percentage basis implying an effect that did not relate to BW differences. One lx compared to 500 lx showed a 23.8 g increase in fatpad weight. Ovary morphology was influenced by photoschedule and light intensity. Long days produced a higher number of LYF but light intensity failed to affect LYF number. LYF parameters of multiple sets showed that both photoschedule and light intensity produced higher numbers of multiple sets in the L photosperiod and the high light intensity respectively. This may indicate an overstimulation of the reproductive system that accelerates ovarian development at the expense of ovarian control.

Key Words: Broiler breeder, egg production, carcass traits, photoschedule, light intensity

7 Ovulation rate in broiler breeder females in response to a mid-cycle increase in photoperiod. N. S. Joseph*, F. E. Robinson, and R. A. Renema, University of Alberta, Edmonton, AB, Canada.

The influence of a post-peak increase in photoperiod on the reproductive performance of broiler breeder hens was evaluated. Two commercial lines of female broiler breeders, (lines A and B) were obtained from Cobb-Vantress Inc. Both lines of birds were housed in floor pens in a light-tight facility and managed identically in terms of photoperiod and...
feeding regimen. At 22 wk of age, 128 pullets from each line were selected and randomly placed into individual cages. Photostimulation occurred at 22 wk of age when the photoperiod was increased from 8L:16D to 14L:10D. At 32 wk of age, a light-tight partition was placed into the cage facility dividing the room in two. At this time, the photoperiod was increased from 14L:10D to 18L:6D [INC] while the other side of the room remained at 14L:10D [CON]. The partition was kept in place until the completion of the trial at 55 wk of age. Carcass traits, including ovarian morphology, were determined at different stages throughout the trial. In addition, a group of hens were blood sampled at regular intervals for measurement of estradiol-17β concentration.

Prime sequence length, did not differ between lines (A = 23.1 d and B = 20.8 d) or photoperiods (20.4 and 23.4 d, for CON and INC, respectively). Overall, total egg number per hen did not differ between lines or photoperiods. However, increasing the photoperiod to 18L:6D increased the total number of eggs from line A and decreased the total number of eggs from line B (approached significance P = 0.053). The number of ovulations was similar between lines A and B (159.1 and 157.0 ovulations, respectively). There was no difference in number of ovulations between CON and INC photoperiods (157.8 and 158.4 ovulations, respectively). However, the INC photoperiod increased the number of ovulations in line A hens while decreasing the number of ovulations in line B hens. Broiler breeders from line A responded positively to the mid-cycle increase in photoperiod, while hens from line B had fewer ovulations and laid less eggs.

Key Words: broiler breeder, photoschedule, ovulation rate, egg production

8 Effects of Pekin Duck Breeder Age on Duckling Growth and Survival During the First Eight Days Post-Hatch. Christie Brown1*, Stacey Neuman1, and Mickey Latour1. 1Department of Animal Sciences, Purdue University, 1151 Smith Hall, West Lafayette, IN 47907.

This study evaluated the effects of duck breeder age on duckling weight, feed consumption, feed conversion, and incidence of mortality. Forty-four hatchlings were obtained from the same Pekin duck breeder flock at breeder ages of 24, 31, and 47 weeks. The hatchlings were raised under identical conditions through eight days of age. Hatchlings from 31 and 47 wk-old breeders weighed significantly more than those from 24 wk-old breeders at both three (P < 0.03) and eight days (P < 0.0001) post-hatch. Duckling feed consumption and conversion were also affected by breeder age. Ducklings from 31 and 47 wk-old breeders consumed significantly more feed per bird after three days post-hatch (P < 0.01) than did those from 24 wk-old breeders. This trend continued throughout the four to eight day post-hatch period. Ducklings from the 31 and 47 wk-old breeders significantly consumed more feed per day (P < 0.004) as compared to ducklings from the 24 wk-old birds. After three days post-hatch, feed conversion was significantly greater for ducklings from the 24 and 47 wk-old breeders with 0.129 g/g gain (P < 0.0002) and 0.131 g/g gain (P < 0.0004), respectively, versus 0.181 g/g gain for ducklings from the 31 wk-old birds. In addition, the incidence of duckling mortality was affected by breeder age. No mortality was observed in ducklings from the 31 wk-old breeders. In contrast, ducklings from the 24 and 47 wk-old birds had 9% and 18% mortality, respectively. These results indicate that breeder age strongly influences duckling growth and survival during the first eight days post-hatch.

Key Words: Pekin duck, Breeder age, Growth, Mortality, Feed efficiency

9 Improved hatchability through semen selection of young broiler breeders in an industry field trial. H.M. Parker1*, L.R. Frank2, and C.D. McDaniels1. 1Mississippi State University, Miss. State, MS, 2Alpharma, Inc., Fort Lee, NJ.

Previous laboratory research has shown that the sperm quality index (SQI) is predictive of broiler breeder fertility. An industry field trial was undertaken to determine if selection of young males for the SQI would improve life of flock hatchability. In this study, all males were raised in a single cockerel house separate from the pullets. At 22 wk of age, 9000 hens were moved into each of four hen houses, and 1800 control males were equally divided between two of these hen houses. The males remaining in the cockerel house were selected for the SQI at 26 wk of age. Males with an SQI in the lower 20% of the population were culled. The males remaining in the cockerel house were selected for the SQI at 26 wk of age. At 32 wk of age, a light-tight partition was placed into the cage facility dividing the room in two. At this time, the photoperiod was increased from 14L:10D to 18L:6D [INC] while the other side of the room remained at 14L:10D [CON]. The partition was kept in place until the completion of the trial at 55 wk of age. Carcass traits, including ovarian morphology, were determined at different stages throughout the trial. In addition, a group of hens were blood sampled at regular intervals for measurement of estradiol-17β concentration.

Prime sequence length, did not differ between lines (A = 23.1 d and B = 20.8 d) or photoperiods (20.4 and 23.4 d, for CON and INC, respectively). Overall, total egg number per hen did not differ between lines or photoperiods. However, increasing the photoperiod to 18L:6D increased the total number of eggs from line A and decreased the total number of eggs from line B (approached significance P = 0.053). The number of ovulations was similar between lines A and B (159.1 and 157.0 ovulations, respectively). There was no difference in number of ovulations between CON and INC photoperiods (157.8 and 158.4 ovulations, respectively). However, the INC photoperiod increased the number of ovulations in line A hens while decreasing the number of ovulations in line B hens. Broiler breeders from line A responded positively to the mid-cycle increase in photoperiod, while hens from line B had fewer ovulations and laid less eggs.

Key Words: broiler breeder, photoschedule, ovulation rate, egg production

10 Influence of Chick Body Temperature at Hatch on Subsequent Performance of Broilers Reared under Low Atmospheric Oxygen. M. Mooney1*, R. G. Teeter, and S. Vanhooser, 1Oklahoma State University, Stillwater, OK.

Previous studies in our laboratory suggest that initial chick body temperature (at hatch) is positively correlated with live weight gain, gain/feed ratio and ascites resistance. Two experiments were conducted to evaluate effects of body temperature at hatching (HT), on subsequent broiler performance under varying levels of feeding and atmospheric oxygen (15.0%/ 20.6%). Chicks were initially divided into four groups according to falling above (AHT) or below (BHT) the mean HT and being male (m) or female (f). Variables measured throughout the study included body temperature (BT), body weight, liver glycogen, and 16 serum analytes. Experiment 1 was conducted as a 2 x 2 x 2 FAT with two BT classes (AHT, BHT), gender (m, f), and atmospheric oxygen (15.0%, 20.6%). Variables were collected on days 0, 2, 4, and 7. Chicks classified as BHT had an increased (P < 0.05) body weight at day 2. An increase in altitude (15.0%/5%) decreased (P < 0.05) day 7 weight, yolk weight and feed consumption while increasing (P < 0.01) hematoctrit, ascites heart ratio and heart weight. Body temperature was found to increase (P < 0.05) overtime regardless of BT class. However, chicks exhibiting BHT increased (P < 0.01) BT at a greater rate than AHT. Those chicks with an AHT reared under 20.6% had a higher (P < 0.05) BT compared to chicks reared under 15.0%. Experiment 2 was conducted to examine HT with feed efficiency utilizing 108 male Cobb broilers exposed to normal atmospheric oxygen reared to 4 weeks of age. Chicks were fasted at the conclusion of this experiment to quantify basal metabolic rate. Birds were scanned to determine body composition utilizing a x-ray densitometer (Hologic QDRTM). As weight increased BT decreased (P < 0.05). A positive correlation (r=0.60) was found between heart, fat and lean (g) and bone mineral content (g). Data indicates BT at hatch impacts subsequent performance. Whether birds with a high or low BT have ability to cope with different stresses is under current investigation.

Key Words: Broiler, Metabolism, Chick, Quality, Body Temperature, Composition

11 Determining the hatchability of broiler chicks from eggs set small end up versus eggs set large end up. G. M. Fasenko1*, F. E. Robinson, S. W. Chapman, and J. R. Higgins, University of Alberta, Edmonton, Alberta/Canada.

The present study was conducted to characterize the loss in hatchability of broiler breeder eggs due to eggs being set small end up. A total of 1708 commercial broiler breeder eggs were equally divided into two treatments of eggs set small end up (SEU) or eggs set large end up (LEU). A flat of 168 eggs served as the experimental unit with 15 experimental units per treatment. After 21 d of incubation at a commercial hatchery, the number of saleable and cull chicks that hatched were noted. Any unincubated eggs were broken to assess fertility or stage of embryonic death. All percent data were transformed prior to analyses using arc sine transformations. The data were analyzed using GLM on SAS® and significance was measured at P≤0.05. The hatchability of fertile eggs was significantly lower (P=0.0001) in the eggs set SEU (86.2%±0.7) compared to the eggs set LEU (93.2%±0.7). Mortality between 15-21 d of incubation was significantly higher (P<0.0001) in the SEU group (7.3%±0.5), compared to the LEU group (1.9%±0.5). The percentage
of embryos that had not externally pipped which were positioned upside down in the egg was significantly greater (P=0.0001) in the SEU (4.8±0.4) versus the LEU (2.0±0.4) group. In addition, the percentage of live embryos that had externally pipped, but were positioned upside down in the egg was greater (P=0.0059) in the SEU (0.62±0.15) compared to the LEU (0.04±0.15) group. The number of chicks culled due to navel problems was larger (P=0.0057) in the SEU (1.8±0.3) versus the LEU (0.5±0.3) treatment. These results show that not only is the hatchability of fertile eggs reduced due to eggs being set SEU versus LEU, but the viability of chicks that hatch from eggs set SEU may be negatively impacted as well.

**Key Words:** Broiler Breeder, Egg position, Small End Up, Hatchability, Embryo Mortality

12 **Evaluating the hatchability of broiler chicks from washed and unwashed nest and floor eggs.** G. M. Fasenko*, F. E. Robinson, M. G. Hittinger, M. A. MacLean, and B. A. White, University of Alberta, Edmonton, Alberta/Canada.

Many broiler breeder hatching egg producers in Canada wash and ship eggs that are laid on the scratch area in an attempt to maximize saleable chick numbers. A total of 1800 eggs were collected from a 41 wk-old commercial broiler breeder flock of Hubbard Hi-Y females (n=4478) and Hubbard Ultra males (n=394). The experiment was a 2 x 2 factorial design with two sources of eggs, Floor (F) (n=900) or Nest (N) (n=900) and two washing treatments, washed (W) or unwashed (Un). Eggs were washed in a container with 30 g of a chlorine-based egg washing compound to 18 L of water at 43-46°C, then rinsed in a container holding 10 mL of bleach in 18 L of water at 43-46°C. Separate wash and rinse water was used for the F and N eggs. All eggs were weighed prior to and after storage, and at transfer from the setters to the hatchers. Each of the four treatment groups was placed into separate setters and hatchers to prevent cross-contamination. After 21 d of incubation all chicks were counted and weighed, and any unhatched eggs broken open to determine fertility and stage of embryonic death. The data were analyzed using the GLM procedure on SAS®, and significance measured at P≤0.05. Fresh egg weight was not different between the treatments. A malfunction of the hatchers in which the NU n eggs were placed negated data collection from this group. Hatchability of fertile eggs was significantly (P=0.0060) lower in the FU n group (86.0±1.6) compared to the FW (92.8±1.6) group. The hatchability of the NW group (90.1±1.6) did not significantly differ between the FU n or FW treatments. Mortality between 8-14 d of incubation was significantly higher (P=0.0229) in the FU n group (2.1±0.5), compared to the FW (0.2±0.5) and NW (0.5±0.5) groups which did not differ between each other. The percentage of live culled chicks did not differ between the treatments, however, the percentage of contaminated eggs did (P=0.0390). The FW group (1.5±0.4) had a higher percentage of rotten eggs than the NW group (0.5±0.4), while the FU n treatment (0.7±0.4) did not differ between the other two groups. These results indicate that properly washed floor eggs can hatch with the same success as nest washed eggs.

**Key Words:** Broiler Breeder, Floor Eggs, Washing Eggs, Hatchability, Embryo Mortality

13 **Improved sensitivity of field oocyst populations to coccidiodial following vaccination with live oocyst vaccine.** L. J. Newman* and H.D. Danforth*, 1 Schering-Plough, Union, NJ, 2 USDA-ARS, Beltsville, MD.

Control of coccidiosis in broilers with vaccination has had limited past success due to excessive lesion development and clinical coccidiosis post-vaccination. New spray cabinet application technology has resulted in uniform vaccine administration. Uniform vaccine application results in minimal lesion development, similar to the lesions that occur when flocks are fed ionophore anticoccidials in the ration. Pen trials and field performance data reveals that immunization is a practical alternative to an-ticoccidials in broilers processed at 42 days of age or older. Immunionization against coccidiosis using Coccivac-B® (Schering-Plough Animal Health, Union, NJ) has an additional benefit: seeding the houses with the coccidiosis-sensitive vaccine oocysts. Oocysts were isolated from litter samples collected from houses that had been vaccinated for 5 flocks, as well as from litter collected from unvaccinated houses using ionophore coccidiostats. Salinomycin sensitivity was tested by challenging SPF birds with both groups of oocyst isolates while they were fed 69 ppm salinomycin. Weight gain in the challenge groups was compared, revealing much better weight gain in the birds challenged with oocysts from the vaccinated houses. Another trial compared the oocysts isolated from litter samples collected from a house prior to immunization with the live oocyst vaccine to isolates from litter samples taken from the same house after vaccination of one flock. Vaccination of only one flock restored salinomycin sensitivity of the litter oocyst population. Field management can have an impact on the ability of immunized flocks to demonstrate competitive performance. Careful management of brooding, litter conditions, lighting programs, and feed access all play a role in the success of a coccidiosis vaccination program. Immunization is an alternative to traditional in-feed coccidiostats, yielding competitive performance. Vaccination provides the added benefit of renewing field oocyst sensitivity to heavily used ionophore coccidiostats.

**Key Words:** Coccidiosis, Vaccination, Salinomycin

14 **Amelioration of drug resistance in Eimeria by rotation of anticoccidial drugs and vaccines.** H.D. Chapman*, University of Arkansas, Fayetteville, AR.

Continuous use of drugs has resulted in a decline in efficacy due to the selection of resistant strains of Eimeria. It is believed that alternation of drugs in rotation programs will delay the emergence of resistance but selection of resistance will not be prevented and the eventual outcome is likely to be the development of multiple resistant strains. In the USA introduction of diclazuril provides a new drug for use in rotation programs. Diclazuril is effective against ionophore resistant strains and strains resistant to other synthetic drugs (Chapman, 1989). The drug is able to suppress oocyst production and therefore should serve to reduce overall oocyst numbers in commercial houses. It is possible to induce resistance to diclazuril and it is important to limit its use (two successive flocks has been recommended). Alternation of the use of drugs with a coccidiostasis vaccine that contains drug sensitive strains of Eimeria is desirable because the vaccine strains may gradually replace any resistant strains present in the broiler house. Evidence has been obtained that monensin was more effective against field strains of Eimeria after vaccination of flocks with Coccivac-B® (Chapman, 1994). A combination of the use of diclazuril and Coccivac-B® may ameliorate the incidence of drug resistance in the longer term. It is proposed that two flocks should be medicated with diclazuril and then two flocks given Coccivac-B®. Use of diclazuril should reduce oocyst numbers in the broiler house and the vaccine should repopulate the house with drug-sensitive parasites. An additional benefit is that use of the vaccine should prevent the emergence of resistance to diclazuril. In countries where strains resistant to diclazuril are already widespread, then an alternative drug should be identified. It is difficult to provide experimental evidence that the rotation program described will reduce the incidence of resistant strains. Nevertheless, adoption of novel strategies for the control of coccidiosis is important because few new effective drugs will be available in the future. Chapman, H.D. (1989) Parasitology 99: 189-192 Chapman, H.D. (1994) Poultry Science 73: 476-478

**Key Words:** Eimeria, anticoccidial resistance

15 **Male Specific Coliphages in Poultry Litter and on Chick Box Trayliners.** Suresh Pillai*, Allyson Herseim1, Amy Obenhaus1, and Allen Byrd2, 1 Department of Poultry Science, Texas A&M University, 2 USDA-ARS, Southern Plains Agricultural Research Center.

The potential for bird-to-bird transmission of pathogens is a critical issue facing hatcheries and broiler houses. Additionally, persistence of pathogens in poultry litter when disposed off on agricultural lands is an environmental concern. The use of traditional pathogen indicator organisms such as fecal coliforms to screen for microbial pathogens has limitations, the most important of which is the inability to monitor for the presence of pathogenic viruses. Viruses in general have different survival characteristics as compared to bacterial pathogens. The use of...