183 Financial impact of removing health-promoting antibiotics from US broiler diets. S Shane*, 1, 1, North Carolina State University.

Regulatory authorities in the USA are contemplating withdrawing approval of feed-additive growth and health-promoting antibiotics in broiler diets. Two compounds with proven efficacy against Gram-positive intestinal flora have been used for over 25 years without adverse reaction and with consistent activity. Neither product has been scientifically proven to be responsible for transferable drug resistance to human pathogens. Neither compound has an exclusive human therapeutic analogue. The banning of four feed-additive antibiotics by the EU in 1998, was not based on a scientific, structured, and comprehensive risk assessment incorporating appropriate factors and costs. The potential loss to the US Broiler Industry was projected applying current production values and costs. Deterioration of 0.85% in feed conversion ratio (FCR), corresponding to a decline of 0.017, was calculated as the breakeven value following antibiotic deletion, assuming a delivered feed cost of $140/ton, antibiotic medication at $1.25/t, and 19.5 FCR and 160 million broilers/week. With a realistic 5% deterioration in FCR attributed to antibiotic withdrawal, as verified by field studies, the US Industry could incur an additional annual feed cost of $294 million. A benefit to cost ratio of 5.5 was calculated for the two approved antibiotic additives. The additional cost resulting from decreased livability and growth consequent to clostridial infections, including necrotic enteritis, botulism and dermatitis, will exceed $108 million, for each 1% decline in output, assuming a live bird cost of 25¢/lb. The incremental consumption of feed as a result of inferior FCR corresponds to an additional 1.5 million tons of corn and 0.6 million tons of soybeans annually.

Key Words: Antibiotics, Financial cost, Broilers

184 Immunostimulatory and growth promoting effects of Korean brown algae seaweed (class Phaeophyceae) in experimental animals. C.W. Kang*, 1, S.K. Kim1, J.M. Sim1, S.K. Kwon1, B.K. Ahn1, S.G. Hwang1, and E. Her1, Konkuk University, Seoul, Korea.

Brown algae (class Phaeophyceae), sea plants, including Ecklonia cava, Sargassum fulvellum, Undaria pinatifida, and Hizika fusiforme growing well in the coast of Korean Peninsula are known to be abundant in immune modulators. The aim of this study was to investigate the effects of the dietary brown algae on immune responses and growth in experimental animals, mice and chicks. In the first experiment, water soluble extracts (WSE) from two of the brown algae, Ecklonia cava and Sargassum fulvellum were carried out to examine the cellular and gut immune responses with macrophages and small intestinal epithelial cells. To approach these tests, the techniques of ELISA, immunoblotting, and RT-PCR were used. The results showed that WSE significantly induced secret tumor necrosis factor (TNF-) and interleukin-1 (IL-1) from the macrophages. This results found out by the ELISA technique was also reconfirmed by the techniques of immunoblotting and RT-PCR. These data suggested that WSE had a possibility to be used as the cellular immune reinforcement. Since gut immune response is very important in animal, it was examined whether WSE would regulate small intestinal epithelial cells or not. WSE significantly induced productions of the IL-1 and IL-6 from small intestinal epithelial cells which is one of the most important cell in the gut immune system. These data made us hope for the agent that strengthen cellular and gut immune system, so as like oral agents. The second experiment was conducted to investigate how the dietary seaweeds affect performances of broiler chicks. Ecklonia cava was dried, ground by use of hammer mill, and supplemented into broiler diets at the levels of 0, 0.1, 1.0 and 3.0%. The dried algae contained TME of 2020 kcal/kg, 9.9-11.3% CP, 35.4% of availability of amino acids. The body weight gain and feed conversion rates were improved by its dietary supplementation at all the levels significantly (p 0.05). Any negative responses in broiler performance were not found upon their dietary supplementation.

Key Words: Brown algae seaweed, Water soluble extract, Mice, Chicks, Cellular and gut immune responses

185 Efficacy of esterified glucomannan to counteract mycotoxicosis in broilers fed with naturally contaminated feed. K. L. Aravind, G. Devegowda*, and V.S. Patil, University of Agricultural Sciences, Bangalore, India.

An experiment was conducted in broiler chickens to evaluate the efficacy of esterified glucomannan (EGM) (Mycosorb, Alltech, Inc.) in ameliorating adverse effects of various mycotoxins present in naturally contaminated diet. The basal diet was prepared to contain no mycotoxins at detectable levels. The naturally contaminated diet was formulated to the nutrient specifications similar to the basal diet by replacing basal diet corn with the naturally mycotoxins-contaminated corn. The contaminated diet was found to contain 168 ppb aflatoxin, 8.4 ppb ochratoxin, 54 ppb zearalenone and 32 ppb T-2 toxin. Two hundred and eighty day-old broiler chicks were randomly allotted to four dietary treatments of seventy chicks each: 1) basal diet; 2) basal diet + EGM (0.05%); 3) contaminated diet; and 4) contaminated diet + EGM (0.05%). Treatment effects on performance, organ weights, and serum biochemical variables were evaluated. Contaminated diet significantly (P<0.05) decreased the body weight (9.51%), feed consumption (7.06%) and resulted in poor feed efficiency (2.3%) when compared to control. Supplementation of esterified glucomannan at 0.05% to the contaminated diet improved (P<0.05) the weight gain (9.7%), feed intake (5.32%) and feed efficiency (3.15%). Significant increase (P<0.05) in the weights of liver (24.9%) and gizzard (12.06%) was observed in chicks fed contaminated diet. EGM supplementation to the contaminated diet did not decrease (P<0.05) the organ weights. Further, feeding contaminated diet was associated with significant decrease (P<0.05) in plasma urea (24.25%) and increase in gamma glutamyl transferase activity (9.63%); however, urea nitrogen concentration was improved (14.3%) with the addition of EGM. These results indicate that EGM at 0.05% level considerably prevented the growth inhibitory effect of mycotoxins in naturally contaminated feed.

Key Words: Mycotoxicosis, Contaminated feed, Esterified glucomannan, Broilers

Physiology

Reproduction II

186 Inhibitory and stimulatory effects of serotonin (5-HT) on prolactin (PRL) secretion in the turkey. O.M. Youngren and M.E. El Halawani*, Department of Animal Science, University of Minnesota, Saint Paul, MN.

Serotonin has been shown to have stimulatory influences on PRL secretion in avian species. This effect is mediated centrally via a pathway that includes dopamine (DA) and vasoactive intestinal peptide (VIP). However, microinjections of 5-HT (50-200 ng) into the ventromedial nucleus of the hypothalamus (VMN) or into the preoptic area (POA) appeared to cause a small but gradual inhibition of PRL secretion. Results of a recent study from our laboratory indicated the presence of a monosynaptic DAergic pathway from the POA to the infundibular nuclear complex (INF) that is stimulatory for PRL secretion. The present study was designed to investigate the interaction between the stimulatory DAergic pathway and the inhibitory effect of 5-HT on PRL secretion in the turkey. When 5-HT microinjections in caudal VMN were combined with low-level electrical stimulation (ES; 50 microamps) of the POA, the ES failed to increase PRL secretion to the same degree as in vehicle-injected controls. Conversely, microinjections of 5-HT into the rostral VMN enhanced ES-induced PRL secretion, even though it had no effect on its own. Serotonergic inhibition of PRL secretion could be effected by decreasing DAergic stimulation of VIP, or by increasing DA release from the median eminence to the anterior pituitary, where it is known that DA inhibits PRL secretion by antagonizing the effect of VIP. The data implies that 5-HT may play a dual role in the avian hypothalamus regarding the regulation of PRL secretion. USDA Grant No. 00-02127.

Key Words: Serotonin Inhibition, Dopamine Stimulation, Vasoactive intestinal peptide, Avian Prolactin regulation, Turkey Hypothalamus
187  Expression of vasoactive intestinal peptide receptor mRNA in the hypothalamus and pituitary throughout the turkey reproductive cycle. Y. Chaiiseha\textsuperscript{1}, O.M. Youngren\textsuperscript{1}, M.G. El Halawani\textsuperscript{2}. \textsuperscript{1}School of Biology, Institute of Science, Suranaree University of Technology, Thailand, \textsuperscript{2}Department of Animal Science, University of Minnesota, Saint Paul, MN.

Avian prolactin (PRL) secretion and PRL expression are regulated by vasoactive intestinal peptide neurons within the infundibular nuclear complex (INF) of the hypothalamus. Dynorphin, serotonin, dopamine, and VIP stimulate PRL secretion via a neural pathway, with VIP as the final mediator. The differential expression of VIP receptors within the hypothalamus and pituitary may be involved in the regulation of the PRL changes observed throughout the turkey reproductive cycle. This in situ hybridization study revealed that VIP receptor mRNA was expressed throughout the hypothalamus and pituitary. VIP receptor mRNA was observed within the medial preoptic area, anterior hypothalamus, lateral hypothalamus, ventromedial nucleus, and INF. Only within the INF were significant differences seen among the reproductive stages. VIP receptor mRNA was markedly reduced in reproductively quiescent (non-photostimulated) and photorefractory hens as compared to laying and incubating hens. The most dense VIP receptor mRNA was found in the anterior pituitary, where content was 2.4- and 3.0-fold greater in laying and incubating hens, respectively, as compared to that in non-photostimulated ones. When hens stopped incubating and became photorefractory, pituitary VIP receptor mRNA levels decreased to that of non-photostimulated birds. The data provides additional evidence that VIP is the avian PRL-releasing factor, suggests that functional VIP receptors may be located in the INF, and indicates that PRL secretion is principally regulated by VIP receptors at the pituitary level. USDA Grant No. 00-02127

Key Words: Avian Prolactin, VIP Receptor, Turkey Hypothalamus, Pituitary, In situ hybridization

188 The suppressive effect of prolactin on prolactin promoter activity in primary anterior pituitary cells from turkey hens. S. W. Kang\textsuperscript{1}, T. Bakken, and M. E. El Halawani. Department of Animal Science, University of Minnesota, St. Paul, MN.

The changes in circulating prolactin (PRL) during the turkey reproductive cycle are accompanied by changes in pituitary PRL mRNA. Our previous studies showed that PRL promoter activities were positively correlated with secreted PRL levels in primary anterior pituitary (AP) cells harvested from hens in different prolactinemic states. However, in AP cells from hyperprolactinemic hens (incubating), PRL promoter activity was down-regulated by VIP. The present study investigated the effect of exogenous PRL on PRL gene expression at the transcriptional level in primary AP cells from laying and incubating hens. PRL promoter activity, PRL mRNA level and secreted PRL level were measured with/without VIP treatment (10\textsuperscript{-6} M), and in the presence and absence of ovine PRL (oPRL) in a time and dose dependent manner. We found that decreased PRL promoter activity and endogenous PRL mRNA levels in AP cells from incubating hens were up-regulated by replacing with new media, suggesting that the secreted PRL may be a negative regulator of PRL promoter activity. oPRL decreased PRL secretion in the VIP-treated laying and incubating AP cells. Promoter activity was also decreased in a dose dependent manner by oPRL in the VIP-treated AP cells. The most suppression of PRL on PRL promoter activity and secreted PRL levels was observed in the incubating AP cells treated with 2 and 10 g/ml oPRL. These results provide evidence for the down-regulation of the PRL gene by PRL and suggest that suppression of PRL promoter activity by PRL may be one of the mechanisms involved in the ultra-short negative feedback regulation of PRL. USDA grant no. 00-35203-9157

Key Words: Prolactin Promoter, Avian VIP, PRL Negative Feedback, Turkey Pituitary, PRL gene expression

189 Effect of embryonic photostimulation on posthatch growth of turkey pouls. I. Rozenboim\textsuperscript{1}, R. Huisinga\textsuperscript{2}, O. Haley\textsuperscript{1}, and M.E. E. El Halawani\textsuperscript{2}. \textsuperscript{1}Hebrew University of Jerusalem, Rehovot, Israel, \textsuperscript{2}Willmar Poultry Corporation, Willmar, MN, \textsuperscript{3}University of Minnesota, St. Paul, MN.

Artificial illumination, including light quality, is important in modern meat type bird management. In the present study the effect of in ovo monochromatic green light photostimulation on post hatch growth of turkey pouls was investigated. In experiment 1, 182 turkey eggs were divided into two light treatment groups (n=91). The first group was intermittently (3 min ON and 3 min OFF) photostimulated with green light provided by 5 light emitting diode (LED) lamps per egg at intensity of 0.14 watts/m\textsuperscript{2}, at eggshell level. The second group was incubated under dark conditions and served as control. Post hatch body weights were recorded at 0, 2, 6, 13, 20, 28, 35, and 59 days of age. A significantly greater body weight at 28 days of age, until the end of the experiment (59 days of age) was observed in the in ovo green light photostimulated females as compared to their corresponding controls. In experiment 2, 273 turkey eggs were divided into 3 light treatment groups (n=91). The first group was intermittently photostimulated (15 min ON and 15 min OFF) with green light provided by 7 LED lamps per egg at intensity of 0.14 watts/m\textsuperscript{2}. The second group was photostimulated with white light provided by one mini-incandescent lamp/egg at similar light intensity and schedule to the first group. Eggs with the third group were incubated under dark conditions and served as control. Post hatch body weights were recorded at 0, 7, 14, 28, 42, 56, and 79 days of age. No significant differences were found in body weight of males incubated under different light conditions. As in experiment 1 in ovo green light photostimulated female turkeys had significantly greater body weight compared to their corresponding control and white light groups from 28 days of age until termination of the experiment at 79 days of age. Breast muscle weight was significantly greater in female turkeys incubated under green light, compared to white and dark incubation treatment groups. We suggest that in ovo green light photostimulation enhance post hatch body weight of turkey female pouls.

Key Words: Turkey embryo, Photostimulation, Growth, Monochromatic light

190 The role of retinal and extra retinal photoreceptors in reproductive activities of turkey hens. Israel Rozenboim\textsuperscript{1}, Steve Whiting\textsuperscript{2}, S. Kang\textsuperscript{2}, T. Bakken\textsuperscript{2}, and Mohamed E. El Halawani\textsuperscript{2}. \textsuperscript{1}Hebrew University of Jerusalem, Rehovot, Israel, \textsuperscript{2}University of Minnesota, St. Paul, MN.

Long day length as well as light intensity is implicated in the initiation and termination of reproductive activity. Brightness is dependent upon activation of retinal photoreceptors by the green-yellow bands of the spectrum with minimum effect on extra retinal photoreceptors. Results of earlier studies indicated that high light intensity accelerated the termination of reproductive activity and the onset of photorefractoriness. We hypothesized that reducing light intensity by decreasing the energy in the green-yellow bands while maintain or increase the red band output would enhance egg production by extending the egg laying season (i.e. delaying the onset of photorefractoriness and molting). One hundred forty four turkey hens were divided among three rooms at 45 birds per room. Two of the rooms were equipped with two lighting systems, each. One system provided red light by using red filters (Lee Filters HT 019: 600 nm), and the second system provided green light by using green filters (Lee Filters HT122: 550 nm). All filters were mounted on 60W incandescent lamps. The birds in the third room (controls) were subjected to 60W incandescent lamps as a light source. Birds in all treatment groups were subjected to a short day of 6hr of light and 18hr of darkness between 20 and 30 weeks of age. Turkey hens were photostimulated with 15hr of light and 9hr of darkness at 30 weeks of age. Birds in one experimental room were photostimulated with the red band of the spectrum; where as the green band remained at 6L: 18D (Red Group). Conversely, birds in the second experimental room were photostimulated with the green band of the spectrum and the red band remains at 6L: 18D (Green Group). Control birds were photostimulated with white light from the incandescent lamps. Turkey hens photostimulated with the red light had significantly higher egg production than that of hens photostimulated with the white or green light (95, 84 and 28 eggs respectively). Control hens photostimulated with the white light laid more eggs than the Green group. It suggested that stimulation of retinal photoreceptors by the green-yellow band has an inhibitory influence on reproductive activity, which antagonizes the stimulatory effect of extra retinal photoreceptor activated by the red band.

Key Words: turkey, photostimulation, retina, red green light
191 Spontaneous recrudescence in turkey breeder hens. T. D. Siopes*, North Carolina State University, Raleigh, NC.

Following long day photoinduction of peak egg production by turkeys there occurs spontaneous decline in egg production and most hens eventually cease lay. If these hens remain on an unchanging long photoperiod they eventually return to lay (spontaneous recrudescence [SR]). This study examined the characteristics of this response and determined the associated changes in thyroid hormones. Large White turkey breeder hens were photostimulated at 30 wk of age on February 2 with a daily photoperiod of 16L:8D. The hens remained in the same facility and photoperiod to 94 wk of age. Egg production was recorded daily. At 62 wk of age (September) the hens were not laying eggs. One group of hens was given short days (8L16D) for 2 wk, then 16L8D to reinitiate lay. Another group of hens remained on 16L8D. Weekly blood samples were taken starting at 62 wk of age. Spontaneous recrudescence occurred in November at 71 wk of age and egg production increased at a moderate rate to about 55% by 79 wk of age and changed little thereafter. Cumulative eggs/hen to 94 wk was 76.1 and 83.5 for SR and recycled hens, respectively. Plasma thyroid hormones in the prelay period were very similar between recycled and SR hens. Thyroxine fluctuated with no particular pattern whereas triiodothyronine (T3) had a distinct parabolic response. That the SR hens remained normally photoresponsive was demonstrated by a similar decline in egg production as recycled hens when all hens were given a change in photoperiod from 16L:8D to 13L:11D at 94 to 98 wk of age. It was concluded that SR is associated with a preceding, parabolic change in T3 similar to artificially recycled hens and that egg production can be substantial, though less than for recycled hens. In addition, photoresponsiveness of SR hens was not altered.

Key Words: Spontaneous Recrudescence, Light, Thyroid Hormones, Turkeys

192 The photo-responsiveness of turkey breeder hens changes during the egg-laying season. J. A. Proudman* and T. D. Siopes*, Germplasm & Gamete Physiology Lab, USDA-ARS, Beltsville, MD, 2North Carolina State University, Raleigh, NC.

Typically, photosensitive species undergo neuroendocrine changes during a reproductive season that cause them to gradually become unresponsive to a photoperiod that initially stimulated reproduction. They may first become relatively photoresponsive (rPR), when they will cease laying only if photoperiod is reduced, and then absolutely photoresponsive, when they will cease laying despite long day length. Our objective was to test for the presence of rPR at various times following photostimulation and to relate photo-responsiveness to plasma levels of prolactin (PRL) and luteinizing hormone (LH). Hens were maintained in cages in light-controlled facilities and photostimulated at 31 wk of age (September) with a photoperiod of 16L:8D. At 8, 14, and 20 wks after photostimulation, treated hens received a 2.5% water substitute of 11L:13D photoperiod and were then returned to 16L:8D. Exposure to the shortened photoperiod at 8 wks of photostimulation resulted in three distinct responses in egg production: no change (30.4% of hens), partial decline (42.6%), or full decline (27%). Average egg production returned to control levels following return to a 16L:8D photoperiod. This response repeated at the 14 and 20 wk treatment periods, and with greater declines in egg production in the non-responder and partial responder groups. Plasma LH and PRL concentrations also declined in response to 11L:13L:5D, and also rebounded to equal or greater levels than that of controls following return to 16L:8D. The hormonal responses of non-responders, partial responders, and full responders was similar. We conclude that most turkey hens exhibit some degree of rPR shortly after reaching peak egg production, and that the incidence and severity of the PR response increases as the laying season progresses. In addition, short-term reduction in photoperiod during lay resulted in a decline in circulating PRL and LH concentrations, but hormone levels did not reflect the differences in egg production among the responder and non-responder groups.

Key Words: Turkeys, Photofractoriness, Light, LH, Prolactin

193 Influence of selenium supplementation on age-related changes in blood and hepatic glutathione oxidation and glutathione redox state in broiler chicks during mild heat stress. K. Z. Mahmoud1 and F. W. Edens2, 1Jordan University of Science and Technology, Irbid, Jordan, 2North Carolina State University, Raleigh, NC.

The purpose of this study was to examine the effect of different sources of selenium on age-related changes in blood and hepatic glutathione (reduced [GSH] and oxidized [GSSG]), glutathione peroxidase (GSHpox) and glutathione reductase (GR), and glucose-6-phosphodehydrogenase (G-6-PDH) during mild heat stress. Three starter diets with different selenium sources were assigned randomly into 180 day-old chicks allocated to different treatments. The basal diet (BS) had 0.26 ppm selenium background. Organic (Sel-Plex, OS) or inorganic (sodium selenite, IS) selenium supplements elevated that level to 0.45 ppm in BS. Ten birds from each treatment were bled at 2, 3 and 4 wk of age. After birds were bled at 4 wk of age, they were exposed to mild heat stress (30 C) for 3 hrs and then 48 birds were bled. Hepatic and blood GSHpox and GSHpox/GR activities from birds given BS without supplemental selenium were lower (P<0.001) compared to both OS and IS. Although selenium source did not affect GSH and GSSG, it is noteworthy to mention that birds fed OS maintained higher hepatic and blood GSH/GSSG and GSHpox/GR ratios. All variables were affected by age (P<0.001) except blood GSSG, GSHpox and GR. Heat stress did not change blood levels of GR and G-6-PDH, but they both increased in birds on BS diet (P<0.01), GSHpox (P<0.01) and GSHpox/GR (P<0.05). Hepatic levels of GSH, GSSG, GSHpox and GSHpox/GR were not affected significantly by heat stress. Hepatic glutathione appeared to be mobilized during mild heat stress. Higher GSH/GSSG and GSHpox/GR ratios in OS-fed birds was indicative of its superiority in controlling oxidative stress effects, and this was supported by lower levels of hepatic Hsp70.

Key Words: GSH, Selenium, Broilers, Heat stress

194 Sulfamethazine requires a long photoperiod to maximize its stimulatory effect on gonadal development. W. J. Kuenzel1, S. Copeland2, J. A. Proudman2, and R. McNew2, 1University of Arkansas, Fayetteville, AR, 2USDA/ARS, Beltsville, MD.

It has been shown that the drug, sulfamethazine (SMZ) has a marked stimulatory effect on testes development in broiler chicks (Macko Walsh, K. and W. Kuenzel, Brain Res. Bull. 44:707, 1997). In past studies with cockerels, SMZ was added to a standard ration at 0.2% and fed under constant light. We wished to determine whether or not the drug acts independently of the classical photo-neuroendocrine system responsible for stimulating gonadal development when birds are exposed to long day photostimulation. Two experiments were conducted to test the interaction of SMZ with light. Each experiment utilized five photoperiodic treatments (trts), the first included trts of 8hr light (L), 16hr of dark (D) and 24hr of continuous light. In each chamber half the birds were fed either a standard diet or an SMZ diet. Blood samples were taken to measure luteinizing hormone (LH) and follicle-stimulating hormone (FSH). Testes weights were determined at the end of each study. Results showed a direct correlation between the length of light treatment and gonadal response in chicks consuming the SMZ diet in photoperiods ranging from 4 to 16hr. Maximum growth of the testes occurred in SMZ-fed birds when exposed to photoperiods of LD16:8 and LD20:4. FSH was directly related to the length of light treatment and gonadal response of SMZ-fed birds when exposed to photoperiods of LD16:8 and LD20:4. FSH was directly correlated with the length of the photoperiod in SMZ-fed birds. In conclusion, SMZ appears to act within the classical photo-neuroendocrine system of chicks. Supported by a grant from the AR Sci. and Technol. Auth. (ASTA) and the AR Agr. Exp. Sta. (AAES).

Key Words: Testes, LH, FSH, Chicken

195 The effects of hen age, strain, individual and sire hen on sperm penetration of the inner perivitelline layer and the relationship to embryonic mortality in turkeys. B. D. Fairchield1 and V. L. Christiansen2, 1University of Georgia, Athens, GA, 2North Carolina State University, Raleigh, NC.

The purpose of this study was to examine individual sire and hen effects on sperm penetration (SP) holes of the inner perivitelline layer (IPVL). Hens from two lines were assigned to individual toms from a third line for single sire inseminations on a weekly basis. Eggs from each hen were examined at an early egg production period (1 to 4 wks of production)
and a mid-production period (12-16 wk of production). The SP hole distribution indicated that 85% of hens had between 21 and 100 holes. Depending on the sire, the data exhibited differences due to hen or hen by period interactions. These results indicated that eggs from hens inseminated with semen from the same sire had significantly different numbers of IPVL SP holes. This suggests that the hen can influence sperm binding and hydrolysis of the IPVL. Hens that have an increased ability for IPVL hydrolysis were suggested from the data to increase hatchability. Furthermore, the hen by period interaction demonstrated that not all hens experienced a change in SP holes as they aged. Due to reduced numbers of eggs available from individuals, hens in the upper (HI) third of the flock were pooled and hens in the lower (LO) third of the flock were pooled, as determined by IPVL holes, to analyze SP hole relationship with embryo viability. No differences in fertility or wk 1 mortality were detected between HI and LO hens, but HI hens had higher hatchability and lower wk 4 embryonic mortality as compared to LO hens. It was concluded that hens could influence the relationship among IPVL SP holes and hatchability.  

**Key Words:** Hen Age, Sperm Penetration, Turkeys, Inner Perivitelline Layer  

196 Sire and dam effects on fertility, inner perivitelline membrane sperm binding and embryonic survival of turkeys selected for increased egg production. Fertilizing abilities of selected lines were mated to hatchmates as well as to sires and dams from their randombred controls lines in reciprocal crosses. Fertilizing abilities of each line and its reciprocal crosses with the appropriate randombred Sire and Dam, Sperm Binding, Embryonic Survival, Fertility  

197 Effect of vitamin E on fertility after artificial insemination with liquid-stored turkey spermatozoon. J. Long1, and M. Kramer, USDA Beltsville Agricultural Research Center, Beltsville, MD.  

Current methods for long-term liquid storage of turkey semen do not provide acceptable fertility rates (>96%) for the commercial industry. Turkey sperm plasma membranes contain high levels of polyunsaturated fatty acids that are susceptible to lipid peroxidation during in vitro storage at 4°C. Herein we assessed the degree of lipid peroxidation and fertility potential of semen liquid-stored for 24h with the antioxidant vitamin E (VE). Semen was collected weekly from 44 males and pooled as pairs (total = 22); paired samples exhibited similar semen quality parameters. After initial evaluation (sperm concentration, viability, mobility), pooled samples were extended with Beltsville Poultry Semen Extender containing no supplement (control), 10 µg/ml VE or 40 µg/ml VE, and then stored at 4°C with constant aeration (150 rpm orbital shaker) for 24h. Lipid peroxidation was determined by measuring malonaldehyde (MDA) in aliquots (50 x 10^6 sperm) of fresh (0h) and stored (24h) semen. Similarly, sperm mobility was evaluated using the Sperm Mobility Assay. A total of 176 hens (8 hens/tom pair: 4 hens/0h, 4 hens/24h) were inseminated (150 x 10^6 sperm/ml) weekly for 4 weeks and fertility determined after 7 days of incubation. Initial MDA values of the 22 pairs ranged from 0.92-1.36 µM. Mean MDA values for control, 10 µg VE and 40 µg VE (3.5, 3.37 and 3.62 µM, respectively) indicated that supplemental vitamin E did not reduce lipid peroxidation during liquid storage. Mean fertility rate (weeks 1-4) with 0h semen was 92.1%. Although AI with 24h semen yielded lower fertility rates (control, 29.7%; 10 µg VE, 32.4%; 40 µg VE, 41.9%), inclusion of 40 µg/ml E in the extender improved the fertility of 24h semen. In summary, vitamin E was beneficial for AI with stored semen but fertility rates still did not approximate that of fresh semen. Interestingly, vitamin E did not reduce the degree of lipid peroxidation during 24h storage at 4°C. It is clear from these results that the cellular mechanisms underlying compromised sperm function after liquid storage remain to be elucidated.  

**Key Words:** Turkey Semen, Liquid Storage, Vitamin E  

198 Transfer and accumulation of genistein, a soybean isoflavone, into the eggs of Japanese Quail (coturnix japonica). M.A. Ottinger1, J. Wu2, M.A. Abdeinabi2, M. Quinn3, and M.M. Giusti1, 1University of Maryland, College Park, MD.  

There has been increasing interest in estrogenic chemicals in the diet. The sources of these chemicals vary, including pesticide and herbicide residues as well as plant phytoestrogens. Genistein is a potent phytostrogen in soy. The purpose of this study was to determine the transfer of genistein and other isoflavones into the eggs of Japanese quail. Japanese quail (Coturnix japonica) were given capsules containing 50 mg genistein for 4 consecutive days. An equal number of quails receiving placebo capsules constituted the control group. Eggs were collected daily for 10 days, starting on day zero. In a preliminary study, genistein was found only in the egg yolk, not in the egg white. Egg yolks were separated, mixed with water and genistein was extracted by adding methanol to a final ratio of 1:4 (egg:water:methanol). After 2 hr methanol, the mixture was centrifuged and the methanol was removed by using a rotary evaporator. Extracts were taken to 5 mL with 80% methanol and analyzed by HPLC, using a C18 column and a photodiode array detector. Results showed that genistein transferred into the yolks, at concentrations ranging from 0.034 - 0.115 ppm. Levels of genistein increased to highest levels on day 5, and gradually declined. Because highest levels were detected between HI and LO hens, but HI hens had higher hatchability, no differences in fertility or wk 1 mortality were pooled, as determined by IPVL holes, to analyze SP hole relationship with embryo viability. No differences in fertility or wk 1 mortality were detected between HI and LO hens, but HI hens had higher hatchability and lower wk 4 embryonic mortality as compared to LO hens. It was concluded that hens could influence the relationship among IPVL SP holes and hatchability.  

**Key Words:** Sire, Dam, Sperm Binding, Embryonic Survival, Fertility  

199 Role of transport coop fecal contamination in the transfer of Campylobacter to carcasses of previously negative broilers. M. E. Barrang1, J. K. Northcutt3, D. L. Fletcher1, and N. A. Cox1, 1USDA-ARS-Russell Research Center, 2University of Ga., Poultry Sci. Dept..  

In commercial operations, broiler live haul transport coops are routinely sent out to be refilled as soon as they are emptied. This study was undertaken to assess the potential for broiler carcass contamination with Campylobacter due to exposure of the live bird to a contaminated transport coop. Broilers were obtained from commercial grow-out houses that had been previously identified as either Campylobacter positive or negative by culturing feces. After four hours off feed, broilers from a Campylobacter positive house were placed at commercial density into three openings of a new un-used transport coop. These positive broilers remained in the transport coop for an additional 8 hours. When broilers